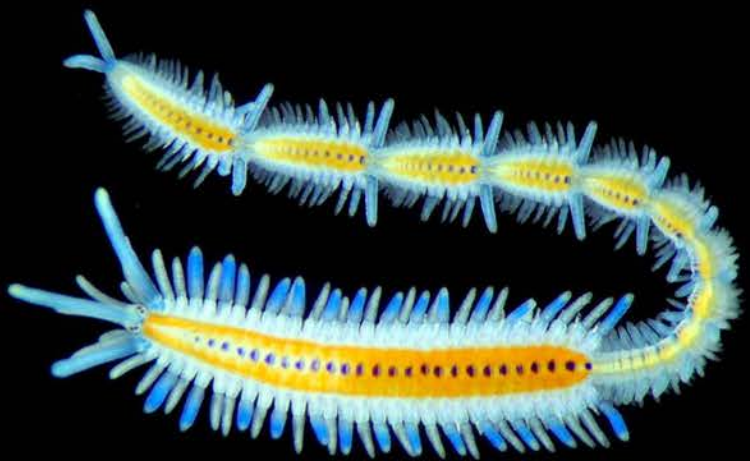


11th International Polychaete Conference

Australian Museum
4-9 August 2013



international polychaete
conference · sydney 2013



A workshop for invited polychaete taxonomists is being held after the conference at the Australian Museum's Lizard Island Research Station (photos inside front and back cover), thanks to support from the Lizard Island Reef Research Foundation



2013 INTERNATIONAL POLYCHAETE CONFERENCE

IPC2013

PROGRAM AND ABSTRACT HANDBOOK



4 - 9 August 2013

Australian Museum

Sydney, New South Wales

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***Loimia* on Contents page:** Gary Cranitch

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Senior Principal Research Scientist
Science and Learning - Marine Invertebrates
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Sydney NSW 2010 Australia

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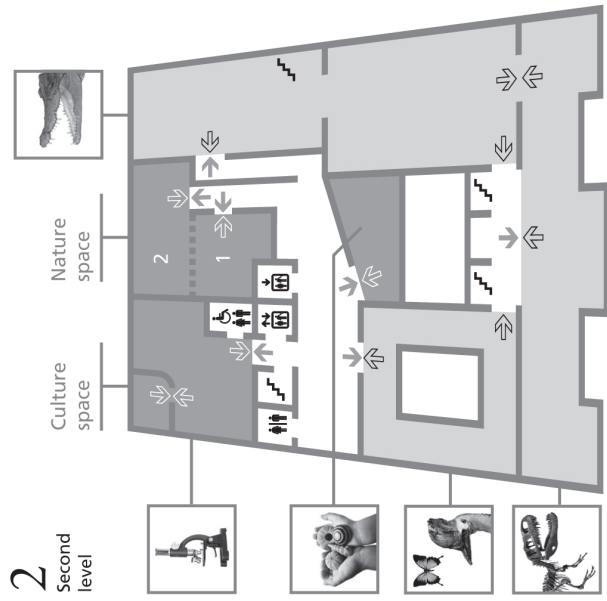
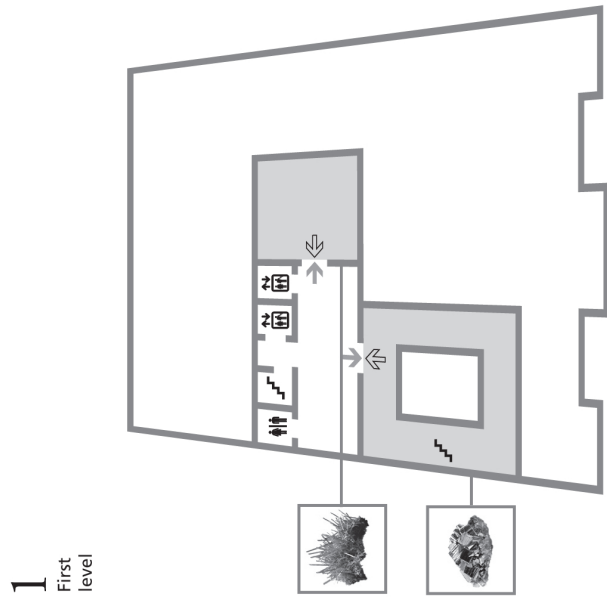
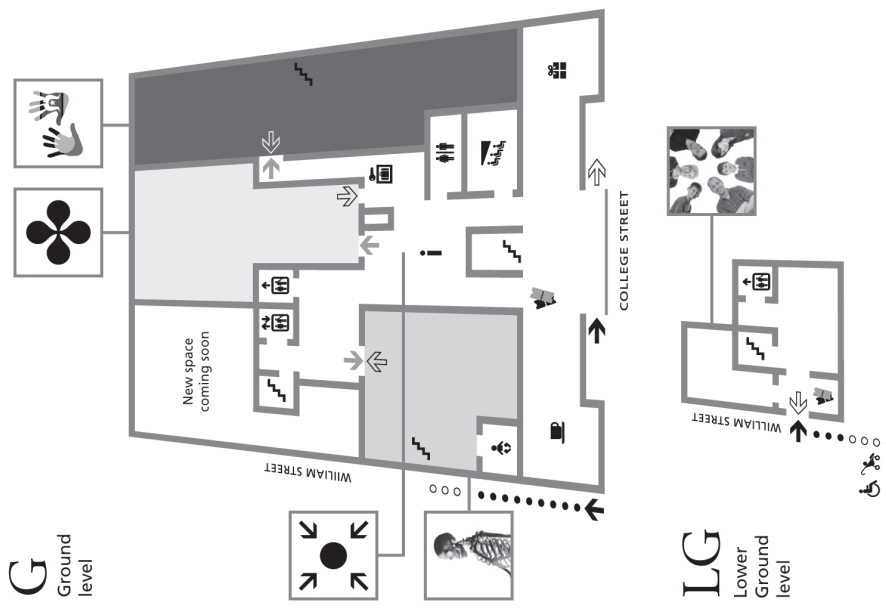
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AUSTRALIAN MUSEUM MAP



Exhibition Galleries



Skeletons
Australians



Indigenous
Australians



Planet of
Minerals



Chapman
Mineral
Collection



Dinosaurs



Birds &
Insects



Surviving
Australia

General Museum Areas



Atrium



Kidspace



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Discover



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Exhibitions G



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nature culture discover



WELCOME FROM IPC2013 COMMITTEE CHAIR

Dear Fellow Polychaetologists,

First of all I would like to welcome you to Sydney for the 11th International Polychaete Conference, for some it represents a return to Sydney after 30 years but for others it will be your first visit to Sydney and to the Australian Museum.

Way back in 1981/82 after having attended the Crustacean, Mollusc and Echinoderm conferences being held at the Australian Museum, I began to think of hosting a polychaete conference. At that stage we had never had such a meeting. I visited the Smithsonian Institute in Washington and the Natural History Museum in London, and I obtained the promise from both Meredith Jones and David George that if the meeting went ahead they would come. I thought they would be excellent drawcards. So back in Sydney I started planning the meeting with Sebastian Rainer and about 95 people from about 15 countries came downunder. I relied upon my friends to help me with the welcome picnic in the Botanical Gardens on the Sunday and museum volunteers prepared all the lunches and morning and afternoon teas. We even had a field trip to Lizard directly after the meeting. This was all done before the advent of the internet and letters were written and people paid with cheques, we even organised the accommodation- how much has changed!.

Little did I know then that this conference would become a tradition with one being held every three years in Denmark (1986), USA (1989), France (1992), China (1995), Brazil (1998), Iceland (2001), Spain (2004), USA (2007) and Italy (2010).

Before the meeting in Lecce in 2010, I had this mad idea about hosting another meeting in Sydney. I talked to Brian Lässig the Assistant Director then of Research and Collections and he was enthusiastic and promised to support the bid. I wanted to highlight the polychaete research being undertaken at the AM and our extensive databased collections. I talked to all of the other Australian polychaete workers and with some trepidation they said they would support such a bid. In Lecce once word was out, all other bids miraculously disappeared and Sydney won the bid- although really there was no competition.

On my return to Sydney, reality hit!! I established the organising committee and Brian provided funds to set up the website. Only gradually did I realise what we had committed ourselves to undertake.

At the same the GFC was progressing well and people said Sydney will be too expensive nobody will come, but I thought surely Sydney has a charisma, people will want to come. So we set about trying to raise sponsorship - not easy selling worms, but with the help of my colleagues, especially Elena Kupriyanova, we have been able to raise funds and we thought of slightly obtuse ways of supporting colleagues to come to Sydney. This has involved raising funds to develop a digital app for identifying invasive species, to running a pest workshop and hosting a systematics course. Another way was to lure people to Lizard for a two week trip with all meals supplied and cooked by a wonderful chef with all expenses paid in return for a taxonomic paper. We found funds for plenary speakers and support for students and early career researchers especially from developing countries and the Indo -Pacific. Again my friends have come to the rescue and will be doing the catering for the mid week excursion.

So it is great that so many of you have come *down under* and in some case have brought partners or family. Also many of you are taking the opportunity to look our collections. Steve and his team are really working hard to accommodate you all and we hope we will see lots of new Australian species being described. We have more than twice the number of oral presentations than in 1983 and many more posters.

So I have promised to my committee – that this will be my LAST conference which I will organise, in future I shall just participate (Robin, I promise!).

I would like to thank all the organising committee, not only for their hard work before the conference, but also for what they will be doing during the meeting to ensure you all have a great time. I would also like to thank many other people in the Museum for making this conference happen - the Web Team (or what was the webteam!) for their great help in developing the digital App, Design for putting up the photographic exhibition in the Coffee Shop and organising postcards for sale, developing the logo, the Prep Shop for help in organising the poster hanging and front of house for all the logistic support as well as the now dismantled Photography Dept for scanning many of those old slides which have been incorporated into the slide show. With much of this being done during a restructure!!

So all that remains is for me to wish you a happy and successful conference and to enjoy yourselves and we look forward to publishing your papers in the *Memoirs of the Museum of Victoria*. Without you all coming to Sydney, we would not be able to host this meeting - so let the conference begin!

Pat Hutchings

Chair of the Organising Committee

July 22nd 2013

GENERAL CONFERENCE INFORMATION

SUNDAY 4TH TO FRIDAY 9TH AUGUST, AUSTRALIAN MUSEUM

REGISTRATION - ATRIUM

ALL PRESENTATIONS WILL BE HELD IN THE MUSEUM THEATRETTE

CONFERENCE SECRETARIAT - REGISTRATION

The Conference Secretariat will be located in the Atrium of the Australian Museum and will be staffed from 1500 - 1730 on Sunday 4th August and 0800 - 1730 Monday, Tuesday, Thursday and Friday.

CONFERENCE STRUCTURE (TIMETABLE, ORAL AND POSTER PRESENTATIONS)

For presentation details, refer to the Timetable pages (printed on purple paper)

CATERING

All catering will be in the Atrium for Morning and Afternoon Teas. Lunch will be in the Rooftop Terrace on Level 4.

Special Dietary Requirements as requested on the registration form will be catered for separately unless a suitable selection is available with the general catering.

PRESENTERS - SPEAKER PREPARATION AND UPLOADS

All presentations are to be loaded onto theatre computers in advance - you cannot use your own laptop unless by special arrangement with the Speaker's Prep staff. A technician will be available each morning and during breaks to assist you in loading your presentation onto the computers. Please ensure that you take your CD / USB to the Theatre to be loaded well before your session to enable you to check it during a break prior to your presentation. Please endeavour to have your talk uploaded the day before your presentation.

NAME BADGES

Delegates are requested to wear their name badge at all times during the conference. This badge is also your ticket to included functions.

CONFERENCE DRESS CODE

Dress for the conference is business-casual comfortable clothing. Ties and jackets are not necessary. Dress for the Gala Dinner on Thursday 11 July is smart casual.

MESSAGES

Please check the notice board by the Conference Secretariat regularly for messages.

During conference hours: Secretariat Telephone is: 0400 358 302

PUBLIC TRANSPORT, TAXIS, ATM AND BANKING

Please check with the Museum Reception.

IPC2013 Conference Organising Committee

Dr Pat Hutchings - Australian Museum (Chair)

Ms Lynda Avery - Associate of Museum of Victoria

Dr Maria Capa - Museum of Natural History and Archaeology, Trondheim, Norway

Dr Chris Glasby - Museum & Art Gallery of Northern Territory

Dr Elena Kupriyanova - Australian Museum

Ms Anna Murray - Australian Museum

Dr Hannelore Paxton - Macquarie University

Ms Charlotte Watson - Museum & Art Gallery of Northern Territory

Ms Lexie Walker - University of Queensland/Australian Museum

Dr Robin Wilson - Museum of Victoria

CONFERENCE SOCIAL FUNCTIONS

The Welcome, Poster and Dinner Functions are Included with all full registrations. Extra tickets are available for purchase for guests and with single day registrations from the Conference Secretariat.

MONDAY - ICEBREAKER - 1800-2000 - Rooftop Terrace on Level 4

An Icebreaker will be held on Monday 5th August, 1800 - 2000 hrs in the Rooftop Terrace on Level 4 of the Australian Museum.

The Icebreaker will be opened by Ms Katharine Livingstone, President of the Australian Museum, followed by a brief welcome by the Director of the Australian Museum Mr Frank Howarth. We will also be acknowledging some of our sponsors who will be in the audience, including Dr Ian Cresswell from CSIRO Oceans National Research Flagship and Michael Preece from ABRS.

TUESDAY - POSTER COCKTAIL SESSION - 1800-2000 - Rooftop Terrace on Level 4

This two-hour Poster Session, during which canapés and drinks will be served, is designed to give poster presenters the opportunity to discuss their work with conference participants. Authors stand with their posters for discussions.

Matt Edmunds of *Australian Marine Ecology* has generously supported prizes for best student posters - these will be judged during the Poster Session.



WEDNESDAY - EXCURSION TO ROYAL NATIONAL PARK

A ticket is required for this activity, and is included in your Name Badge pocket, along with guest tickets, if ordered. Extra tickets (if available) can be purchased from the Registration Desk.

THURSDAY (OPTIONAL FUNCTION) - MEMBERS NIGHT - 1800 - 2000

Into the Worm Hole: a beginner's guide to practical polychaetology...

The friends of the Museum are hosting a members night on the 8th August, where a Q&A session will be hosted by Dr Richard Smith, with the panel of Jim Gehling, Damhnait McHugh and Pat Hutchings. This meeting will be held in the Australian Museum Atrium and there will be a limited number of tickets available to conference delegates at no cost, but on a first come first serve basis. The exact number of tickets available will be known at the time of registration.

Full details can be found on the web site at: <http://australianmuseum.net.au/event/science-show-worm>

FRIDAY - GALA CONFERENCE DINNER, SERGEANT'S MESS, CHOWDER BAY 1830 - 2330

Transport to and from the venue is via the *Royale*, a Rossman Ferry, departing from Commissioner's Steps (pickup 5:30pm for 5:45pm departure) to Chowder Bay.

Please be on time for the ferry departure - if you miss it, a taxi, at an approximate cost of \$60, is the only way to get to the venue in time.

Prizes for student posters, supported by Matt Edmunds, of *Australian Marine Ecology*, will also be presented.

Royale ferry will depart at 11:45 for arrival by 12:30am at Commissioner's Steps.

The Sergeant's Mess is one of the most exclusive function venues in Sydney and has been especially selected to celebrate the grand finale of the 11th International Polychaete Conference. *Baker Boys*, a popular Sydney band, will provide the music for the evening.

We assure you of a wonderful evening and one by which you will remember Sydney!

Polychaete Poster Exhibition - Australian Museum

As part of the celebration of the 11th International Polychaete Conference the Australian Museum is hosting a polychaete poster exhibition in the coffee shop from the 29th July until early October 2013 and it will then travel.

This exhibition demonstrates the beauty, diversity of polychaetes and illustrates their feeding diversity, plus one explaining the rationale for the Australian Museum hosting the 11th International Polychaete Conference.

These 11 images were selected from numerous images offered by well known photographers, and we selected images by Michael Aw, Gary Cranitch, Greg Rouse, Alexander Semenov and Roger Steene, and we would like to thank all these people for allowing us to reproduce these gorgeous images at no cost. A brief description is given for each poster and additional information is available on scanning the QR codes.

Three of these images have been used to produce the *worm* postcards for sale in the Australian Museum book shop.

INVITED KEYNOTE SPEAKERS

With financial aid from the Ian Potter Foundation we have been able to support three internationally recognised polychaete workers to give us comprehensive overviews of current developments in their fields.

We chose three plenary speakers at different stages in their careers, as well as from differing parts of the world. Another criterion was to ensure that we invited people who had been to previous meetings and understood the philosophy of the conference. This conference is somewhat unusual in that there are no concurrent sessions and therefore this represents a wonderful opportunity for people to attend talks on topics they probably would never normally listen to. Therefore we selected our plenary speakers based on their ability to introduce their topics and present their data in manageable bites. Our first and fourth plenary talks are on the roles of molecular and morphological studies in helping to elucidate the phylogeny of Annelids. The second plenary talk is on reproduction, metamorphosis and settlement of encrusting species such as ‘hull-foulers’, which are transported around the world as invasive species, and which can have major economic impacts. Pei-Yuan’s target species *Hydroides elegans* may be such a species as, although it was originally described from Sydney in 1883, it now occurs in many international ports, and there is some doubt as to whether it is native to Australia or is in fact introduced to Australia.

We have introduced a different plenary topic this year –*Birds Eye View*, to be given by Jim Gehling of the South Australian Museum, entitled “When the worm turned: the quest for Ediacaran bilaterians”, to really encourage people to think about the origins of our group – and to encourage thinking outside one’s comfort zone!

Pat Hutchings, Chair, Conference Organising Committee

PROFESSOR DAMHNAIT MCHUGH

Phylogeny of polychaetes Monday 8:50 - 9:20 am



Damhnait McHugh is Professor of Biology and Director of the Picker Interdisciplinary Science Institute at Colgate University in Hamilton, New York. McHugh studies the ecology and evolution of marine invertebrates, particularly polychaete annelids. Her research on phylogenetic reconstruction of annelid evolutionary history using molecular data is funded by the National Science Foundation, and has been widely published. She has served on the editorial boards of *Evolution*, *Molecular Phylogenetics and Evolution*, and the *Journal of the Marine Biological Association*, UK. She has held the G. Kirk Raab Chair in Biology, was an Assistant Professor and Curator at Harvard University, and was awarded an NSF/Sloan Postdoctoral Fellowship in Molecular Evolution at Cornell University. McHugh received a B.Sc. in Zoology from University College Galway (Ireland), a M.Sc. in Biology from the University of Victoria (Canada), and a Ph.D. in Biology from the University of California, Santa Cruz (USA).

Our current understanding of annelid evolutionary relationships

Understanding the early diversification of Annelida presents major challenges for evolutionary biologists. Over 15 years ago, efforts to construct a molecular phylogeny of this ancient, diverse, and ecologically important group based on a short gene fragment for 20 taxa led to the hypothesis that clitellates, siboglinids, and echiurids are derived annelids, rendering “Polychaeta” paraphyletic. Subsequent studies based on much increased gene sequence data and expanded taxon sampling show support for an echiurid-capitellid sister grouping, and Siboglinidae nested within Annelida, as well as monophyly of many traditional families. This is the case for our most recent analyses of three nuclear coding genes for ~ 100 annelids and over a dozen outgroups. As with other molecular analyses, however, placement of myzostomids and sipunculids remains poorly supported on our trees, although SOWH tests do not reject hypotheses of their inclusion in Annelida. Annelid researchers are now applying the next generation of molecular tools to better estimate annelid phylogeny; high-throughput sequencing is underway, and micro-RNA families are being surveyed. The first phylogenomic analyses (34 annelids, ~ 50k amino acids) support the traditional split between Errantia and Sedentaria, and basal positions for myzostomids, sipunculids and chaetopterids. On the other hand, parsimony analysis of presence/absence data from early micro-RNAs surveys with very limited taxon sampling supports myzostomids as derived annelids, and Sipuncula as sister to Annelida. Phylogenomic approaches provide access to enormous amounts of data, but they can suffer from problems associated with missing data, taxon choice, and gene function, etc.; microRNA profiling suffers from its own pitfalls. I will discuss the need for corroboration among data sets with much expanded taxon sampling before well-founded assertions regarding basal annelid taxa, reconstructions of ancestral conditions, and placement of Annelida among other lophotrochozoans can be made.

KEYNOTE SPEAKERS

PROFESSOR PEI-YUAN QIAN

Development: Tuesday 8:40 - 9:10 am



Pei-Yuan Qian is currently the Chair and Professor in the Division of Life Science and Director of Environmental Science Programs at the Hong Kong University of Science and Technology. He studies reproductive ecology and larval attachment/metamorphosis of marine invertebrates, with polychaetes as his favourite animals. His recent work pioneered larval genomic research of marine invertebrates and he and his team have discovered a number of genes, proteins and pathways involved in larval attachment and metamorphosis. He has published over 280 SCI papers and delivered over 40 plenary/keynote talks and over 230 oral presentations in international conferences and. He serves as editor or editorial board members of many national and international journals and holds adjunct professorship in 10 top Chinese marine institutions. He is also one of world leaders in biofouling/antifouling research and his group has also discovered many non-toxic antifouling compounds and holds a number of USA and China Patents.

Molecular mechanisms of larval attachment and metamorphosis of *Hydroides elegans*

The polychaete *Hydroides elegans* (Serpulidae, Lophotrochozoa) is a problematic marine fouling organism in tropical and subtropical coastal environment. Competent larvae of *H. elegans* undergo the transition from the swimming larval stage to the sessile juvenile stage with substantial morphological, physiological, and behavioral changes. This transition is a critical process of controlling population dynamics in this species. In the recent years, we have studied molecular mechanism of larval attachment and metamorphosis of *H. elegans*. At the genomic level, we successfully identified 21 genes that were more highly expressed (up-regulated) in competent larvae than in pre-competent larvae, indicating those genes are very important for larvae to attain their competency. We also identified 218 genes that showed different expression levels between competent larvae and metamorphosing juvenile, indicating their possible involvement in larval attachment and metamorphosis. After mapping those differentially expressed genes to their relevant signal transduction pathways, we then selected some of those genes, such as p38 MAPK and calmodulin, and further confirmed their expression patterns in different larval stages using real-time PCR, located their expression sites in whole-mounted larvae using *in situ* hybridization, and revealed their putative roles in the process of attachment and metamorphosis using gene-specific inhibitor bioassay. We concluded that both P38 MAPK and calmodulin related signal transduction pathways likely regulate larval attachment and metamorphosis of *H. elegans*. Since transcriptome contains the set of all the RNA molecules, including mRNA, rRNA, tRNA and other non-coding RNA produced in an organism, and reflects the genes that are being actively expressed, at any given time, we examined global transcripts expression levels (transcriptome profiling) of pre-competent larvae, competent larvae, and adults using the most advanced 454 pyrosequencing platform. We predicted 136,490 open reading frames (ORFs, useful for gene prediction), of which 38,259 were matched to known genes, whereas other 98,231 ORFs had no matches in database. Bioinformatic analysis of transcriptomic database revealed many genes and pathways (including p38 MAPK and calmodulin pathways) that were differentially expressed between competent larval and metamorphosing juvenile, suggested their important roles in larval attachment and metamorphosis. Furthermore, since biological functions are often executed through protein expression rather than gene or transcript expression, we studied larval settlement and metamorphosis at the proteomic level (large scale study of proteins, particularly their structure and function), using both the 2D gel-based and gel-free proteomic techniques. We successfully identified many differentially expressed proteins and phosphoproteins at different larval stages. We concluded that the proteins responsible for energy metabolisms and stress responses as well as enzymes involved in TCA cycle and cytoskeleton processes played very important roles in larval attachment and metamorphosis of *H. elegans*. Overall, our results showed that 1) larval attachment and metamorphosis required up- or down-regulation (that is, increase or decrease in expression) of different sets of genes, transcripts, and proteins in *H. elegans*; 2) p38 MAPK and calmodulin genes and their relevant pathways played very important roles in larval attachment and metamorphosis of *H. elegans*; and 3) TCA cycle, and cytoskeleton were important for attaining larval competency while energy-metabolism and stress-response related proteins were important for larval attachment and metamorphosis. In conclusion, identification of differentially expressed genes, transcripts, and proteins and transduction pathways in pre-competent, competent larvae, and newly settled juveniles, allowed us to reveal the genes, proteins and pathways that regulate specifically larval development (attaining competency), attachment, and metamorphosis of *H. elegans*. These genes and proteins can serve as the specific molecular targets for screening non-toxic antifouling compounds, which can aid the development of environmentally friendly antifouling coatings.

KEYNOTE SPEAKERS

DR JIM GEHLING

Bird's Eye View Plenary: Thursday 8:35-9:05 am



Dr Jim Gehling will give a keynote address summarising recent discoveries and research findings into the question of which, if any, ancestors of modern protostomes might be represented among the Ediacara fossil fauna of the Flinders Ranges, South Australia. Jim, from the South Australian Museum, Adelaide, is an authority on the fossils of the Ediacara assemblage and co-author of 'The Rise of Animals: evolution and diversification of the Kingdom Animalia'.

When the worm turned: the quest for Ediacaran bilaterians

Ediacara fossils preserved as impressions in sandstone were discovered in the Flinders Ranges of South Australia in 1946. Martin Glaessner interpreted the iconic forms *Spriggina* and *Dickinsonia* as polychaetes on the basis of superficial resemblances to *Tomopteris* and *Spinther*. Rather than relying on comparative morphology, Adolf Seilacher first used bau plan similarities to argue that the Ediacara biota, with few exceptions, represented a

lost kingdom. The Ediacara biota is often dismissed as a "failed experiment" that ended at the Ediacaran-Cambrian boundary, dated at 542 Ma. The "Cambrian explosion" of animals is documented on several continents by arrays of Burgess Shale-type fossil assemblages of stem and crown group metazoan phyla. Recently constructed molecular phylogenies of diverse metazoans, scaled to recognize first appearances in the fossil record of crown group phyla, put the split between sponge clades, cnidarians and bilaterians as back in the Cryogenian (635 - 780 Ma), and the divergence of ecdysozoans, lophotrochozoans and deuterostomes as spanning the Ediacaran-Cambrian transition. The predictions of these revised molecular trees have prompted a re-examination of diminutive Ediacara body fossils, such as *Spriggina* and *Parvancorina*. Serial sets of tracks and feeding traces, associated with *Dickinsonia* and *Kimberella*, represent the best evidence that bilaterians were part of the Ediacara biota. In the gap between Ediacaran and Cambrian-style fossil windows (circa. 540 - 525 Ma), less noticed but increasingly complex trace fossils and small shelly fossils, represent the existence of some Ediacaran survivors, and the evolution of ecological innovations. The rise of mineralized skeletal elements, deep burrowing, sediment processing and predation put an end to Ediacaran-style ecology and preservation. The result was a 10-15 million year interval during which most crown group phyla, including the annelids, evolved.

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KEYNOTE SPEAKERS

PROFESSOR GÜNTER PURSCHKE

Systematics, Evolution and Phylogeny of Annelida

Friday 8.35-9.05



Dr Günter Purschke, is Professor at the group of Zoology and Developmental Biology (group leader Professor A. Paululat) at the University of Osnabrueck, Germany. He is working on the morphology, systematics, phylogeny and evolution of Annelida and related taxa. The phylogenetic relationship among Annelida still is one of the largest unresolved problems in metazoan systematics. Central problems concern the monophyly of annelids and polychaetes, the organization of the annelid (polychaete) stem species and the interrelationships between the different annelid taxa. Given their great diversity and phylogenetic age Annelida are also excellent candidates to study more general questions of evolution and phylogeny. For instance, basal metazoans possess only 4 cell types whereas vertebrates account for more than 400. How did such diversity evolve without corresponding multiplications in the genome and what is the basis for metazoan diversity? Gunter uses conventional light microscopic techniques confocal laser scanning microscopy, transmission and scanning electron microscopy, comparative gene expression studies as well as other molecular methods to help him answer these questions. Currently the evolution and diversity of photoreceptor cells and eyes, the central

nervous system and body wall musculature are his main areas of research interest. Günter is author or co-author of several German textbooks in invertebrate zoology (e.g., Westheide/Rieger (2007) *Spezielle Zoologie*, Spektrum, Heidelberg) and co-editor of the Annelid volume in the *Handbook of Zoology* (DeGruyter, Berlin).

Systematics, Evolution and Phylogeny of Annelida – a morphological perspective

Annelida, traditionally divided into Polychaeta and Clitellata, is an ancient and ecologically important group usually considered to be monophyletic. However, there is a long debate regarding the in-group relationships as well as the direction of evolutionary changes. This debate is correlated to the extraordinary biodiversity and evolutionary diversification of the group. Although annelids may generally be characterized as organisms with multiple repetitions of identically organized segments and certain other characters such as a collagenous cuticle, chitin chaetae or nuchal organs, none of these is present in every subgroup. This is even true for the annelid key character, segmentation. The first morphology-based cladistic analyses of polychaetes were not published until 1997 (Rouse and Fauchald, *Zool Scr.* 26: 139) showing Polychaeta and Clitellata as sister groups. The former were divided into Scolecida and Palpata comprising Aciculata and Canalpalpata. This systematization definitely replaced the old concept of dividing polychaetes into Errantia and Sedentaria, whereas the group Archiannelida was already abandoned earlier. Irrespective the fact, that Aciculata and Errantia comprise the same subtaxa, main critics came from a contradicting hypothesis relying on scenario based plausibility considerations regarding Clitellata as highly derived annelids forming a polychaete in-group and rendering the latter paraphyletic. In this hypothesis the absence of typical polychaete characters was regarded as losses rather than as primary absences, although thus far attempts failed to unambiguously identify the sister group of Clitellata. Thus, two hypotheses on the last common ancestor have been put forward either seeing an oligochaete-like burrowing animal or a parapodia-bearing epibenthic worm as stem species. These attempts are reviewed and discussed in the light of new morphological evidence such as photoreceptor cell and eye evolution as well as evolution of the nervous system and musculature. Moreover, reliability with recent progress in molecular phylogenetic analyses is also considered.

We acknowledge and thank the Ian Potter Foundation for providing sponsorship to support our international Keynote Speakers



THANK YOU TO OUR SPONSORS



Australian Museum

Funding from the Australian Museum allowed us to support nine students to attend the meeting and the committee gave preference to those from developing countries.



Australian Museum Foundation

The Australian Museum Foundation exists solely to support the important scientific research and educational and cultural programs at the Australian Museum. In the past six years the Foundation has provided more than \$1.5 million in grants for the Museum to undertake groundbreaking research projects, to acquire cultural and scientific objects for its collections, to mount scientific expeditions and to develop and implement innovative education programs.

The Australian Museum Foundation gave Elena Kupriyanova and Pat Hutchings funds to develop the Digital App for Invasive marine worms which is being launched during the Pest Workshop being held at the Australian Museum on the 1 and 2nd August and will be available for purchase subsequently.

Fisheries Research and Development Corporation (FRDC)

FRDC provided financial support for those researchers presenting at the Pest Workshop prior to the Conference. They were keen to support the training of personal in the correct identification of invasive marine worms and how to distinguish these from native species.



FRDC
FISHERIES RESEARCH & DEVELOPMENT CORPORATION

Publication of Proceedings of the 11th International Polychaete Conference, Sydney 2013

The proceedings of the Conference will be published in the *Memoirs of Museum of Victoria* and will be available to participants as free access. Hard copies will be available but must be paid for at time of manuscript acceptance (cost to be advised). Recent issues of the Memoirs of Museum of Victoria are available on the Memoirs website and instructions to authors are provided in the front section of the most recent volume.

<http://museumvictoria.com.au/about/books-and-journals/journals/memoirs-of-museum-victoria/>

Final date for submission of papers from oral presentations and posters will be the 30th September 2013, and all papers will be peer reviewed.



Editorial Committee (Proceedings)

Dr Richard Marchant- Editor of Memoirs of Museum of Victoria
Dr Chris Glasby - Museum & Art Gallery of Northern Territory
Dr Pat Hutchings - Australian Museum
Dr Elena Kupriyanova - Australian Museum
Dr Robin Wilson - Museum of Victoria

SPONSORS

ABRS provided sponsorship for the Philosophy of Systematics Course which is being held from the 29th July to the 2nd August at the Australian Museum, being given by Dr Kirk Fitzhugh of the Los Angeles County Museum, as well as support for publishing the proceedings in the *Memoirs of the Museum of Victoria*.



Australian Biological Resources Study

The Australian Biological Resources Study (ABRS)

In 1973, the Australian Government established the Australian Biological Resources Study (ABRS) to coordinate research in taxonomy and document the flora and fauna of Australia.

Forty years later, the ABRS continues to pursue these objectives as a program within the Parks Australia Division of the Australian Government Department of Sustainability, Environment, Water, Population and Communities.

ABRS is the Australian Government focal point for species discovery, taxonomy and biological collections. Through its active support of taxonomic and systematics research on Australia's biodiversity, ABRS is a recognised world leader in making taxonomy information widely available. The ABRS pursues its aims and objectives through the National Taxonomy Research Grant Program (grants and training schemes that fund taxonomic and related research), through strategic partnerships with industry and non-government organisations, and through ABRS publications and identification tools.

Since it was established, the ABRS has provided more than \$40 million in funding through the National Taxonomy Research Grant Program and other initiatives to support taxonomic research on Australia's biodiversity and to build taxonomic capacity. <http://www.environment.gov.au/biodiversity/abrs/index.html>

The Australian Faunal Directory

A premier initiative of ABRS, the Australian Faunal Directory (AFD) is a freely available online catalogue of taxonomic, distributional and biological information on terrestrial and aquatic Australian animals. Data for around 117,000 species is currently available.

Visit <http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/afd/home>

AFD and Polychaeta

The Australian polychaete fauna currently listed in AFD includes 1371 validly described species in 434 genera and 56 families. Where possible, together with names (valid, synonyms, generic combinations, common), nomenclatural and biological information is provided along with images and drawings to illustrate the wonderfully diverse Australian polychaete fauna.

Species lists and bibliographies can be generated and downloaded from AFD, and statistics can be compiled for included taxa.

Lizard Island Reef Research Foundation

Funding for the 2013 polychaete taxonomic workshop at Lizard Island being held directly after the conference has been proudly provided by LIRRF.

(Further information; Inside back cover)



CSIRO

Funding from CSIRO Wealth from Oceans National Research Flagship also allowed us to sponsor six students or early career researchers to participate in the conference and some of the preconference workshops.

SPONSORS



CSIRO's marine research – delivered through the Wealth from Oceans National Research Flagship and by the Marine and Atmospheric Research Division – focuses on understanding our oceans and their biodiversity, resources and relationships with the climate system.

The Flagship delivers practical science that enables governments, industries and communities to make informed decisions about the sustainable management of ocean and coastal resources. The Flagship contributes to national and international challenges where oceans play a central role, taking a whole-of-system approach to marine science.

CSIRO Marine and Atmospheric (CMAR) has more than 550 staff, plus another 250 students, visiting scientists, and associates working in: Aspendale, Victoria; Canberra, ACT; Brisbane and Bribie Island, Queensland; Floreat, WA; and the Divisional headquarters in Hobart, Tasmania. CMAR is home to the Marine National Facility Research Vessel, *Southern Surveyor*, which will be replaced in 2013 with the purpose built, state-of-the-art, 94-metre RV *Investigator*. CMAR houses collections of national significance, including the Australian National Fish Collection and Australian National Algae Culture Collection.

www.csiro.au/oceans



PROGRAM EXPLANATION AND TIMETABLE - SUNDAY

OVERALL CONFERENCE TIMETABLE AND PROGRAM EXPLANATION

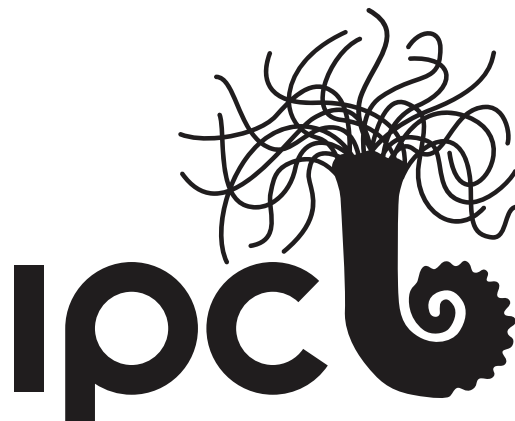
Please refer to the Table of Contents on page 3 for the sections listed below.

The Daily Timetables , giving details of rooms, sessions and speakers, from Monday 5th to Friday 9th are on the coloured pages.

Posters are numbered within topic Sections alphabetically by first author last name. Posters will be on display for the conference week in numerical order in the Rooftop Terrace (Level 4). Authors will be by their posters during the Poster Cocktail Session on Tuesday evening to discuss their work and answer questions.

Abstracts follow after the Timetables, in alphabetical order by the last name of the first author. The presenting author is marked with an asterisk. For oral presentations, there is also a second entry under the presenter's last name if the first author is not the presenter. Poster abstracts are marked with [Poster] at the end of the title.

The Delegate List follows the Abstracts.



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Sunday Timetable - 4th August

	 <p style="text-align: center;">AUSTRALIAN MUSEUM</p> 
3:00–5:30	REGISTRATION, PRESENTATION UPLOAD AND POSTER PREPARATION (ENTER VIA WILLIAM STREET ENTRANCE)
	OWN ARRANGEMENTS FOR THE EVENING (A LIST OF LOCAL RESTAURANTS IS INCLUDED IN YOUR DELEGATE SACHEL)

INFORMATION DISCLAIMER

The speakers, topics and times are correct at the time of publishing. In the event of unforeseen circumstances, the organisers reserve the right to alter or delete items from the Conference Program.

TIMETABLE - MONDAY

Monday Timetable - 5th August

Monday	<i>Australian Museum Theatrette (access via William Street)</i>
8.00-8.30	REGISTRATION AND POSTER HANGING
8.30-8.45	Welcome by Dr Brian Lassig , Assistant Director, Science & Learning, Australian Museum
Monday	Session: Phylogeny of Polychaetes Chair: Pat Hutchings
8.50-9.20 Keynote	Keynote Presentation Our current understanding of annelid evolutionary relationships McHugh, Damhnait
Monday	CONTRIBUTED PAPERS
9.20-9.35	Evolution of Siboglinid annelids and their symbiotic relationships revealed by transcriptome data. Halanych, Kenneth M , Damien S. Waits, Li Yuanning, Daniel J. Thornhill and Scott R. Santos
9.35-9.50	Mitochondrial genomes to the rescue? – Phylogeny of interstitial annelid taxa. Golombek, Anja , Günter Purschke and Torsten H. Struck
9.50-10.30	MORNING TEA (ATRIUM)
Monday	Session: Phylogeny of Polychaetes Chair: Dieter Fiege
10.30-10.45	Phylogenomic analyses illuminate the base of the annelid tree Weigert, Anne , Conrad Helm, Matthias Meyer, Birgit Nickel, Günter Purschke, Kenneth M Halanych, Scott Santos, Detlev Arendt, Torsten H Struck and Christoph Bleidorn
10.45-11.00	Molecular phylogenetics of Annelida based on a supermatrix analysis of publicly available sequence data: a baseline study for the WormNet II Project Williams, Bronwyn W. and Frank E. Anderson
11.00-11.15	Genomic signatures of divergent selection and adaptive evolution in <i>Hediste diversicolor</i> Hall, Emmi and Alastair Grant
11.15-11.30	Phylogeography of the Christmas Tree worm <i>Spirobranchus corniculatus</i> (Annelida, Serpulidae) from the Coral Triangle, Australia, and Fiji. Iñiguez, Abril , Craig J. Starger, Elena K. Kupriyanova, Demian Willette, Tristan Varman, Joshua A. Drew, Abdul Hamid Toha, Benedict Maralit, Kent E. Carpenter and Paul H. Barber
11.30-11.45	Extremely rapid mineralisation of <i>Alvinella</i> tubes at hydrothermal vents: implications for polychaete evolutionary history Georgieva, Magdalena N. , Crispin T.S. Little and Adrian G. Glover
11.45-1.30	LUNCH (ROOFTOP TERRACE, LEVEL 4)

TIMETABLE - MONDAY (CONT'D)

Monday	Session: Phylogeny of Polychaetes (cont'd)	Chair: Chris Glasby
1.30-1.45	Latest news from the WormNet II Community Sequencing Project Schulze, Anja and Frank E. Anderson	
1.45-2.00	Recent divergence and species diversity of <i>Diopatra</i> (Onuphidae) from intertidal zones along the Brazilian coast Paiva, Paulo , Victor Seixas, Tatiana Steiner, Cecília Amaral and Antonio Sole-Cava	
2.00-2.15	Phylogeography of <i>Ophryotrocha</i> (Dorvilleidae: Polychaeta) species from different ocean basins Wiklund Helena , Thomas G. Dahlgren and Adrian G. Glover	
2.15-2.30	New insights into the systematics of nautiliniellids and <i>Calamyzas</i> , two groups of symbiotic annelids nested among chrysopetalid polychaetes (Chrysopetalidae, Calamyzinae) Aguado, M. Teresa , Arne Nygren and Greg W. Rouse	
2.30-2.45	The species-complex <i>Trypanosyllis zebra</i> (Grube, 1860) in the Pacific Ocean Álvarez-Campos, Patricia , Ana Riesgo, Pat Hutchings and M. Teresa Aguado	
2.45-3.00	Phylogeny of the Polynoidae: many trees, but not on the same scale Fauchald, Kristian and Robin Wilson	
3.00-3.30	AFTERNOON TEA (ATRIUM)	
Monday	Session: Taxonomy	Chair: Robin Wilson
3.30-3.45	Regional taxonomic standardization and intercalibration: how to achieve it? Lovell, Lawrence L.	
3.45-4.00	On the state of taxonomy and world fauna of Spirorbinae Rzhavsky, Alexander V.	
4.15-4.30	Review of the family Cirratulidae (Carus, 1863) from the Magellan Region (Chile): with description of a new species of <i>Dodecaceria</i> Ebbe, Brigitte and Americo Montiel	
4.30-4.45	Diversity of <i>Marphysa</i> (Eunicidae, polychaete) on the Australian coast Zanol, Joana and Pat Hutchings	
4.45-5.00	The origin and evolution of Spionidae (Annelida) Radashevsky, Vasily	
5.00-5.15	Who are they, where do they come from, how did they get there? Meißner, Karin , Andreas Bick and Theresa Guggolz	
5.15-5.30	Preliminary phylogeny of Sphaerodoridae and relationships with other Phyllodocida Capa, María , María Teresa Aguado and Torkild Bakken	
6.00-8:00	Icebreaker (Rooftop Terrace, Level 4)	

TIMETABLE - TUESDAY

Tuesday Timetable - 6th August

Tuesday	Session: Development Chair: Elena Kupriyanova
8.40-9.10 Keynote	Keynote Presentation Molecular mechanisms of larval attachment and metamorphosis of <i>Hydroides elegans</i> Qian, Pei-Yuan
Tuesday	Contributed papers
9.10-9.25	Epigenetics, developmental plasticity, and larval evolution Gibson, Glenys
9.25-9.40	Oogenesis in <i>Phragmatopoma</i> (Sabellariidae): Evidence for morphological distinction among geographically remote populations Faroni-Perez, Larisse, and Fernando José Zara
9:40-9.55	Reproduction and development in onuphid polychaetes Budaeva, Nataliya, Elena Vortsepneva, Sofia Pyataeva and Karin Meissner
9.55-10.30	MORNING TEA (ATRIUM)
Tuesday	Session: Development (cont'd) Chair: Maria Capa
10.30-10.45	The ventral brooding of eggs in Exogoninae (Syllidae), first results Fukuda, Marcelo Veronesi and João Miguel de Matos Nogueira
10.45-11.00	Life history of <i>Polydora ongawaensis</i> (Polychaeta: Spionidae) from northeastern Japan Teramoto, Wataru, Waka Sato-Okoshi, Goh Nishitani and Yoshinari Endo
11.15-11.30	Taxonomy and dynamics of planktonic spionid larvae in Onagawa Bay, Northeastern Japan Abe, Hirokazu, Waka Sato-Okoshi, Goh Nishitani and Yoshinari Endo
11.30-11.45	Polychaete tubes and oligochaete cocoons: an evolutionary link? Rossi, Anthony M. and Daniel H. Shain
11.45-12.00	Transcriptomic and proteomic insights into larval metamorphosis of the polychaete <i>Pseudopolydora vexillosa</i> Chandramouli, Kondethimmanahalli, Timothy Ravasi and Pei-Yuan Qian
12.00-1.30	LUNCH (ROOFTOP TERRACE, LEVEL 4)
Tuesday	Session: Development (cont'd) Chair: Lynda Avery
1.30-1.45	Proteomic characteristics of the reproductive stages of the Polychaetous <i>Neanthes arenaceodentata</i> Reish, Donald, Kondethimmanahalli Chandramouli and Pei-Yuan Qian
1.45-2.00	Polychaetes as marine pollinators? van Tussenbroek, Brigitta I, Vivianne Solís-Weiss and Verónica Monroy-Velazquez

TIMETABLE - TUESDAY (CONT'D)

2.00-2.15	On the enigmatic symbiotic polychaete " <i>Parasyllidea</i> " <i>humesi</i> Pettibone, 1961 (Hesionidae): phylogenetic, taxonomic, and behavioural overview Martin, Daniel , Arne Nygren, Per Hjelmstedt and João Gil
2.15-2.30	Cryptic sympatric species across the Australian range of the global estuarine invader, <i>Ficopomatus enigmaticus</i> Styan, Craig A, Claire F McCluskey, Elena K. Kupriyanova and Ty Matthews
2.30-2.45	Morphology, molecular sequence analysis and shell infestation characteristics of <i>Polydora</i> (Polychaeta: Spionidae) from East Asia Sato-Okoshi Waka , Hirokazu Abe, Kenji Okoshi, Wataru Teramoto, Byoung-Seol Koh, Yong-Hyun Kim, Jae-Sang Hong and Jing-Yu Li
2.45-3.00	<i>Ficopomatus enigmaticus</i> in the Coorong and Murray Mouth estuary, South Australia; distribution, settlement and reef structure Dittmann, Sabine , Alec Rolston, Aaron Kirkpatrick, Melanie Goldschmidt, Courtney Cummings, Stephanie Baggalley, Eli Brown, Shea Cameron, Michael Drew and Justine Keuning
3.00-3.30	AFTERNOON TEA (ATRIUM)
Tuesday	Session: Invasives + Systematics Chair: Harry ten Hove
3.30-3.45	Alien invasive serpulids in the Levant Mediterranean—an update Ben-Eliahu, M.N., A. Chipman, H.A. ten Hove , H.K. Mienis and G. Rilov
3.45-4.00	Polychaete assemblages associated with the invasive alga <i>Avrainvillea amadelpha</i> and unvegetated sediments in Oahu, Hawaii Magalhães, Wagner and Julie Bailey-Brock
4.00-4.15	Combined morphological and molecular data reveal new species in the <i>Namalycastis abiuma</i> species group from India Magesh, Mathan and Christopher J Glasby
4.30-4.45	Polychaetes associated with deep-sea coral reefs from the SE Brazilian coast Miranda, Vinicius Rocha , Guarani de Hollanda Cavalcanti and Ana Claudia dos Santos Brasil
4.45-5.00	Towards an assessment of phylogenetic relationships within Polycirridae Nogueira, João M. M., Kirk Fitzhugh , Orlemir Carrerette , and Pat Hutchings
5.00-5.15	Glyceriformia (Annelida) of the abyssal South Atlantic and Southern Ocean Böggemann, Markus
5.15-5.30	Original material and type localities of early described Polychaeta from Norway, with particular focus on species described by O.F. Müller and M. Sars Oug, Eivind , Torkild Bakken and Jon Anders Kongsrud
6.00-8.00	POSTER SESSION (ROOFTOP TERRACE, LEVEL 4)

TIMETABLE - WEDNESDAY & THURSDAY

Wednesday- 7th August - Royal National Park Excursion
 Pickup at Australian Museum, 6 College Street at 8:30 am

Thursday Timetable - 8th August

8.30-8.35	Session: Bird's Eye View Plenary Chair and introduction: Damhnait McHugh
8.35-9.05 Keynote	Keynote Presentation When the worm turned: the quest for Ediacaran bilaterians Gehling, James G.
Thursday	<i>CONTRIBUTED PAPERS</i>
9.05-9.20	Testing the serpulid fossil record by ultrastructural analysis of the tube Ippolitov, Alexei and Elena K. Kupriyanova
9.20-9.35	Written in stone: history of serpulids through time and space Kupriyanova, Elena K. and Olev Vinn
9.35-9.50	Dense <i>Ditrupa arietina</i> (Polychaeta: Serpulidae) populations – are they a distinct faunal assemblage? Hartley, John P.
9:50-10.05	Different diets affect performance and lipid profile of cultured polychaete worm <i>Perinereis vallata</i> Davies, Sam , James Harris and Graham Mair
10.05-10.40	<i>MORNING TEA (ATRIUM)</i>
Thursday	Session: Techniques Chair: Rafael Sardá
10.40-10.55	Long-term incubation of <i>Nereis virens</i> in metal-spiked sediment: behavioural, biochemical, cellular and genotoxic responses Pini, Jennifer and Gordon Watson
10.55-11.10	Polychaete diversity in the Norwegian Sea – new insight based on extensive seabed sampling and mapping by the MAREANO project Bakken, Torkild, Katrine Kongshavn , Eivind Oug, Jon Anders Kongsrud and Tom Alvestad
11.10-11.25	Micro-computed tomography as a tool for the 21 st century taxonomist? An evaluation using polychaetes Faulwetter, Sarah, Aikaterini Vasileiadou, Michail Kouratoras, Thanos Dailianis, Gordon Paterson, Daniel Sykes and Christos Arvanitidis
11.25-11.40	Polychaete abundance and diversity inside a deep-sea submarine canyon Gunton, Laetitia , Adrian Glover, Andrew J. Gooday and Brian Bett

TIMETABLE - THURSDAY (CONT'D)

11.40-11.55	Panmixia of a meso- to bathypelagic gelatinous zooplankter, <i>Poeobius meseres</i> Osborn, Karen J. , Kristina Walz and Bruce H. Robison
11.55-1.30	LUNCH (ROOFTOP TERRACE, LEVEL 4)
Thursday	Session: Ecology and Biodiversity Chair: Rafael Sardá
1.30-1.45	Deep-water benthic infauna offshore Brunei, Island of Borneo, South China Sea Blake, James A.
1.45-2.00	Distributional patterns of Terebellids from Northern Australia Hutchings, Pat
2.00-2.15	Siboglinid polychaetes from Antarctic hydrothermal vents Glover, Adrian G. , Helena Wiklund, Laura E. Hepburn, Alfred Aquilina, Jon T. Copley and Rachel A. Mills
2.15-2.30	Mesoscale assessment of shallow water polychaete assemblages in the north-western Mediterranean Sea Sardá, Rafael* , Letzy Serrano, Céline Labrune, João Gil, Jean Michel Amouroux, Sergi Taboada and Antoine Grémare
2.30-2.45	Population structure of <i>Marphysa moribidii</i> Idris, Hutchings and Arshad, 2013 (Polychaeta: Eunicidae) in Morib mangrove, Straits of Malacca, Malaysia Idris, Izwandy , Japar Sidik Bujang, Muta Harah Zakaria, Zaidi Che Cob and Aziz Arshad
2.45-3.00	Do symbiotic polychaetes migrate from host to host? Mekhova, Elena and Temir Britayev
3.00-3.30	AFTERNOON TEA (ATRIUM)
Thursday	Session: Ecology Chair: Andy Mackie
3.30-3.45	Spatio-temporal variability of polychaete settlement along a gradient of acidification at volcanic CO ₂ vents (Italy) Ricevuto, Elena, K.J. Kroeker, F. Ferrigno, F. Micheli and M.C. Gambi
3.45-4.00	The polychaete fauna occurring on Sandstone Reefs off the states of Paraíba and Pernambuco, northeastern Brazil Nogueira, João Miguel de Matos , Karla Paresque, Orlemir Carrerette, Marcelo Veronesi Fukuda, Carlos Diego Neves Ananias, and Tauana Junqueira da Cunha
4.00-4.15	Biodiversity of benthic polychaetes from a shallow tropical bay, Bay of Bengal, India Srinivasa Rao , Mosuru, Chandrabhotla Annapurna and Duggaraju Srinivasa Rao
4.15-4.30	Polychaete faunal assemblages identified along the coast of Massachusetts, United States. Doner, Stacy and Todd Callaghan

TIMETABLE - THURSDAY (CONT'D)

4.30-4.45	Shallow-water whale bones in the Southern Ocean: an interesting habitat for the study of specialized polychaetes Taboada, Sergi , Helena Wiklund, Adrian Glover, Thomas Dahlgren, Javier Cristobo, Stacy Doner, James Blake, Maria Bas, Ana Riesgo and Conxita Avila
4.45-5.00	Long term monitoring of a brine discharge: impact and recovery on polychaete assemblage Del-Pilar-Ruso, Yoana , Elena Martínez-García, Francisca Giménez-Casalduero, Angel Loya-Fernández, Luis Miguel Ferrero-Vicente, Candela Marco-Méndez, Jose Antonio De-la-Ossa-Carretero and Jose Luis Sánchez-Lizaso
5.00-5.15	The polychaete fauna of Darwin Harbour prior to major urbanization and industrialization Keppel Erica, Marco Sigovini , Davide Tagliapietra and Chris Glasby
5.15-5.30	Considering small macrofauna in biodiversity research: polychaetes of the Joseph Bonaparte Gulf, Timor Sea, Australia Przeslawski, Rachel, Chris Glasby, Charlotte Watson and Andrew Carroll
5.30-5.45	Bringing the worms back to a mudflat: Efforts to promote an intertidal polychaete community Petch, David , William Steele, Suelin Haynes, Liz Morris and David May
6.00-8.30	MEMBERS NIGHT (ATRIUM)

MEMBERS NIGHT – THURSDAY 8 AUGUST 2013

INTO THE WORM HOLE:

A BEGINNER'S GUIDE TO PRACTICAL POLYCHAETOLOGY...

A rare scientific subculture is worming its way into Sydney in August: real human beings who are passionate about polychaete worms! Wriggle in to the Australian Museum to discover why these remarkable (and remarkably overlooked) animals are so interesting, important and beautiful. And the worms are pretty interesting too...

Here's your chance to meet some of these specialists and to try out all those wormy questions you were too afraid to ask. Find out what makes a person devote their lives to these spineless, soft-bodied wonders. We'll even throw in an opportunity to see a slide show of these worms and a chance to check out the poster exhibition in the coffee shop.

The highlight of the evening will be a Q&A session, chaired by closet worm-fancier Dr Richard Smith, award-winning documentary filmmaker and host of the recent 4-part ABC series Australia: The Time Traveller's Guide. In a past life Richard probed some rather beautiful worms to find out how they see our world. Now he'll turn the spotlight on the brainy bunch of humans on the panel:

1. **Dr Jim Gehling**, South Australian Museum, world-renowned expert on the Ediacaran fauna: fossils of some of the oldest animals on Earth discovered in the Flinders Ranges of South Australia. Some of these strange creatures have been interpreted as polychaetes because of their resemblance to modern day worms. But is this really where the worm story begins?
2. **Professor Damhnait McHugh**, Biology Department, Colgate University, New York. As a child on the west coast of Ireland, Damhnait spent rather too long playing in tide pools and ended up turning into one of the world's pre-eminent annelid biologists! Her quest? To work out where worms come from and who is related to whom!
3. **Dr Pat Hutchings**, Australian Museum, convenor of the Conference and the person you may hold responsible for gathering the world's worm experts together in Sydney. Pat has spent a lifetime hunting down these animals in the field and herding them into collections in the lab. In her mission to find true blue Aussie worms there is no mud too soft, reef too deep, nor stone unturned. Hear her stories from the worm front line.

TIMETABLE - FRIDAY 9 AUGUST

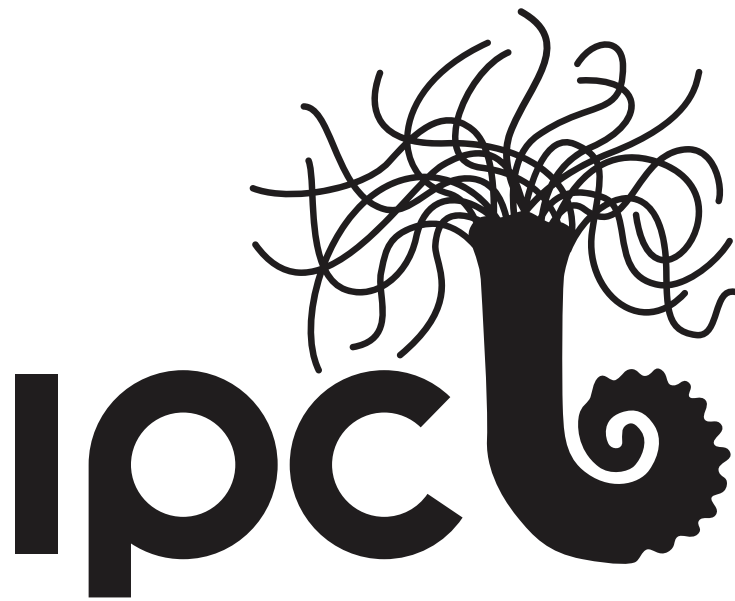
8.30-8.35	Session Morphology Chair: Torkild Bakken
8.35-9.05 Keynote	Keynote Presentation Systematics, Evolution and Phylogeny of Annelida – a morphological perspective Purschke, Günter
9.05-9.20	Morphology, functioning and possible homology of the anterior end of <i>Cossura pygodactylata</i> Jones, 1956 (Cossuridae) Zhadan Anna, Elena Vortsepneva and Alexander Tzetlin
9.20-9.35	The evolution of myoanatomy in Annelida as revealed by immunohistochemical investigations Helm, Conrad and Christoph Bleidorn
9:35-9.50	Why are chaetae in the parapodia organized in rows? Kolbasova, Glafira , Alexander Tzetlin and Elena K. Kupriyanova
9.50-10.05	Searching for apomorphies: using microCT to investigate pharyngeal anatomy in the Articulata Paterson Gordon , Ahmed Farah, Faulwetter Sarah, Ball Alex, Dinley John1, Hawkins Lawrence, Sykes Dan and Arvantidis Christos
10.05-10.35	MORNING TEA (ATRIUM)
Friday	Session: Morphology (Cont'd) Chair: Brigitte Ebbe
10.35-10.50	Comparative study of epidermal papillae in polychaetes (Fam. Opheliidae, Flabelligeridae, Scalibregmatidae) Vodopyanov, Stepan and Anna Zhadan
10.50-11.05	Nervous system and musculature in <i>Polygordius appendiculatus</i> (Annelida, Polygordiidae) – a model for the annelid ground pattern? Lehmacher, Christine , Dieter Fiege and Günter Purschke
11.05-11.20	Venom evolution in glycerid polychaetes Richter, Sandy , Francine Schwarz, Lars Hering, Björn Marcus von Reumont, Ronald Jenner, Giampietro Schiavo and Christoph Bleidorn
11.20-11.35	Two new species of <i>Syllis</i> Lamarck, 1818, including a viviparous species, associated with aquaculture species in South Africa Simon, Carol , Guillermo San Martín and Georgina Robinson
11.35-11.50	Phylogeography of <i>Stygocapitella subterranea</i> (Parergodrilidae) in the Northeast Atlantic Stateczny, Dave, Dominik Siemon, Jana Wegbrod, Julia Lange, Anne Rikeit, Günter Purschke, Anja Golombek and Torsten H. Struck
11.50-1.30	LUNCH (ROOFTOP TERRACE, LEVEL 4)
12.00-1.30	POLYCHAETE ASSOCIATION ADVISORY COUNCIL MEETING LEVEL 4 MEETING ROOM (ADJACENT TO THE LUNCH ROOM)

TIMETABLE - FRIDAY (CONT'D)

Friday	Session: Polychaete Studies Chair: Paulo de Lana
1.30-1.45	Diversity and distribution pattern of Polychaetes along the Indian Coast (6° to 23°) Sivadas, Sanitha K* and Baban S Ingole
1.45-2.00	The diversity and radiation of polynoid scaleworms (Annelida) in the Antarctic Amundsen Sea Neal, Lenka, Helena Wiklund, Alex Muir and Adrian G Glover*
2.00-2.15	Professor Elis Wyn Knight-Jones FLShc – pioneering marine biologist and polychaete taxonomist (1916-2013) Mackie, Andrew , Gaynor Oddy, Ioanna Psalti, John Ryland and Ernest Naylor
2.15-3.00	Polychaete Association Meeting (all welcome!)
3.00-3.30	<i>AFTERNOON TEA (ATRIUM)</i>
3.30-4.30	Bids for next meeting
	<i>PLEASE MAKE SURE YOUR POSTERS ARE REMOVED BY 4:30 PM</i>
5.30	<i>FERRY FROM COMMISSIONER'S STEPS AT CIRCULAR QUAY TO CHOWDER BAY (PLEASE DO NOT BE LATE AS THE FERRY WILL NOT WAIT!)</i>
From 6.30	<i>CONFERENCE DINNER- SERGEANT'S MESS, CHOWDER BAY</i>
11.45pm	<i>RETURN FERRY FROM CHOWDER BAY TO CIRCULAR QUAY</i>



The Sergeant's Mess, Chowder Bay



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POSTER PRESENTATIONS

POSTERS

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Posters are numbered within topic Sections alphabetically by first author last name. Posters will be on display for the conference week in numerical order in the Rooftop Terrace (Level 4). Authors will be by their posters during the Poster Cocktail Session on Tuesday evening to discuss their work and answer questions. Presenters are indicated by an asterisk beside their name.

Systematics and Phylogeny

- 1. Molecular Analysis of the 18S rRNA Gene of Spionid Polychaetes**
Abe, Hirokazu*, Waka Sato-Okoshi, Goh Nishitani and Yoshinari Endo
- 2. Syllids from the Pacific (Annelida, Syllidae). Some genera sharing a significant evolutionary history**
Aguado, M. Teresa* and Christopher J Glasby
- 3. Taxonomy of *Namalycastis* (Namanereidinae: Nereididae) of the Brazilian coast**
Alves, Paulo, Isabela Guerra and Cinthya Santos*
- 4. A new deep-sea species of *Ampharete* from the Norwegian Sea**
Alvestad, Tom*, Jon Anders Kongsrud, and Katrine Kongshavn
- 5. Symbiotic Syllidae (Polychaeta) from north Vietnam (South China Sea)**
Antokhina, Tatiana I., Temir A. Britayev, Patricia Lattig, Daniel Martin*
- 6. Contribution to the knowledge of polychaetes from the deep sea waters of south Brazil**
Barroso, Rômulo* & Paulo Cesar de Paiva
- 7. Redescription of *Capitella perarmata* (Gravier) from Antarctica with notes on life history and comparison with *C. capitata* from the Arctic**
Blake, James A.*
- 8. New species of *Chaetozone* (Polychaeta: Cirratulidae) from British Columbia and the Canadian Arctic**
Blake, James A*. and Stacy A. Doner
- 9. First insight into phylogeny of Hyalinoeciinae (Onuphidae) inferred from one mitochondrial and four nuclear markers**
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- 10. Sphaerodoridae from the Northeast Atlantic**
Capa, Maria* and Torkild Bakken

11. **New species of *Branchiomma* Kölliker, 1858 (Polychaeta: Sabellidae) from the northeastern Brazilian coast, states of Paraíba and Pernambuco**
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12. **New species of Terebellidae (Annelida: Polychaeta) from the Campos Basin, off the Brazilian coast**
Carrerette, Orlemir* and João M. M. Nogueira
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- 40. Analysis of the phylogeny of Canalipalpata using four nuclear protein-coding genes**
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- 41. Capitellidae from southern Brazil**
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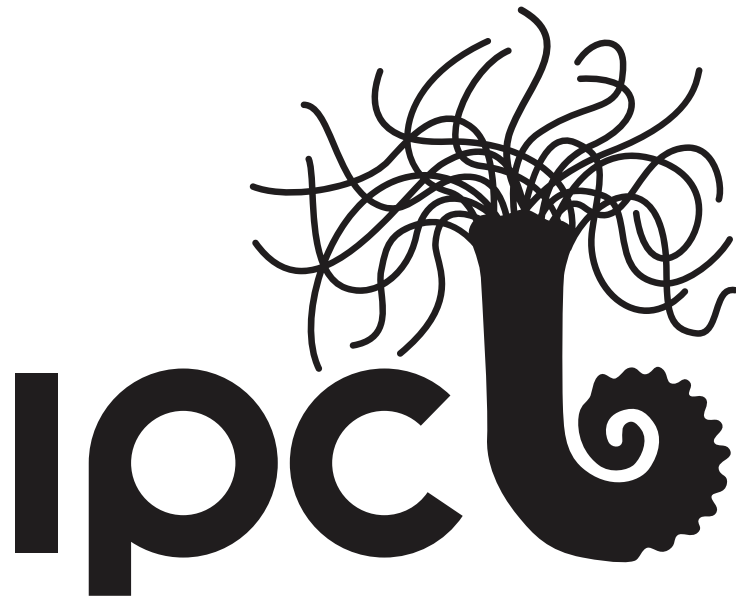
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Abstracts

Oral and Poster Presentations

Molecular Analysis of the 18S rRNA Gene of Spionid Polychaetes [Poster]

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The spionid polychaete (Family Spionidae) is one of the major polychaete groups and a major component of coastal marine benthic communities. Morphological variability of spionid species often leads to difficulties in their morphological description and classification. There are also some species complexes within spionid polychaetes which include different species that are morphologically indistinguishable from each other. Although molecular biological approaches have been suggested to be effective for species determination in various taxa, to date, there is little molecular genetic information in spionid polychaetes. In this study, 40 species belonging to 14 genera of adult spionid polychaetes were collected from various parts of the world and the molecular sequences of the 18S rRNA genes of these spionid polychaetes were analyzed. No intraspecific variation was detected in the sequences obtained in this study even if between the sequences of individuals from separate populations, and the sequences were completely distinct between different species. Although there are some exceptions, species belonging to the same genus formed a generic group and polydorid species formed a monophyletic group. Therefore, it was suggested that the molecular analysis of the 18S rRNA gene can provide not only a key tool for the accurate discrimination of spionid species but also a key tool for elucidating phylogenetic relationships among the taxa. It is considered to be important to use both morphological and molecular methods, and accumulate DNA information based on accurate identification for clearing up the taxonomic confusion.

Taxonomy and Dynamics of Planktonic Spionid Larvae in Onagawa Bay, Northeastern Japan

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Planktonic larvae of spionid polychaetes are one of the most abundant and diverse groups, and often occur dominantly in coastal zooplankton communities all around the world due to the abundance of adult populations, high reproductive ability, and long planktonic life. Although the dynamics and recruitment of the planktonic larvae are important to understand the dynamics and structure of marine invertebrates populations and communities, these ecological studies on marine invertebrates have been hampered by the difficulties of larval identification on the species level. In this study, we analyzed the nuclear 18S ribosomal RNA gene of both adults and larvae of spionid polychaetes, and planktonic larvae were identified through comparison of adult and larval DNA. More than 30 species belonging to 13 genera of planktonic spionid larvae were identified and morphological characteristics of these larvae were described. Most spionid larvae have different morphological characteristics specific to each species and genus and it has become possible to identify spionid larvae to species or genus level morphologically. Seasonal dynamics of spionid larvae showed some similar patterns each year and there were clear seasonal occurrences in spionid larvae. Larvae of *Polydora onagawaensis* and *Polydora* sp. dominated in planktonic polychaete larvae during winter and spring, and larvae of *Pseudopolydora achaeta* and *Prionospio* spp. dominated during summer and autumn in Onagawa Bay. Larvae of *Dipolydora* spp. and *Rhynchospio glutaea* were observed in various seasons and occurred over a relatively long period of time. Occurrence of each larvae seemed to be most closely related to the water temperature. Trend of vertical distribution of planktonic larvae differed from species to species. Tidal vertical migration was observed in larvae of *Ps. achaeta* and *Prionospio* spp. Although vertical migration was small in scale, these larvae seemed to avoid dispersal by moving to slower-flowing deeper water during flood and ebb tides.

Syllids from the Pacific (Annelida, Syllidae). Some genera sharing a significant evolutionary history [Poster]

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Syllids (Annelida, Syllidae) are one of the most speciose families of polychaetes. There are more than 700 species in more than 70 genera. The geographic distribution of three intriguing genera of Syllidae, *Alcyonosyllis*, *Paraopisthosyllis* and *Megasyllis*, is restricted to the West Pacific and the Red Sea, with most of the species from the south-western Pacific. These three genera share several striking morphological characteristics, such as the alternation in the arrangement of dorsal cirri, wide segments with secondary annuli and remarkable colour patterns. Several species have been found in association with other organisms, the most notable being the anthozoan commensal *Alcyonosyllis* spp. A phylogenetic analysis performed with different phylogenetic methodologies (Maximum Parsimony, Maximum Likelihood and Bayesian inference) using sequences of three genes (18S, 16S and COI) reveals that these genera belong to a single, monophyletic group. This result indicates that all three genera form an evolutionary lineage within Syllidae, with a common ancestor and several synapomorphies, which is restricted to the Pacific and the Red Sea. Their geographic distribution pattern, the relationships between these genera and the remaining Syllidae, and the symbiotic relationships they maintain with other organisms, are discussed.

New insights into the systematics of nautiliniellids and *Calamyzas*, two groups of symbiotic annelids nested among chrysopetalid polychaetes (Chrysopetalidae, Calamyzinae)

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Nautiliniellidae is a small group of polychaetes with 20 currently described species in 11 genera, all appearing to live symbiotically in the mantle cavity of bivalves, mainly from cold seeps and hydrothermal vents. Calamyzidae includes only one described species, *Calamyzas amphictenicola* Arwidsson, 1932, which is ectoparasitic on ampharetid polychaetes. Nautiliniellidae and Calamyzidae have been considered to belong to Phyllodocida, however, few phylogenetic studies had dealt with their evolutionary relationships. Recently, a systematic revision using morphological and molecular information (nuclear and mitochondrial genes) of nautiliniellids from Pacific hydrothermal vents and cold seeps and specimens of *Calamyzas* from the Atlantic has been carried out. As a result, Nautiliniellidae and *Calamyzas* formed a well-supported clade. Additionally, The nautiliniellids-*Calamyzas* clade was found nested within Chrysopetalidae, a free-living family of polychaetes. The chrysopetalid genus *Vigtorniella*, a bacterial-mat grazer found at methane seeps, anoxic basins and whalefalls, was found to be the closest chrysopetalid group. As a result Calamyzidae and Nautiliniellidae were synonymized with Chrysopetalidae and three subfamilies Chrysopetalinae, Dysponetinae and Calamyzinae were established. This study continues research on the systematics of this complex group describing new taxa of Calamyzinae from Pacific hydrothermal vents and the Atlantic coast of the Iberian Peninsula. Additionally, the status of another family of polychaetes, Antonbruuniidae, is herein considered. Finally, the biogeography of Calamyzinae and coevolution with hosts is discussed.

The species-complex *Trypanosyllis zebra* (Grube, 1860) in the Pacific Ocean

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Trypanosyllis Claparède, 1864 is an easily recognizable genus of Syllidae polychaetes, characterized by medium to large sized dorso-ventrally flattened body, ribbon-like, frequently conspicuously coloured, dorsum with transverse bands of minute papillae on some species, pharynx provided with trepan, with or without mid-dorsal tooth and reproduction by means of tetraglene stolons. The genus includes more than 20 species currently known, living on many different kinds of substrates and it has been reported worldwide. The type-species, *Trypanosyllis zebra* (Grube, 1860) is considered a cosmopolitan species in temperate and tropical seas and some authors have suggested that it may represent a cryptic species complex containing a still-undetermined number of species. Specimens of *T. zebra* from different localities shows differences in color pattern, length of body and cirri and number and shape of aciculae; however the morphology of chaetae, that is considered one of the most important characters for species identification, is always the same. A morphological and molecular analysis of 52 specimens of *T. zebra* from Eastern and Western Australia, Philippines Islands, Chile and the Iberian Peninsula has been performed. The mitochondrial gen 16S, and the ribosomal ITS1 have been sequenced and used for phylogenetic inference with both maximum likelihood and Bayesian inference methods. In a comparative analysis using both morphological and molecular data, we discuss the appearance of divergent clades within the species, which could be interpreted as separate species.

New species of *Alcyonosyllis* Glasby and Watson, 2001 and *Parahaplosyllis* Hartmann-Schröder, 1990 from the Philippine Islands [Poster]

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A new species of *Alcyonosyllis* associated with the alcyonacean *Dendronephthya* sp. (Nephtidae) is described. This is the sixth known species of this genus living in the Indo-Pacific region and the second for the Philippines. The new species differs from other *Alcyonosyllis* in having long and slender cirri with the first pair of dorsal cirri slightly thicker than the remaining, bidentate chaetae with distal tooth larger than proximal one, and a distinct colour pattern, with a median longitudinal, slender reddish line, and two lateral wider bands, giving a tri-lineate appearance. We also include the first report of *A. hinterkircheri* Glasby and Aguado, 2009 from Luzón Island. A new species of *Parahaplosyllis* is also described. Up to now, it was a monospecific genus, with only a single known species, *P. brevicirra*, from Australia. The new species is characterized by having one dorsal capillary unidentate chaeta and a thick, hooked simple bidentate chaeta, with curved spur. We also include comments and descriptions on the reproductive, sexual stolons of the two species. A final discussion of the enigmatic *Syllis lycochaetus* Grube (1855) from the Philippines is also provided due to the fact that it shares features both of *Alcyonosyllis* and *Parahaplosyllis*.

Taxonomy of *Namalycastis* (Namanereidinae: Nereididae) of the Brazilian coast [Poster]

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The family Nereididae is one of the most studied group of polychaetes. In contrast, its subfamily Namanereidinae is less well known especially in terms of its biology and taxonomy. With 37 species in three genera, the Namanereidinae is a successful group in both brackish and fresh water, being found all around the world. Here we focus on the taxonomy of the genus *Namalycastis* on the coast of Brazil, based on a comparison of published literature and our own data. Samples were taken in estuaries in three regions – North (Pará), Southeast (Rio de Janeiro) and South (Paraná) – in order to sample widespread populations, find regional population characters and morphological differences that could characterize these populations or indicate new species. Individual analyses were based on literature reviews for the subfamily, and divergences from descriptions have been noted preliminary as regional features. Preliminary results indicate the presence of three species: *N. abiuma*, *N. macroplatis* and *N. siolii*, in five populations, 3 from North, and 2 from Southeast, South populations still undone. All species have been recorded previously from the Brazilian coast, although, some variation in characters was found. In *N. macroplatis*, just two individuals were found in Pará, what still prevents an extrapolation of the characters to the whole population. For *N. siolii* 160 individuals were recorded from the north region (Pará), with differences in chaetal distribution and the position of the eyes. For *N. abiuma* (53 individuals from southeast) we found differences in the occurrence of serrations in falcigers of the anterior region and in the spinigers of the mid-posterior region. In order to reach more robust results, additional samples will be examined and further analyses conducted. Our results indicate the value of population studies and regional characterization of species and suggest that some cryptic speciation may be involved in this group.

A new deep-sea species of *Ampharete* from the Norwegian Sea [Poster]

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A new species of *Ampharete* is described based on material collected by the large-scale mapping program MAREANO (Marine AERIAL database for NORwegian waters) off the north-west coast of Norway. The new species is of small size, up to 5 mm long and 0.5 mm wide, and thus it may have been overlooked in previous studies. A total of 1600 specimens from 60 different localities have been examined, and the new species is shown to be a common and widespread species in the Nordic Seas at depths between 600-1650 m. The new species is referred to the genus *Ampharete* based on characteristics of the prostomium, presence of papillose buccal tentacles, four pairs of branchiae, 15 thoracic segments with chaetae (including paleae), and 12 thoracic segments with neurochaetae. The new species differs from all known species of *Ampharete* in having 11 rather than 12-28 abdominal segments with uncini. The new species is further characterized by having buccal tentacles with relatively few and short papillae; branchiae arranged close together, with three pairs in an anterior transvers row and last pair in a posterior position; ten-twelve long, thin and slender paleae on each side, gradually tapering to long filiform tips; pygidium with two short conical lateral cirri and a number of small rounded papillae; thoracic uncini with two vertical rows of 4-6 teeth above rostrum and abdominal uncini with four vertical rows of 4-6 teeth above rostrum.

Molecular phylogenetics of Annelida based on a supermatrix analysis of publicly available sequence data: a baseline study for the WormNet II Project

Anderson presenting: Williams, Bronwyn W. and Frank E. Anderson*

Refer Williams for abstract.

Symbiotic Syllidae (Polychaeta) from north Vietnam (South China Sea) [Poster]

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The Syllidae are a highly diverse group of polychaetes, which were among the most poorly studied families having symbiotic species (Martin, Britayev 1998). Since then, an increasing diversity of symbiotic species has been described worldwide, and the tropical Vietnamese waters are not an exception. The most comprehensive study of the Vietnamese polychaetes reported only five syllids, all of them free living (Gallardo 1967). Our extensive sampling of sponge, cnidarian, shrimp, and starfish associates, mainly focused in the Bay of Nhatrang, revealed seven species of symbiotic syllids: *Haplosyllides aberrans* Fauvel, 1939, a parasite of the pontonin shrimp *Platycaris latirostris*; *Alcyonosyllis phili* Glasby et Watson, 2001, associated with the alcyonaceans *Carijoa* cf. *reisii*, and *Dendronephthya* sp., but widely distributed in the tropical west Pacific, as well as five new species. These are: *Alcyonosyllis* sp., which produces marked troughs and galleries on the branches of the host alcyonacean *Viminella* sp., *Inermosyllis* sp., which lives on the oral surface and the ambulacral grooves of the starfishes *Luidia maculata* and *Archaster angulatus*, and three species of *Haplosyllis* associated with two sponges (i.e. *Callyspongia* sp., and a unidentified demonsponge) and the alcyonacean *Carijoa* cf. *reisii* (living in grooves and burrows inside the host tissues). Our study is, thus, the first approach to assess the diversity of symbiotic syllids within the Vietnamese polychaete fauna.

Observations on the reproductive biology of four sympatric species of *Diopatra* (Annelida: Onuphidae) from northern Spain [Poster]

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Four species of *Diopatra* inhabit intertidal to shallow subtidal estuaries in northern Spain, in some cases sympatrically. We are presenting observations on the reproductive biology of three of these species. *Diopatra marocensis* is a simultaneous hermaphrodite with presumed internal fertilization and brooding in the parental tube, while *D. biscayensis* attaches egg sacs to the distal end of its tube where the lecithotrophic larvae develop to 3-chaetiger metatrochophores before leaving to settle. The unique paired dorsal papillae of *D. cryptornata* were found to contain sperm and may serve as seminal ducts/vesicles/or receptacles. We have no data on *D. neapolitana* from the study sites yet but know from the literature that they are broadcast spawners with a free-swimming stage. These four species are classed as type I (brooding in parental tube), III (egg mass attached to tube), and IV (broadcast spawning) respectively according to Paxton's classification of developmental characteristics in the genus *Diopatra*. We are discussing and expanding this scheme by including sperm and larval morphology, showing that *D. marocensis* (type I) has ent-aquasperm and direct developing larvae, while type III and IV have both ect-aquasperm and lecithotrophic trochophores. *Diopatra biscayensis* (type III) larvae leave the protective egg sac as 3-chaetiger metatrochophores, while *D. neapolitana* (type IV) eggs are free-spawned, developing in the water mass to metatrochophores; both species settle and start to build their own tube at this stage. Although this information is not available for most *Diopatra* species, these or similar patterns are expected to apply to other species as well.

Micro-computed tomography as a tool for the 21st century taxonomist? An evaluation using polychaetes

Arvanitidis presenting: Faulwetter, Sarah^{1,2}, Aikaterini Vasileiadou^{2,3}, Michail Kouratoras⁴, Thanos Dailianis² Gordon Paterson⁵, Daniel Sykes⁵ and Christos Arvanitidis^{2,*}

Refer Faulwetter for abstract.

Morphospecies diversity of Polychaeta from the continental margin of western and northwestern Australia [Poster]

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Prior to the 1990s, taxonomic works describing Australian polychaetes had an eastern and southeastern focus. That work was fuelled by the earliest European explorations, and by major environmental studies since the 1960s, which were mostly from the southeast. Since the 1990s, however, the western coastline of Australia (WA) has received increased attention, due to a need for national-level data on bioregions for marine planning (the Australian Government's National Environmental Research Program, NERP, 2005-present). Other significant contributions have been: environmental explorations of the Kimberley and elsewhere in WA (2006-present); expeditions of the WA Museum (1990-present); benthic surveys of Darwin Harbour (1993); Joseph Bonaparte Gulf (2010) and a coral reef biodiversity assessment project (CREEFS, 2000-2010). Collectively, these studies have increased WA collections in all Australian museums by many thousands of lots. Full taxonomic assessment of these large collections will require many researchers for many decades. Here we present initial data based on recent family-level taxonomic revisions and preliminary assessment of diversity with both species and "morphospecies" as OTUs. Of the families studied since 2003 and thought to be relatively well known from eastern Australian material, more than 100 new species have been recognised from the western and northwestern samples, equivalent to an increase of about 30% in those families. With the publication of sufficient taxonomic treatments and the availability online of occurrence data through the Atlas of Living Australia (ALA), polychaetes now begin to provide suitable data on a national scale for bioregional analysis and marine environmental management, as befits their abundance and diversity across marine environments. This study presents summary data for taxa we know best, supported by online resources of Australian museums, ALA and the Encyclopedia of Life. We hope taxonomists undertaking future revisions will include these significant collections in their studies.

Polychaete diversity in the Norwegian Sea – new insight based on extensive seabed sampling and mapping by the MAREANO project

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This contribution presents the background, some preliminary results and perspectives of the research project "Polychaete diversity in the Norwegian Sea – from coast to the deep sea" (2013-2015). The study particularly aims at illustrating the diversity of the deep sea in comparison with shelf and slope areas and identifying depth zones where major shifts in species composition take place. The project is based on the extensive and systematically collected material from the large-scale seabed mapping programme MAREANO (Marine AREAL database for Norwegian waters, 2006-), supplemented with material from extensive inventory and environmental monitoring studies and the collections of marine invertebrates at the University Museum of Bergen, Norway (ZMBN). Preliminary results for selected families (Lumbrineridae, Acrocirridae, Flabelligeridae, Opheliidae, Scalibregmatidae, Ampharetidae, Maldanidae) indicate a strong shift in species composition at about the continental margin and the upper slope (500-800 m), coinciding with the upper border for basin deep-water with temperatures below 0 °C. Another shift in species composition takes place at about 2000 m, where the slope-fauna is replaced by a relatively low-diversity deep-sea fauna, composed of rather few but generally abundant and widely distributed species. The results further suggest that the present taxonomy of slope and abyssal polychaetes is strongly under-developed as the material includes many undescribed or poorly known species. In forthcoming work, detailed morphological studies using SEM will be combined with DNA barcoding through the Norwegian Barcode of Life project (NorBOL) to investigate diversity and species relationships within groups of closely allied species. Further, new insight related to occurrence and distribution of different species is expected when combining species records with detailed mapping of environmental factors in the MAREANO project.

Contribution to the knowledge of polychaetes from the deep sea waters of south Brazil [Poster]

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Unlike the North Atlantic and Antarctic waters, which, over the last century, were extensively studied with European and North American surveys, the deep sea invertebrate fauna of the South Atlantic Ocean remains largely unknown. Currently information is restricted to descriptive studies which are fundamental to a better understanding of regional biota and biogeographical patterns. In this study we present the species of Amphinomidae (n=2), Opheliidae (n=5), Syllidae (n=9) and Paraonidae (n=13), collected in south Brazil, from depths of 380 to 3.300 m, as part of two projects (Oceanprof and Habitats) coordinated by the Research Center of the Brazilian Petroleum Company (CENPES/PETROBRAS). From a group of 29 species, fourteen were considered as new, two have already been described (*Paramphinome posterobranchiata* and *Chloeia kudenovi*) and 12 still remain to be [Parexogone sp. 1, *Parexogone* sp. 2, *Sphaerosyllis* sp. 1, *Sphaerosyllis* sp. 2, *Anguillosyllis* sp. 1, *Levinsenia* sp. 1, *Paradoneis* sp. 1, *Paradoneis* sp. 2, *Aricidea* (*Aricidea*) sp. 1, *Aricidea* (*Allia*) sp. 1, *Aricidea* (*Allia*) sp. 2 and *Aricidea* (*Acmira*) sp. 1]. Three species are first records for the South Atlantic Ocean - *Ophelina chaetifera*, *Levinsenia reducta* and *Aricidea* (*Allia*) *abbranchiata* - and the genus *Anguillosyllis* for Brazil. Although the occurrence of some species was restricted to shallow waters (e.g. *Syllis aciculigrossa*, *Parexogone* sp. 2), and others to the deeper sites (eg. *Ophelina chaetifera* and *Anguillosyllis* sp. 1), some occurred throughout the entire bathymetrical ranges studied (e.g. *Paramphinome posterobranchiata*, *Parexogone wolffi* and *Aricidea* (*Allia*) *abbranchiata*). The general decrease in species richness and abundance could be correlated with increasing depth. As regards biogeographical patterns, although the most common was that of cosmopolitan species, this needs to be confirmed by means of molecular techniques. As to the remainder, the main patterns were of species occurring in North Atlantic waters, with the occurrence of a few species in common to Antarctic waters.

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Description of morphology and anatomy of *Ophelia limacina* (Rathke, 1843) (Opheliidae). Comparison of different methods [Poster]

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Data on anatomy are important for understanding annelid evolution. Most classical anatomical methods are laborious and lead to the destruction of the object. Morphology and anatomy of *Ophelia limacina* were studied using microtomography, anatomical dissections, histology, scanning and transmission electron microscopy; results obtained by these methods were compared. The studying of external morphology with microtomography revealed all important characters: general body shape, secondary annulation, body division into regions, shape of prostomium, pygidium, parapodia, and branchia, presence of nuchal and lateral organs. Ciliation and gland openings are seen only by SEM and TEM. Microtomography showed good results for the investigation of internal structure: it revealed musculature, dissepiments, digestive, circulatory and nervous systems; big rod-bearing coelomocytes are also seen. The advantage of microtomography with comparison to other methods is the possibility to build 3D reconstructions without damaging the object, little time and minimum preparations required. It is a very promising method for the investigation of rare museum specimens. The main disadvantage of microtomography is the low resolution as compared with SEM and TEM.

Alien invasive serpulids in the Levant Mediterranean—an update

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Recent serpulid samples have been obtained from three sources: 1) hard substrate material collected by a scuba team (0–20 m); 2) molluscs from fishermen's trawls (ca. 20–40 m); and, 3) mollusc shells in the Tel Aviv University collections (collected less recently). The samples enable an appraisal of relative importance and the colonization dynamics of these serpulid taxa along the Israeli Mediterranean coast over time. The list of alien invasive serpulids numbers the seven previously reported Lessepsian migrant taxa, *Hydroïdes* cf. *brachyacanthus*, *H. homoceros*, *Spirobranchus kraussii*, *H. operculatus*, *H. heterocerus*, *Spirobranchus tetraceros* and *H. minax*, each of them collected by Melih E. Çınar from the eastern Levantine coast of Turkey in 2005 (Çınar 2006). As an eighth species, we now add *Serpula hartmanae*, reported several years ago by Zibrowius and Bitar (pers. comm to H.A. ten Hove), that we had previously identified as *S. cf. concharum*. This taxon appears to have greatly increased in importance recently along the shallow Israeli coast, similar to abundance patterns previously observed in other Lessepsian migrants, thus we are accepting it less tentatively as a Lessepsian migrant than in the past (moreover, specimens have been collected in both the Gulf of Aqaba and the Suez Canal). Additional work, including molecular analysis, is necessary for properly identifying it. Two Lessepsian taxa, *Hydroïdes* cf. *brachyacanthus*, and *H. operculatus*, are no longer present in recent Israeli samples. The widely distributed ship-fouling species, *Hydroïdes elegans* and *H. diramphus* are still both present along the Israeli coast. Some indigenous taxa appear to be less abundant in the present shallow sampling than in the past, indicating a change in the shallow Israeli fauna, presumably due to Mediterranean warming and/or to ecological interactions. Deeper sampling to determine whether these taxa are still present along the Israeli coast in greater depths is presently lacking.

Deep-water benthic infauna offshore Brunei, Island of Borneo, South China Sea

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Deep-water habitats in the South China Sea are poorly known. In 2011, TOTAL EandP Deep Offshore Borneo B.V. issued a contract for an environmental baseline study of its Block CA1 to collect sufficient samples of sediment and water column to assess potential impacts of oil and gas exploration and production. In May–June 2011, 51 0.25-m² box core samples were collected for benthic infauna and sedimentology over depths of 1000–1740 m. Another 54 stations were sampled for seafloor video images. The benthic infaunal composition is typical for slope and deep-sea sediments, with polychaetes dominating the fauna, and groups such as amphipod, isopod, and tanaidacean crustaceans being common together with bivalve, gastropod, and aplacophoran molluscs. The acrocirrid squid worm, *Teuthidrilus samae* was observed in video images. A total of 616 species of benthic infaunal invertebrates were identified. The polychaete annelids were dominant with 329 species and accounted for 53.4% of the fauna. The molluscs and crustaceans, accounted for 6.2 % and 33.3%, respectively. The fauna consists of numerous rare species that are believed to be entirely new to science together with other more common taxa such as *Aurospio dibranchiata*, *Prionospio fauchaldi*, *Levinsenia flava*, and *Glycera tessellata* that are more widely distributed globally. The degree of endemism is extraordinary, however, with up to 85% of the species believed to be new to science. Although density was relatively low, species richness and diversity were high in all samples. Evenness ranged from 0.92 to 0.98, reflecting the equitable distribution of individuals among species. Application of Fisher's Log series model and Hurlbert's rarefaction (ESn) demonstrated that all samples approached the log-series distribution of species of individuals predicted by Fisher's Log series model. There were no apparent depth-related community patterns. Instead the benthic faunal assemblages are more or less similar throughout the study area.

Redescription of *Capitella perarmata* (Gravier) from Antarctica with notes on life history and comparison with *C. capitata* from the Arctic [Poster]

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Capitella perarmata (Gravier, 1911) was originally reported as *Isomastus perarmatus* from the South Shetland Islands in shallow subtidal depths. The species has subsequently been reported more widely around the Antarctic continent and to date remains the only species of the genus named from the Southern Ocean. A large collection provided by the Australian Antarctic Program from shallow subtidal depths near the Davis and Casey Stations contained excellent material for study. Additional collections from the eastern side of the Antarctic Peninsula were also examined. The species is similar to the type-species, *C. capitata*, from Arctic and subarctic locations in that the majority of specimens have male genital spines; specimens lacking these spines are rare. The thoracic region is generally consistent in shape and size, it may sometimes have a few enlarged anterior setigers, but typically the thoracic setigers are uniform in size, and only slightly larger than abdominal setigers. Thoracic segments are not pigmented, but the abdominal region is distinctly speckled with brown pigment. Methyl green stain concentrates on setigers 5–7. The 9-setiger thoracic region has capillaries on noto- and neuropodia of setigers 1–7; these are replaced by genital spines on setigers 8–9. Neurosetae of setigers 8–9 include multidentate hooded hooks with numerous apical teeth in several rows above the main fang. All setae of abdominal segments are hooded hooks. The thoracic capillaries are thicker and fewer in number than reported for *C. capitata*. Branchiae are absent. Numerous specimens were found with egg masses present inside the tubes. Development is entirely direct, similar to that of *C. capitata*.

New species of *Chaetozone* (Polychaeta: Cirratulidae) from British Columbia and the Canadian Arctic [Poster]

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Polychaetes from Baffin Island, Hudson Bay, and Prince Rupert, BC include new species of the cirratulid genus *Chaetozone*. As typical for bitentaculate cirratulids, most species are endemic to certain geographical areas and/or habitats; few species are widely distributed. The new Arctic species reported here have been erroneously referred to *C. setosa* Malmgren, the type species. *Chaetozone* sp. 1. Baffin Island: East Angiak Island, 132–245 m and Hudson Bay, ~100 m. Body heavily pigmented with irregular brown speckles; prostomium, narrow, elongate; with one long peristomial ring and a narrow short ring bearing a pair of tentacles; first pair of branchiae occur immediately posterior to tentacles on an elongate first setiger followed by a second more posterior pair of branchiae on the same setiger in line with setal fascicles; posterior spines occur in partial cinctures with a few short, curved blunt-tipped spines alternating with capillaries; neurohooks beginning in posterior 1/3 of body, notohooks beginning in far posterior setigers. Pygidium simple, with a terminal anus and simple ventral lobe. *Chaetozone* sp. 2. Hudson Bay, ~100 m. Body without any distinctive pigment; prostomium elongate, peristomium with two large achaetous rings; tentacles arising from posterior margin of second ring; first and second pair of branchiae of setiger 1; posterior spines heavy, pointed, alternating with long, thin capillaries organized into full cinctures on elevated membranes; narrow, with elongate, ventral cuplike lobe. *Chaetozone* sp. 3. Prince Rupert, British Columbia, 5–20 m. This species is similar to *C. commonalis* Blake, 1966, a California shelf species in having the tip of the posterior spines drawn out into a fine point that then curves back upon itself forming a simple hood. The British Columbian species differs in having the first pair of branchiae on the peristomium and lateral to the tentacles instead of on the first setiger.

The evolution of myoanatomy in Annelida as revealed by immunohistochemical investigations

Bleidorn presenting: Helm, Conrad and Christoph Bleidorn*
Refer Helm for abstract.

Glyceriformia (Annelida) of the abyssal South Atlantic and Southern Ocean

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Within the framework of the multinational Census of the Diversity of Abyssal Marine Life (CeDAMar) programme the ANDEEP, BIOZAIRE and DIVA projects explore the fauna inhabiting sediments in the South Atlantic and Southern Ocean deepsea basins. Therefore, in numerous working areas a quantitative sampling was performed for organisms of all size classes (nano- to megafauna). The main aim of the study was to recognize the benthic deep sea diversity and furthermore, to detect potential biogeographic barriers between the investigated basins. Polychaetes are one of the dominant groups in such soft bottom habitats in terms of abundance and species richness. Especially, taxa within the Phyllodocida are often biogeographically widespread and species of the families Glyceridae Grube, 1850 and Goniadidae Kinberg, 1865 are well known as typical muddy sediment inhabitants. Therefore, morphological and molecular investigations of these Glyceriformia Fauchald, 1977 might be profitable for examining species diversity and their distribution patterns.

A new and effective narcotic to immobilize nereid worms [Poster]

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Different narcotics have been successfully used to immobilize polychaetes, either in preparation for fixation, or prior to photography. The most widely used substance, yielding best results to date, is magnesium chloride ($MgCl_2$), diluted in seawater to about 7%. Other substances used for this purpose, mentioned in different references, are MS222, phenoxyethanol with final less than 1%, and ethyl alcohol 70%. We examined different narcotic agents ($MgCl_2$, $MgSO_4$, menthol crystals, and a new commercially developed carvacrol called Dentol, Khoramman Co.) with similar concentrations, and similar exposure time, to relax nereid polychaetes and to facilitate the eversion of the proboscis. Everted proboscis status was used to measure the substances' effectiveness. One hundred and twenty live nereid worms, collected from the intertidal zone of Qeshm Island, Persian Gulf, were relaxed in aforementioned substances, fixed in 5% formaldehyde in seawater, stored in 70% ethyl alcohol, and were observed under a stereomicroscope. Our results showed that the Denthol carvacrol was by far the best substance, in comparison to the other three chemicals, to relax polychaetes. The next best substances in this study were $MgSO_4$, menthol crystals, and $MgCl_2$.

New symbiotic associations involving polynoids (Polychaeta, Polynoidae) from Atlantic waters, with re-description of *Parahololepidella greeffi* (Augener, 1918) [Poster]

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Among the polychaete families, the Polynoidae includes the highest number of symbiotic species. These were about 163 (involved in more than 420 relationships) after Martin and Britayev (1998), but its number has continuously been increased, currently being more than 200 species involved in about 550 relationships. Among the newly reported associations some correspond to species reported either as non-symbiotic or as free-living, which turned out to be symbionts when new or more precise observations were being carried out. This is the case of the genus *Parahololepidella*, which was proposed by Pettibone (1969) to include *Hololepidella greeffi* Augener, 1918. The same author also considered *H. fagei* Rullier, 1964 as a junior synonym. All known specimens of the species were reported as free-living from shallow waters in the vicinity of San Tome and Cabo Verde islands. New materials of this species, also collected in Sao Tomé, were found in the collections of the Museo Nacional de Ciencias Naturales (MNCN-CSIC) of Madrid. In this case, all specimens were living in association with antipatharian colonies (*Antipathes* sp.), crawling on the main stems of the plumose branches of the coral, having very similar color (at least preserved). The morphology of these new specimens agrees well with the original description, except in the distribution of elytra after chaetiger 32. This varied from specimen to specimen, indicating that this feature is not appropriate neither for specific, nor for generic differentiation. In this poster, we provide a re-description of *P. greeffi*, as well as further details of the disposition of the worms on the host colonies and some considerations on the status of *P. fagei*. A list of all known polychaete species associated with antipatharian corals is also provided. Furthermore, we also report on new findings of *Gorgoniapolynoe* species from deep waters of the Atlantic coasts of Spain, living in tubes formed by highly modified sclerites of *Candidella* and *Narella* corals, and *Anotochaetoneo michelbaudi* Britayev and Martin (2005), previously known only from the two specimens of the original description.

Reproduction and development in onuphid polychaetes

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Polychaetes of the family Onuphidae are tube dwelling worms with lecithotrophic development and different degree of parental care ranging from broadcast spawning to viviparity. Gametes and developmental patterns in *Mooreonuphis stigmatis* and *Leptoecia vivipara*, species representing two monophyletic subfamilies of onuphids, were studied utilizing methods of light microscopy, histology, SEM, TEM and cLSM. *Mooreonuphis stigmatis* was collected from intertidal mud flats in the north-eastern Pacific. Females bear large yolky eggs with two attached strings of nurse cells in the posterior segments. Males have spermatozoa with very long nuclei, conical acrosomes and relatively short flagella developing in the coelomic cavity. Genital segments of females bear dorsal seminal receptacles – organs of sperm storage. Lecithotrophic larvae develop inside the parental tubes. Up to three hatches with about 20–30 larvae can be found in a single female tube. Larvae in every hatch develop synchronously and are released to the environment at a stage of 18–20 chaetigers. A number of brooding specimens of *L. vivipara* was found at several deep-sea sites around Antarctica. Supposed females have paired serial ovaries in the anterior segments and may bear up to 12 broods inside the coelomic cavity of the mid body region. Development of broods is asynchronous; each brood represents a consecutive stage from an unfertilized oocyte with a cap of nurse cells to a well developed juvenile with up to 13 chaetigers. No male gametes were observed in *L. vivipara*. Both analysed species display reduction of trochal ciliation in the developmental stages and replacement of provisional chaetae by definitive chaetae. Two patterns of chaetal replacement characteristic for two onuphid subfamilies are described. Two types of consecutive sets of maxillae are found in non-feeding broods of both species. The third type of maxillae is reported in juveniles released to the environment and in adults.

First insight into phylogeny of Hyalinoeciinae (Onuphidae) inferred from one mitochondrial and four nuclear markers [Poster]

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Hyalinoeciinae represent one of the two monophyletic subfamilies of onuphid polychaetes comprising six genera and ca. 80 species. They have a world-wide distribution from shallow subtidal areas to abyssal plains with greater species diversity in deep waters. Hyalinoeciinae share a number of morphological and ontogenetic synapomorphies such as the position of subacicular hooks in parapodia, arrangement of nurse cells in oocytes or specific pattern of chaetal replacement in larval development. Although they can reach extremely high densities and are commonly found in trawl and sledge catches, none of the six genera has been the subject of comprehensive revisionary work and their species compositions and monophyletic status remain questionable. All members of Hyalinoeciinae demonstrate signs of progenesis in lacking a number of morphological characters normally present in adults of other onuphid genera. The body size and degree of character loss/underdevelopment varies in different genera and species, however it is not clear whether this variation is depth-related or not. A complete nuclear 18S rDNA (~1800 bp), ITS1 (~500 bp), ITS2 (~350 bp), a fragment of the nuclear 28S rDNA (~650 bp) and a fragment of the mitochondrial 16S rDNA (~500 bp) were amplified for nine species of Hyalinoeciinae representing four genera in order to assess their monophyly and investigate intrageneric relationships within the subfamily. Preliminary results show that *Hyalinoecia* and *Nothria* are monophyletic with strong node support while *Neonuphis* and *Leptoecia* form a joint monophyletic clade. *Leptoecia+Neonuphis* were sister to *Hyalinoecia* also sharing a number of morphological synapomorphies such as organic tubes and the absence of peristomial cirri.

Sphaerodoridae from the North Atlantic [Poster]

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Sphaerodorids (Sphaerodoridae, Polychaeta) from the North Atlantic are relatively well known in comparison with other parts of the world. Several surveys and collecting trips have been undertaken in the last two decades, resulting in a broad range of specimens from shallow waters, slope and deeper environments. However, revision of type material and a vast amount of additional specimens from museum collections revealed the presence of new species and increased the range of distribution of some of the previously known ones. We are presenting the results of this taxonomic survey together with the biogeographic information. The potential effect of bottom topography and distribution of ocean currents and water masses on species distributions is discussed. In relation to this, distribution and presence of species across the ridge separating the North Atlantic and the Nordic Seas is studied.

Preliminary phylogeny of Sphaerodoridae and relationships with other Phyllodocida

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Sphaerodoridae is an uncommon group of marine worms associated mainly with sediments from shallow to deep sea environments from worldwide localities. Monophyly of the family relies on morphological features such as the presence of glandular tubercles and papilla over their body surface, arranged in longitudinal rows and a thick cuticle covering the epithelium. Sphaerodoridae share several features with members of Phyllodocida but sistergroup relationships have not yet been assessed. The classification and relationships of the members of the family also require further investigations. The family currently comprises approximately 90 species in 10 accepted genera, with number of species within each genus being very variable, (*Amacrodorum*, *Commensodorum* and *Euritmia* are monospecific while *Sphaerodoropsis* comprises 47 species). We present the first phylogenetic hypothesis of Sphaerodoridae using morphological, mitochondrial and nuclear sequence data. Homologies of certain morphological attributes of Phyllodocida and character transformations are discussed. The inclusion of several members of Phyllodocida also enlightens evolutionary relationships of members of this clade.

New species of *Branchiommma* Kölliker, 1858 (Polychaeta: Sabellidae) from the northeastern Brazilian coast, states of Paraíba and Pernambuco [Poster]

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Coastal reefs off the northeastern Brazilian coast, formed mostly by coralline algae, corals and sandstone reefs, present great structural complexity. Several microhabitats are found, suitable for colonization by benthic marine organisms. Polychaetes, one of the most important marine groups in species richness, are particularly abundant on the reefs off northeastern Brazil, however the species composition of the polychaete fauna on these areas is still poorly known. Sabellidae comprises sedentary animals, belonging to ~500 valid species, distributed in 46 genera; of those, 42 species have been recorded for the Brazilian coast, although only 6 are known to occur off the states of Paraíba and Pernambuco. The aim of this study is to describe new species of *Branchiommma* from Paraíba and Pernambuco, northeastern Brazil. Collections were made at peaks of low tide from reefs off fifteen beaches along the states. Algae, ascidians, sponges, coral reefs, and similar substrates were scraped from the rocks, relaxed in menthol solution, preserved in 4% formalin and later transferred to 70% ethanol. Specimens were identified under stereo-, light and scanning electron microscopes. Three new species of *Branchiommma* were identified, *Branchiommma* sp. n. 1, has crown repeating units of pigmentation, each with pink, yellow, and white bands; basalmost row of stylodes paired and unpaired among radioles, following rows always paired; all stylods similar. *Branchiommma* sp. n. 2, has crown alternating five sets of olive-green and white bands, with yellow spots between stylods of each pair; stylodes of variable length and shape, longest about twice the length of shortest; stylodes of basalmost row digitiform and unpaired, following rows with distinctly broader, distally forked stylods. *Branchiommma* sp. n. 3, has crown alternating olive-green to dark brown bands with white bands, pigmentation extending to pinnules; stylodes of uniform length and morphology, those of basalmost row digitiform and unpaired.

New species of *Loimia* (Malmgren, 1865) from the northeastern Brazilian coast, states of Paraíba and Pernambuco [Poster]

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Polychaetes are usually one of the most important groups in terms of both benthic biomass and species richness, from the intertidal zone to great depths. The family Terebellidae counts ~500 valid species, distributed in 64 genera. The genus *Loimia* has ~20 valid species, of which just three have been recorded for Brazilian waters so far. The aim of this study is to describe three new species of *Loimia* from the Brazilian coast. For this study we used material from different localities off the Brazilian coast. Collections in the northeast of Brazil were made at peaks of low tide from reefs off fifteen beaches along the states of Paraíba and Pernambuco. Algae and sponges, ascidians, mussel beds and similar substrates were scraped from the rocks, examined under stereomicroscopes, polychaetes were sorted, relaxed in menthol solution, preserved in 4% formalin solution and later rinsed in fresh water and transferred to 70% ethanol. In addition, material from the Campos Basin (RJ-ES), collected by Habitats project, "Environmental Heterogeneity in the Campos Basin", coordinated by CENPES/PETROBRAS, which collected at depths from 12–3.301 m, between 2008 and 2009 also were used. The species were identified using stereo-, light and scanning electron microscopes. Three new species of *Loimia* were found: *Loimia* sp. n. 1 is characterized by having a pair of low lateral lobes on segment 1, distally rounded, almost semicircular; segment 3 with lower lateral lobes than the previous ones; large eyespots, dark, arranged in descending order of size, from the mid-dorsal lateral direction to dorsolateral. *Loimia* sp. n. 2 has segment 1 with a pair of high lateral lobes, thick, triangular and rounded distally, and may cover the upper lip; segment 3 with a pair of high lateral lobes, thick, semicircular, rounded distally. Finally, *Loimia* sp. n. 3 which is characterized by having a pair of high lateral lobes on segment 1, with rounded distally, almost semicircular, thin, reaching half of the upper lip.

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New species of Terebellidae (Annelida: Polychaeta) from the Campos Basin, off the Brazilian coast [Poster]

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Polychaetes are usually one of the most important groups in terms of both benthic biomass and species richness, from the intertidal zone to great depths. The family Terebellidae counts ~500 valid species, distributed in 64 genera, of which only 41 species, belonging to 20 genera were already recorded for the Brazilian coast. Furthermore, taxonomic surveys in Brazil were concentrated in coastal areas with shallow waters, while the fauna inhabiting deeper areas is virtually unknown. The aim of this study is to report the diversity of Terebellidae in the Campos Basin, off the states of Rio de Janeiro and Espírito Santo, southeastern Brazil. The material was collected by the HABITATS project, "Environmental Heterogeneity in the Campos Basin", coordinated by CENPES/PETROBRAS, from 12–3.301m deep, in 2008 and 2009. The specimens were identified under stereo-, light and scanning electron microscopes. Nearly 1500 specimens of terebellids were identified, belonging to 25 species; of those, 16 species are new to science, belonging to the genera *Amaeana*, *Amphitrite*, *Eupolymnia*, *Lanice*, *Loimia*, *Pista*, *Pistella*, *Hauchiella*, *Polycirrus*, *Proclea*, *Pseudostreblosoma*, *Streblosoma*, *Euthelepus*, and *Thelepus*. In addition to the new species, this is also the first report of the genera *Hauchiella*, *Euthelepus* and *Proclea* for Brazilian waters. From the continental shelf (down to 200 m), around 400 specimens were collected, belonging to 18 species, of which *Amaeana* sp. nov., *Polycirrus nonatoi* and *P. papillosus* were the most abundant. On the continental slope and canyons (~200–3100m), higher abundance of specimens and species diversity were detected, with ~1100 specimens obtained, belonging to 21 species, seven of which are exclusive to these areas, *Polycirrus breviuncinatus*, *P. habitats*, *Loimia* sp. nov., *Pista* sp. nov., *Streblosoma* sp. nov., *Thelepus* sp. nov., and *Proclea* sp. nov.

Considering small macrofauna in biodiversity research: polychaetes of the Joseph Bonaparte Gulf, Timor Sea, Australia

Carroll presenting: Przeslawski, Rachel*¹, Chris Glasby², Charlotte Watson², Andrew Carroll*¹

Refer Przeslawski for abstract.

How many *Monticellina* (Laubier, 1961) species (Cirratulidae) occur in North East Atlantic? [Poster]

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Monticellina (Laubier, 1961) was erected as a new genus for a new species *heterochaeta* from Banyuls-sur-Mer, Mediterranean Sea and placed in the family Ctenodrilidae. Later, Laubier (1966) synonymized his new genus with *Tharyx* (Cirratulidae). In a revision of Cirratulidae (Blake, 1991) from the North West Atlantic *Monticellina* was re-instated in a new combination with a species described from off West Africa as *Cirratulus dorsobranchialis* (Kirkegaard, 1959). Since then *Monticellina* has been recorded from various localities in the North Atlantic and Mediterranean (Arvantides, 2000, Simboura & Nicolaidou 2001, Aleffi et al 2003 and Gil & Sarda, 1999). However, the taxa are very fragile and there are no adequate descriptions of whole specimens. The aim of this research is to establish the distribution of *Monticellina* species in the North East Atlantic.

Transcriptomic and proteomic insights into larval metamorphosis of the polychaete *Pseudopolydora vexillosa*

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The life cycle of the polychaete *Pseudopolydora vexillosa* has two distinct stages: the larval stage and the juvenile stage. The transition between these two stages is mediated by onset of competency, attachment and metamorphosis. The molecular mechanisms that regulate this transition process remain largely unknown. To improve this situation, transcriptomic and proteomics techniques have been adopted to identify molecular processes that regulate larval metamorphosis of *Pseudopolydora vexillosa*. First, we highlight the progress made by gel based (2-DE) proteomics approach. Several proteins, phosphoproteins and glycoproteins were identified in larval to juvenile stages. The majority of these proteins were related to translation and transcription, energy metabolism, cytoskeleton, and oxidative stress. Second, transcriptome analysis of *P. vexillosa* revealed abundant expression of transcripts associated with signal transduction pathways (MAPK, Wnt, Notch and Ca²⁺/CaM-mediated pathways). Third, gel-free proteomics improved the identification of differentially expressed proteins; molecular processes such as cell signaling, metabolism, transcription and translation and oxidative phosphorylation that probably regulate larval metamorphosis in polychaetes. Our results highlighted the importance of transcriptome/genome sequences to improve the output and quality of proteome in non-sequenced organisms. Overall, the above dataset offers new hypotheses and questions to further investigate the regulatory mechanisms during larval metamorphosis in polychaetes.

Polydora (Annelida, Spionidae) boring into shells of oysters and abalone cultured in South Korea [Poster]

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Three *Polydora* species, *P. aura* Sato-Okoshi, 1998, *P. calcarea* (Templeton, 1836), and *Polydora* sp. were found infesting shells of the Pacific oyster *Crassostrea gigas* in hanging culture on Geoje Island, South Korea. *Polydora* cf. *hoplura* Claparède, 1868 was found boring into shells of the abalone *Haliotis discus hannai* cultured in land-based tanks on Shinji Island, South Korea. Worms morphologically identical to oyster-boring *Polydora* sp. were also found inhabiting silty tubes on muddy substrata. Adult *Polydora* are described and illustrated and a key for their identification is provided. These species are non-specialized borers and also occur in shells of other molluscs. The prevalence of oyster infestation by *Polydora* varied among farms and reached 100% in some places. *Polydorins* boring in oysters cultured in South Korea probably do not reproduce until harvest. The oysters become infested with the polydorin larvae produced by worms boring in oysters kept for 1–2 years for breeding in the farms, and have been identified boring in wild molluscs in the vicinity of the farms. Despite the high prevalence of infestation and ability to form mud blisters on shells, *Polydora* worms do not appear to pose a threat to oyster aquaculture in South Korea because of the short cycle of oyster cultivation, where oysters reach commercial size and are harvested after approximately nine months hanging in the water.

Effects of anesthesia and fixation on the morphology of *Scolelepis chilensis* Hartmann-Schröder, 1962 (Spionidae) [Poster]

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The goals of the present study are to identify the effects of methods of anesthesia and fixation on body shape of *Scolelepis chilensis* Hartmann-Schröder, 1962, and also check for morphology variation due to time in fixation methods. Specimens were collected at Flamengo beach, Rio de Janeiro State, Brazil in the intertidal area and divided into 11 treatment groups, with 17 specimens each. These treatments consisted of: control group (CTR, measured alive); fixed in 4% formaldehyde (FOR), 70% ethanol (ETO), and 92.8% commercial ethanol (ETA); anesthetized by magnesium chloride (MAC), menthol crystals (MEN), freshwater (FRW), and refrigeration (REF). To test the morphology variation with time, specimens were fixed directly in 4% formaldehyde (FOR 6), 70% ethanol (ETO 6) and 92.8% commercial ethanol (ETA 6) being measured after six months. Fifteen morphometric variables were analyzed by multivariate statistics with R package. Size effect was controlled using a Principal Components Analysis, using the residuals to perform a Discriminant Analysis. With respect to the effect of anesthetics and fixatives, the first two canonical variables (CV) explained 48% of morphometric variation observed. CV1 was able to separate CTR, FOR and ETO from others treatments by presenting longer prostomia and higher second chaetigers. CV2 was able to separate the same treatments as in CV1, due to width, height and branchial length of chaetiger 30. Also in CV2 ETO is grouped with ETA, MAC, FRW, REF and MEN meaning that these treatments produced similar morphology variation. Concerning the temporal variation in fixatives, CV1 showed a significant variation in morphology since groups measured six months after fixation presented higher scores related to length and width of prostomium. Such differentiation was also observed in relation to body size. As expected, formaldehyde proved to be the best fixative in order to maintain the actual shape for spionid polychaetes.

Morphological anomalies in *Perinereis* species from the Brazilian coast (Polychaeta: Nereididae) [Poster]

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The examination of a large numbers of specimens, mainly in taxonomic studies, may lead to the discovery of morphological anomalies. The aim of the study is to describe morphological anomalies observed in some individuals of *P. anderssoni* and *P. ponteni*, collected in different regions on the coast of Brazil. A total of 290 individuals were analyzed from the states of Paraná (PR), São Paulo (SP), Rio de Janeiro (RJ), Bahia (BA) and Paraíba (PB). The specimens were observed with the aid of an optical microscope and a stereomicroscope and photographed with a Sony digital camera. A total of 36 specimens presented morphological anomalies such as variations in the number of tentacular cirri and eyes, bifid or fused antenna, chaetiger with three parapodia, and others. Considering only the modified specimens *P. anderssoni* (58.33%) present the highest percentage. As for *P. anderssoni* the most frequent anomaly was the presence of a single antenna and for *P. ponteni*, the presence of seven tentacular cirri. With respect to sampling localities, considering the two species, Ilha do Mel (PR) was the area with the highest number of individuals with anomalies (16.12%), followed by São Francisco do Conde (BA) (12.5%), Martim de Sá (SP) (11.34%), Itaipu (RJ) (11.23%) and Tambaba (PB) (11.11%). Regarding the health of these areas, previous data report the presence of different contaminants in most regions in which our samplings were made. Even though it is beyond our aim, at this time, to identify the possible causes, pollution may be a possible factor generating the anomalies. Therefore, additional studies are needed to confirm the real cause of the anomalies and its occurrence extension.

Pseudonereis (Polychaeta: Nereididae) from the Brazilian coastline [Poster]

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The Nereididae family is one of the most well known taxa of polychaetes, the members of this group have a wide geographic distribution and may be found in many environments. Nevertheless, due to some difficulties imposed by the apparent morphological homogeneity between species, many taxa have been considered cosmopolitan or presenting a wide distribution. Meanwhile its occurrence on large coastline areas remains poorly known or even unknown. This study aims to provide a taxonomic survey of *Pseudonereis* species from the Brazilian coastline. Previous studies recorded three species, two of them originally described for the region, but some identifications requires some review. Up to now we were able to examine about 210 specimens from São Paulo, Espírito Santo, Rio de Janeiro and Paraíba. Preliminary morphological results indicate intrapopulation and interpopulation variation in notopodial ligules and size of dorsal cirri of posterior parapodia, as well as in the types and quantity of paragnaths. Three species were identified: *Pseudonereis palpata* in São Paulo and Espírito Santo, *Pseudonereis variegata* in São Paulo; and *Pseudonereis* sp. in Rio de Janeiro and Paraíba. Previous records of *P. gallapagensis* from the Brazilian coast are probably misidentifications. Some variations were not indicated in previous studies, which may suggest the presence of new records or even new species. Type and additional material will be examined and morphometric analyses will be performed in order to clarify some issues.

Diversity of Polychaeta on Falkland Islands shores [Poster]

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The Falkland Islands are situated in the South Atlantic just north of the Antarctic Convergence. The coastline is affected by two very different maritime regimes; southeastern coasts are dominated by southern cold subantarctic water, while northern temperate waters prevail in northwestern areas. Sediment type is greatly variable around the different shores with a large variety of habitats represented from soft mud to hard bedrock. Although some collecting and research was done on the intertidal polychaetes of the Falkland Islands at the beginning of the twentieth century, since then most sampling has been conducted offshore and the intertidal region has been largely neglected. In 2011, a project was initiated to investigate the polychaete fauna of the intertidal region, visiting shores from all around the islands in order to provide a more complete overview of the diversity and species present and their distribution. To date, three new species have been confirmed and it is expected that the samples will yield many more. This analysis looks at the different communities dominating the different sediment types and investigates whether there is any evidence of differing communities between the northwestern and southeastern regions.

Different diets affect performance and lipid profile of cultured polychaete worm *Perinereis vallata*

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Considerable R and D effort is being invested to reduce dietary inclusion rates for fishmeal and fish-oil and their use for animals not intended for the human food chain, such as for bait, is difficult to justify. It is known that some nereids can synthesise long chain highly unsaturated fatty acids (LCHUFAs) *de novo*. *Perinereis vallata*, a candidate for baitworm culture in South Australia, was grown on diets with varying proportions of fishmeal and fish-oil (HM, LM and NM reflecting high, low and no-marine derived ingredients) for 12 weeks. Survival was high (>86 %) and unaffected by diet or time. Culture performance was best in HM worms; growth (mg worm⁻¹ day⁻¹), specific growth rate (SGR), final mean weight and biomass were significantly higher with HM than LM. Feed conversion ratio and total lipid (7.9 – 9.8 %) were unaffected by diet. Lipid level in HM worms was lower than dietary levels whereas LM and NM worms contained more lipid than their diet. Despite HM worms containing significantly more LCHUFA than NM worms, levels were lower than those in their diet. In comparison LM and NM worms had higher LCHUFA levels than their diets. Total n-3, n-3 HUFA and n-3:n-6 were significantly higher in HM than LM or NM and total n-3 and n-3:n-6 were also significantly higher in LM than NM. Despite HM worms containing more EPA and DHA than LM or NM they contained less than their diet whereas LM and NM worms contained more; thus confirming *P. vallata*'s ability to synthesise LCHUFAs *de novo*. Thus baitworms fed high lipid diets rich in LCHUFA appear to use lipids as fuel whereas those fed low-lipid and low-LCHUFA diets are able to increase both lipid and LCHUFA levels. Results suggest cultured worms may be fed low cost diets without marine derived ingredients.

Long term monitoring of a brine discharge: impact and recovery on polychaete assemblage

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Desalination of seawater is a growing industry in many regions that may impact on benthic communities. The aim of this work is to present the impact of a brine discharge on polychaete assemblages and their recovery following the implementation of mitigation measures. An eight-year study was conducted in San Pedro del Pinatar (SE Spain) and a grid of 12 sites in a depth range of 29-38 meters was analysed during autumn 2005-2013. Brine discharge started in 2006 and produced a significant decrease of abundance, richness and diversity of polychaete families in the location with closest proximity to the discharge, where salinity reached 50 psu. In 2010, a diffuser had been deployed at the end of the pipeline in order to increase the mixing and reduce the impact on benthic communities. After implementation of this mitigation measure, the salinity decreased to less than 38.5 psu and a recovery of abundance, richness and diversity of polychaetes was observed to levels similar to that before the discharge. It has been observed that some families like Paraonidae and Magelonidae are more tolerant to this impact. Syllidae and Capitellidae, although affected by the discharge, recovered faster; while some families such as Sabellidae and Cirratulidae recovered slowly and only reached the assemblage structural parameters similar to the initial values at the 2013 survey.

Interesting Polychaeta species in Alicante Bay (W Mediterranean): Syllidae and Sabellidae [Poster]

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Two alien species of the genus *Branchiomma* (Sabellidae) that are well established in the Western Mediterranean, *Branchiomma luctuosum* and *B. bairdi*, and four species of Syllidae have been newly detected in several surveys on the Alicante coast. A dense population of *B. luctuosum* and two specimens of *B. bairdi* were detected in an area close to a brine discharge. These two species have been first detected on the Spanish coast quite recently (2007 for *B. luctuosum* and 2009 for *B. bairdi*), and records come from areas within a 200 km range, such as Valencia Port for *B. luctuosum* and the Mar Menor coastal lagoon for *B. bairdi*. Thus, a rapid spread along the Spanish Mediterranean coast can be suspected. Among the identified material, one new syllid species belonging to the genus *Sphaerosyllis* Claparède, 1863 was also found: *Sphaerosyllis climenti*, distinguished in having bulbous, small antennae, tentacular and dorsal cirri, small parapodial glands, with granular material, and compound chaetae with short blades. Two other syllid species collected, *Parapionosyllis* cf. *macaronesiensis* and *Syllis* cf. *mauretanica*, are first reported in the Mediterranean Sea. Besides, another syllid species collected in the study area, *Erinaceusyllis serratosetosa*, was originally described from Australia but has been recorded occasionally from Menorca and the Italian coast, pointing to a real spread process. The presence of these species increases the number of taxa that characterize the marine biodiversity of the Spanish East Coast (Mediterranean Sea) as well as the knowledge of their geographical distribution. Some of these species, such as *B. luctuosum*, *B. bairdi* and *E. serratosetosa*, are already recorded in the current catalogues of alien species for the Mediterranean Sea, but further research would be necessary to understand the reason why *Parapionosyllis* cf. *macaronesiensis* and *Syllis* cf. *mauretanica* are present in this geographic area.

Protodrilus (Protodrilidae, Annelida) from the southern and southeastern Brazilian coasts* [Poster]

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Protodrilus corderoi, *Protodrilus* n. sp. 1 and *Protodrilus* n. sp.2 are reported from beaches in southern and southeastern Brazil and described combining live observations with light and electron scanning microscopy. *Protodrilus corderoi* is redescribed from specimens collected at the type locality and a neotype is assigned, since the original type material no longer exists. New information on reproductive organs, segmental adhesive glands and unpigmented ciliary receptors as well as morphometrics is provided. *Protodrilus* n. sp. 1 and *P. n. sp. 2* are formally described. *Protodrilus* n. sp. 1 is diagnosed by the presence of separated lateral organs on segments 7-12, three spermiducts in segments 10-12 and salivary glands in segments 1-9. *Protodrilus* n. sp. 2 is defined by the presence of separated lateral organs on segments 7-16, long pygidial lobes and body tapering towards the pygidium. Our results suggest that the species-specific occurrence of *Protodrilus* is strongly correlated with the conditions of their interstitial environments. *Protodrilus* n. sp. 2 has a large body and long palps with dense ciliary bands hereby exploiting the larger interstices of the very coarse sandy sediments of a reflective sheltered beach where it was collected. Conversely, *Protodrilus corderoi* and *P. n. sp. 1* both have slender bodies and shorter unciliated palps (except for sensory compound cilia), which may be advantageous in the medium-coarse well-sorted sediments of the more energetic swash zone of exposed intermediate-reflective beaches where they are found. Moreover, *Protodrilus* n. sp. 2 and *P. corderoi* were found in nearby beaches but never co-occurring, whereas *P. corderoi* and *P. n. sp. 1* can be found in geographically widely separated areas though within similar habitats.

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Ficopomatus enigmaticus in the Coorong and Murray Mouth estuary, South Australia; distribution, settlement and reef structure

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One of the most common serpulids found in estuaries and lagoons around the world is the reef-building tube worm *Ficopomatus enigmaticus* (Fauvel, 1923). The Coorong, Murray Mouth and Lower Lakes at the terminus of Australia's largest river system have been subject to extreme environmental changes, including the Millennium drought and recent flood. In a series of projects spanning several years and environmental extremes, we investigated the structure and renewed growth of the tubeworm reefs as well as their occurrence before and after water releases over barrages into the estuary and lagoon. We used experimental settlement plates to detect the distribution of *F. enigmaticus*, and found settlement at a wide range of salinities. Tubeworm reefs had distinct faunal assemblages, and empty tubes were often utilised by spionid polychaetes. Experiments showed that the different assemblages were mainly due to the biogenic structure as such. This presentation will synthesise our investigations into a conceptual model of the ecology of *F. enigmaticus* in an estuary under extreme conditions.

Polychaete faunal assemblages identified along the coast of Massachusetts, United States

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The Massachusetts Office of Coastal Zone Management (CZM) and U.S. Environmental Protection Agency (EPA) collected 521 benthic samples from 2010–2013 aboard the OSV *Bold* off the 192 mile long coast of Massachusetts. The coastline was divided into five zones based on various landmasses and bays: 1) North Shore, 2) Massachusetts Bay, 3) Cape Cod Bay, 4) South of the Islands, and 5) Buzzards Bay. Data from these infaunal samples as well as corresponding still images and sediment grain size samples will be used to categorize and map the various marine habitats in Massachusetts Commonwealth waters. Infauna was identified to the family level for use in characterizing faunal assemblages and their corresponding relationship to environmental factors of interest, including water depth, sediment type, and seafloor topography. The majority of stations were dominated by polychaete families and will be the primary focus of the current presentation. Families of amphipods and bivalves dominated at a limited number of stations. The polychaete only data will be used to identify faunal assemblages within the five zones as well as between the zones. The PRIMER 6 package of statistical routines will be used to calculate Shannon's H' Pielou's evenness value J' , and similarity using the Bray-Curtis algorithm. Similarity analysis using SIMPROF will be used to reveal internally consistent groups of stations while SIMPER will be used to identify the polychaete families that contribute to the similarity within a group as well as the dissimilarity between groups. Non-metric multi-dimensional scaling (MDS) diagrams will depict the relationship of stations in terms of the major cluster groups identified as well as the three environmental factors of interest.

The Bitentaculate Cirratulidae of Norway [Poster]

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The taxonomy of the Cirratulidae of northern Europe remains unresolved. Regional waters including those of Norway serve as the type locality for several species yet the true diversity of this family in the region is poorly understood based on more detailed recent studies of character states. This presentation is focused on eight bitentaculate species collected from coastal waters of Norway. A redescription of *Chaetozone setosa* Malmgren, 1867, the type species for the genus, is presented based upon examination of newly collected material including SEM images. *Chaetozone jubata* Chambers & Woodham, 2003 and *Chaetozone zetlandica* (McIntosh, 1911) were also identified in the material and are redescribed. A new species of *Chaetozone* with a widely expanded thorax and fully developed cinctures is formally described. The four species of *Chaetozone* differ based on development of posterior parapodial membranes and structure of the associated spines that form the distinctive cinctures. A new species of *Caulleriella* with widely separated noto- and neuropodia, distinctly bifid spines, and a pair of anal cirri is described. This differs from a new species of *Tharyx* where the noto- and neuropodia arise close together and the modified spines are knob-tipped rather than bifid. Two new species of *Aphelocheata* are separated based on body shape, prostomial and peristomial characteristics, branchial arrangement, methyl green staining pattern, and number and length of simple capillary setae present. A key to the species of the region is provided.

Histological studies on the reproduction of *Marphysa gravelyi* (Polychaeta:Eunicidae) [Poster]

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The reproductive biology of the eunicid polychaete, *Marphysa gravelyi* (Southern, 1921) of Pulicat lake, India was studied using histological examination of 25 specimens for a period of one year. The worms are dioecious without sexual dimorphism. *M.gravelyi* possesses a pair of ovaries in each genital setiger arising from the lateral side of the worm between the dorsal and ventral musculature and in close proximity to the parapodium and septum. Follicle cells or nurse cells are not seen accompanying the oocytes. Vitellogenesis begins when the oocytes are inside the ovary. In males the testes are present in the same position as the ovaries. *M.gravelyi* was found to breed throughout the year.

A *Chaetopterus* Turf: Discovery of an unusual benthic assemblage in the German Bight, North Sea [Poster]

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During investigations of benthic communities in the German Bight (North Sea), video transects were established to help describe the epifauna on different sediments reaching from boulders to pebbles, sand and clay bottoms. The resulting data are part of a baseline against which changes in environmental quality are going to be measured on a European level. In one of the locations sampled throughout the German EEZ, a dense turf of large tubes was discovered, interspersed with dense assemblages of ascidians. In dredge hauls from the same area, these tubes could be identified as those of *Chaetopterus variopedatus*. As such an assemblage has only been reported once before in the northern North Sea, the new record is presented here together with a discussion of possible environmental conditions that may be favourable.

Review of the Family Cirratulidae (Carus, 1863) from the Magellan Region (Chile): with Description of a new Species of *Dodecaceria*

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The Cirratulidae is one of the polychaete families that tend to be locally restricted on the species level. Identification of cirratulids from relatively unexplored areas therefore has to be undertaken with great care. Assigning specimens to already known species and possibly extending their distributional ranges may often be incorrect, as closer examination rather may reveal new species. The taxonomy of cirratulids is difficult as generic definitions are still not well-defined in all cases despite great efforts undertaken in the recent past, and species-level differences are subtle. The Magellan region is particularly interesting with regard to faunal overlap between the Antarctic and adjacent oceans. The cirratulids from several shelf locations off the Chilean coast were studied in detail, and some of the newly discovered species were presented preliminarily at a past IPC but not yet published. With the material now fully examined, we present a complete overview of the cirratulid fauna of the region, propose synonymies and discuss the faunal affiliations with the Southern Ocean.

Three new species of *Asclerocheilus* (Polychaeta: Scalibregmatidae) from the Norwegian Sea [Poster]

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Members of the scalibregmatid genus *Asclerocheilus* may be recognized by the presence of acicular chaetae in the notopodia (and in some species in the neuropodia as well) of the 1–4 anteriormost chaetigers, combined with an arenicoliform body shape, the absence of branchiae and the absence of dorsal or ventral parapodial “cirri”. At the present, only one species of this genus has been reported from NE European waters, *i.e.*, the type species *A. intermedius* (Saint-Joseph, 1894). Based on material from extensive recent sampling efforts off the west coast of Norway, in particular the MAREANO initiative to map the Norwegian Sea, three new species of *Asclerocheilus* are described. The most common of these species, *A. sp. nov. 1*, has been found in two distinct depth intervals: 35–184 m and 689–1045 m. This species is morphologically very similar to *A. intermedius*, but differs in having notopodial furcate chaetae that begin on chaetiger 2 rather than chaetiger 3. Genetic comparisons of the two species, as well as of specimens of the new species from both depth intervals, will be carried out based on newly collected specimens of *A. intermedius* from near the type locality (Dinard, France). The two other new species of *Asclerocheilus* are found at depths down to 200 m and, although only a limited number of specimens are available, they are morphologically very distinct from *A. sp. nov. 1*. One of them, *A. sp. nov. 2*, has elongate, “antenniform” prostomial lobes and the other one, *A. sp. nov. 3*, is the only one of all these species that possesses eyes. Confusion in the literature concerning the true identity of *A. intermedius* is addressed and a new name proposed for the species reported by Fauvel (1914, 1927) under that name.

Review the Polychaetes of Sudan [Poster]

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The coastal waters of Sudan are known for the highest diversity of habitats and species of the whole Red Sea. The Red Sea is a long, narrow marine basin, with a total length of about 1900- km. It extends northwards from the strait of Baab El Mandab in Yemen to the southern tip of the Sinai Peninsula in Egypt. Its maximum width is 306 km. The Sudanese Red Sea is still fortunate to have attractive and mostly pristine habitats, particularly its coral reefs. Two protected areas are established; Sanganeb and Dongonab-Mukawar Island with good representation of the Red Sea marine ecosystems. Polychaete worms are closely related to leeches and earthworms and together make up the Phylum ANNELIDA. Data on diversity and endemic species for the majority of invertebrate groups including the polychaetous annelids are either not available or have not yet been summarised. The polychaete fauna of the Red Sea is well known. However, as in other taxa mentioned, no data for the total number of species or any statement with regard to endemics for the polychaetes of the Red Sea. Many of the polychaetes were regionally distributed from the Red Sea, Family Acoetidae Kinberg, 1858 (*Polyodontes maxillosus* (Ranzani, 1817)); Family Ampharetidae Malmgren, 1866 (*Ampharete acutifrons* (Grube, 1860); Family Amphinomidae Savigny in Lamarck, 1818 (*Amphinome rostrata* (Pallas, 1766)), other families were recorded from the same source. Thirty-two species of calcareous tube-dwelling polychaetes (Families Serpulidae and Spirorbidae) are recorded from coral reefs in the Sudanese Red Sea. Twenty-two species belong to the family Serpulidae, and 10 to the family Spirorbidae.

Oogenesis in *Phragmatopoma* (Sabellariidae): Evidence for morphological distinction among geographically remote populations

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The Southwest Atlantic Ocean sand-reef builder polychaetes, *Phragmatopoma lapidosa*, was recently morphologically synonymised with *Phragmatopoma caudata*. This study describes, using histochemical and ultrastructural procedures, the gametogenesis in female *Phragmatopoma caudata* from the Southwest (SW) Atlantic and compares it with previous forms for the Northwest Atlantic (NW). In the South American worms, the uncovered ovary consists of simple groups of oogonia attached to blood vessels, and, unlike the NW Atlantic worms, only the proliferative and previtellogenesis phases of the oocytes are associated with blood vessels. In SW Atlantic worms, the oocytes float in the coelom during the vitellogenic phase. We uncovered several heterogeneous features (e.g., cell extensions, accessory cells, ovary capsule, active uptake of material from blood vessels and egg envelope) that can be used to distinguish between North and South Hemisphere populations of *P. caudata*. In light of the observed divergence between worms from these separated populations, our findings do not support taxonomic synonymy. The present study elucidate the biodiversity of sand-reef makers.

Phylogeny of the Polynoidae: many trees, but not on the same scale

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The polychaete family Polynoidae, commonly known as scale worms, comprise 20 or 21 subfamilies and 825 reasonably well described species in over 170 genera. Yet in our analyses, there are perhaps only 6 subfamilies (Admetellinae, Branchinotogluminae, Lepidonotopodinae, Macellicephalinae, Eulagiscinae and Iphioninae) that we might yet consider monophyletic. We present our current best approach using parsimony methods, and discuss the limitations of these results. Among the issues with this analysis that we discuss are: patterns and bias in the geographic and bathymetric distribution of polynoid species, non-independence among the major morphological characters. Molecular data from other workers are beginning to provide an independent means of estimating phylogeny of polynoid taxa. However, since it is unlikely that molecular data will be available for all taxa any time soon, a principal challenge is to relate analyses that are not on the same scale.

Micro-computed tomography as a tool for the 21st century taxonomist? An evaluation using polychaetes

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Continuous improvements in the resolution of three-dimensional imaging have led to an increased application of these techniques in conventional taxonomic research in recent years. Coupled with an ever increasing research effort in cybertaxonomy, three-dimensional imaging could give a boost to the development of virtual specimen collections, allowing rapid and simultaneous access to accurate virtual representations of type material. We explore the potential of micro-computed tomography (X-ray micro-tomography), a non-destructive three-dimensional imaging technique, for supporting research in systematics and taxonomy. This technique allows the creation of digital, three-dimensional representations of specimens, displaying both internal and external characters of the specimens at sub-micron resolution. Sample preparation, image acquisition, data processing and presentation of results are demonstrated using polychaetes as a study object. Effects of the technique on the morphological, anatomical and molecular identity of the specimens are investigated. The resulting 3D models are interactive, allowing users to virtually rotate, magnify or even dissect the specimen, whereas the structure and genetic material of the analysed specimen are kept intact for future studies. These data hold an intriguing potential to be used as virtual type material, so-called "cybertypes", and the creation of virtual collections, simultaneously and instantly accessible via the internet, will inevitably support the transformation of taxonomy into a cyberscience.

Towards an assessment of phylogenetic relationships within Polycirridae

Fitzhugh presenting: Nogueira, João M. M.¹, Kirk Fitzhugh^{2*}, Orlemir Carrerette¹, Pat Hutchings³

Refer Nogueira for abstract.

Ultrastructure of paired utero-intestinal Ducts in Myzostomids reveals their possible excretory Function [Poster]

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Myzostomids are tiny marine worms, parasites or commensals with echinoderms. They are acoelomate, parenchymous, hermaphroditic creatures with complex reproductive system. Their peculiar structure strongly differs from typical annelid organization. Most myzostomids have paired ciliated ducts running from the uterus to the intestine, but multiple pairs are also known. These ducts were assumed to have various functions, with the majority of authors considering them as nephridia, or sometimes as oviducts. The current consensus is that they serve to release the excess of spermatozoa after fertilization. We studied the ultrastructure of utero-intestinal ducts of *Hypomyzostoma* sp. (Myzostomida). The ducts originate from the anterior part of the uterus with a separate opening, run to the ventral side and open with a separate ending into the distal part of the intestine, becoming wider towards the distal section. The epithelium of the ducts is built of cylindrical ciliated cells. At the anterior section of the ducts these cells carry numerous microvilli and a few cilia which entirely fill most of the lumen space. At the posterior section, the cells still carry cilia but not microvilli. In the posterior section of the duct the lumen is substantially wider; both spermatozoa and developing and mature oocytes have been observed there. The presence of spermatozoa there favours the hypothesis about the role of the ducts in expelling the excess of reproductive cells, however, the simultaneous occurrence of the oocytes at different stages of development in the lumen of these ducts is likely to be an artifact. The cytoplasm of the epithelial cells is filled with numerous vesicles, being accumulated in the apical part of the cytoplasm. This is an indication of active physiological processes in that area. We therefore believe that these ducts may complement protonephridia in assisting the excretion process.

The ventral brooding of eggs in Exogoninae (Syllidae), first results

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The reproduction of Syllidae Grube, 1850 includes an unusual variety of mechanisms. In this family, there are examples, among others, of epitoky, hermaphroditism, mating rituals, and direct transference of sperm via spermatophores. In the Exogoninae Langerhans, 1879, the incubation of eggs and, in many cases, also of juveniles, is found in nearly all members, and considered as an adaptation to the interstitial lifestyle. The incubation process occurs in two different ways: dorsal brooding of eggs; and ventral brooding of eggs and, after these hatch, of juveniles, which remain attached to the parental form until they reach a stage of ~10 segments. These two ways of incubation reflect distinct evolutionary lineages, as is becoming better understood with recent phylogenetic studies. However, there are many points of these processes that are still ignored, rendering it difficult to make comparisons with similar phenomena occurring in species of other subfamilies of Syllidae, for a better understanding of the relationships within the family. The present study is a first step to investigate the mechanisms involved in these processes. Examinations are being made with scanning and transmission electron microscopy, and histological sections of *Exogone* sp. n. collected at the Araçá Bay (São Sebastião, São Paulo, Brazil). Our first results indicate that the egg envelope shares the same nature as the body wall cuticle. This alone is an important change in the way we see the process, as the "egg" itself can be considered as part of the juvenile body. If this new idea is corroborated by the additional studies in progress, the larva, instead of the egg, is what is initially ventrally attached to the parental body in *Exogone* sp. n. It is still necessary to investigate if the same occurs in other taxa brooding eggs ventrally, to make more proper comparisons with the remaining syllids.

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On some new records of syllid genera from Brazilian waters [Poster]

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Despite of the extensive length of the Brazilian coast, the numbers of species (~140) and genera (~30) of syllids registered from the country are still low, when compared with other localities, where thorough studies on the syllid fauna have been carried out (e.g., Australia and Spain). Furthermore, many records from the country were provided in thesis and dissertations not formally published, and, especially in the case of ecological studies, most failed in depositing the specimens in permanent scientific collections, making it difficult to confirm the occurrences of those taxa off the Brazilian coast. In addition, most of these reports came from studies from intertidal to shallow waters, and so almost every sample collected in waters below 100m brings at least new occurrences to Brazilian waters, and not rarely species new to science. The material reported here came from surveys during the 'Habitats Project – Campos Basin Environmental Heterogeneity by PETROBRAS/CENPES' (Brazilian energy company), which sampled depths of ~30–3000m deep off the state of Rio de Janeiro, southeastern Brazil. Many species new to science were found, and new records to Brazilian waters include not only species, but also some genera, such as *Eurysyllis* Ehlers, 1864; *Nudisyllis* Knox and Cameron, 1960; *Plakosyllis* Hartmann-Schröder, 1956; *Streptodonta* San Martín and Hutchings, 2006; *Streptosyllis* Webster and Benedict, 1884; and *Xenosyllis* Marion and Bobretzky, 1875. There is still a lot of work ahead, as a great number of specimens remain to be identified, and, in many cases, specific identifications are still missing. However, several of these new records for genera correspond to new species, yet to be formally described.

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Spatio-temporal variability of polychaete settlement along a gradient of acidification at volcanic CO₂ vents (Italy)

Gambi presenting: Ricevuto, Elena¹, K.J. Kroeker², F. Ferrigno¹, F. Micheli² and M.C. Gambi^{1*}

Refer Ricevuto for abstract.

When the worm turned: the quest for Ediacaran bilaterians.

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Ediacara fossils preserved as impressions in sandstone were discovered in the Flinders Ranges of South Australia in 1946. Martin Glaessner interpreted the iconic forms *Spriggina* and *Dickinsonia* as polychaetes on the basis of superficial resemblances to *Tomopteris* and *Spinther*. Rather than relying on comparative morphology, Adolf Seilacher first used bau plan similarities to argue that the Ediacara biota, with few exceptions, represented a lost kingdom. The Ediacara biota is often dismissed as a “failed experiment” that ended at the Ediacaran-Cambrian boundary, dated at 542 Ma. The “Cambrian explosion” of animals is documented on several continents by arrays of Burgess Shale-type fossil assemblages of stem and crown group metazoan phyla. Recently constructed molecular phylogenies of diverse metazoans, scaled to recognize first appearances in the fossil record of crown group phyla, put the split between sponge clades, cnidarians and bilaterians as back in the Cryogenian (635 - 780 Ma), and the divergence of ecdysozoans, lophotrochozoans and deuterostomes as spanning the Ediacaran-Cambrian transition. The predictions of these revised molecular trees have prompted a re-examination of diminutive Ediacara body fossils, such as *Spriggina* and *Parvancorina*. Serial sets of tracks and feeding traces, associated with *Dickinsonia* and *Kimberella*, represent the best evidence that bilaterians were part of the Ediacara biota. In the gap between Ediacaran and Cambrian-style fossil windows (circa. 540 - 525 Ma), less noticed but increasingly complex trace fossils and small shelly fossils, represent the existence of some Ediacaran survivors, and the evolution of ecological innovations. The rise of mineralized skeletal elements, deep burrowing, sediment processing and predation put an end to Ediacaran-style ecology and preservation. The result was a 10-15 million year interval during which most crown group phyla, including the annelids, evolved.

Extremely rapid mineralisation of *Alvinella* tubes at hydrothermal vents: implications for polychaete evolutionary history

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Polychaete tubeworms are an abundant and diverse component of hydrothermal vent and cold seep ecosystems. Currently very little is known about their evolutionary history within these environments, such as over what timescales they were able to adapt to a mode of life based on chemosynthesis and to the extreme conditions associated with vents and seeps. The tubes produced by these polychaetes are one of few robust features produced by annelids that are capable of becoming preserved as fossils, and may therefore hold important clues as to how members of this major animal phylum were able to colonise even these seemingly inhospitable environments. Fossil tubes are quite commonly encountered in deposits representing ancient chemosynthetic sites, and rapid mineralisation processes occurring at these localities are a pathway through which the tubes of these worms may become preserved within the fossil record. However, presently very little is known about how these processes act to completely replace a tube. Recent experiments have shown that the tubes of alvinellids at vents can become entirely mineralised within the timescale of just one year. Preliminary results outlining the progression of mineral replacement for these tubes will be presented, as well as the implications for the evolutionary history of the tube-forming polychaetes at chemosynthetic sites.

Polychaetes as an important source of biomass for applied purposes: ten years of experience [Poster]

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Here we describe ten years of experience in the production and utilization of some filter feeder polychaetes biomass in the Mediterranean Sea. New systems based on polychaetes reared in polyculture to mitigate the impact of aquaculture activities and the development of alternative strategies for control of microbial pollution were developed. In particular we experimented an integrated polyculture technique co-culturing two different low food-chain organisms: *Sabella spallanzanii* and *Mytilus galloprovincialis*, to avoid or reduce environmental impact of mussel farming and to increase the biomass production in a completely not-fed culturing system, obtaining a large amount of biomass per year. This polychaete was also cultured this way in an in-shore aquaculture system. Survival, growth and capability of this species to remove several bacterial groups from aquaculture waste were evaluated in order to ascertain its employment as bioremediator in a farming scenario coupled with the conversion of the wastes into polychaete protein rich biomass of potentially marketable value. Finally we proposed to utilize the produced biomass for different purposes: from the extraction of active compounds, to the production of a dietary supplement for fishes nourishment.

Epigenetics, developmental plasticity, and larval evolution

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Developmental plasticity is the ability of an organism to respond to environmental signals through a change in development, leading to a change in form. We investigated a potential epigenetic effect on plasticity in larval development in the spionid *Polydora cornuta*. Larvae of *P. cornuta* are dimorphic and include both small planktotrophic larvae and large cannibalistic juveniles. We tested the hypothesis that plasticity is influenced by epigenetic modifications by: treatment of females with compounds that may alter these modifications; using immunohistochemistry to detect changes in histone methylation; and investigating changes in larval phenotype. Females were cultured in the presence of a putative methyl donor (folate) and methyl releaser (bisphenol A). Histone modifications (H3K9me) were similar between larval morphs but differed in dimorphic organs (e.g., chaetal sacs). Females exposed to folate produced large numbers of juveniles while females exposed to BPA produced large numbers of planktotrophic larvae, relative to controls. BPA-treated females produced few nurse eggs although overall egg production was unchanged. Larvae of BPA-treated females had loss of H3K9me in chaetal sacs and increased number of larval spines. These data suggest that plasticity in *Polydora cornuta* is influenced by histone modifications and further, exposure to BPA "shifts" brood traits towards planktotrophy in terms of decreased nurse egg production, increased number of planktotrophic larvae, loss of methylation in key tissues, and increased spine production. These results suggest that epigenetic processes provide a mechanistic link between the environment and developmental plasticity leading to alternate phenotypes of young.

Siboglinid polychaetes from Antarctic hydrothermal vents

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During oceanographic research cruises in the austral summers of 2010 and 2011 we discovered and sampled several new hydrothermal vent fields in the Southern Ocean. Here we report on the discovery of three siboglinid species that are present in three contrasting chemosynthetic habitats from the region. These include a sedimented continental margin site in the Bransfield Strait (1150 m), a sedimented low-temperature vent on the Hook Ridge (~1100 m) and a very unusual high-sulphide higher-temperature vent in the Scotia Arc (Kemp Caldera; 700 m). Two of the species correspond morphologically with *Siboglinum* and *Sclerolinum* whilst the third is a more divergent lineage with unusual morphology. The Antarctic continental margin site exhibits characteristic suboxic pore-fluid biogeochemistry associated with high productivity in the water column. The Hook Ridge low-temperature vent sediments exhibit advective flow of metal and sulphide-rich diluted vent fluids through the sediment pile. The species at Kemp Caldera lives in an environment of almost pure elemental sulphur. We present a morphological and molecular analysis of the new species and compare and contrast their ecology based on detailed studies of their sediment biogeochemistry.

Deep Sea ID: a new iOS application for deep sea biologists [Poster]

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Deep Sea ID is a field guide iOS application (app) to the World Register of Deep Sea Species (WoRDSS), a contextual database of the World Register of Marine Species (WoRMS). It currently stores taxonomic information on over 20,000 deep sea species including a large image library of quality specimen photographs; all these data are available for offline use on your device in the field. The app is designed to improve access to taxonomic information for researchers and contractors working at sea, in the field or in the laboratory as well as educators and science communicators who wish to learn more about the remarkable diversity of deep sea life.

Biofouling on recreational vessels and the potential for marine invasives (polychaetes) in Trinidad and Tobago [Poster]

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Trinidad and Tobago is an attractive yachting destination and port of call since it is located outside of the hurricane belt. The twin-island state has 30 international ports and offers a prime hurricane Caribbean shelter, with excellent boating and repair facilities. This has resulted in a significant growth in the yachting industry over the last 30 years. In 2008, twenty-seven (27) recreational vessels in the Chaguaramas Bay (one of the seven anchorages in this coastal area) were surveyed for biofouling organisms. The majority of the recreational vessels were fouled with organisms belonging to six major phyla: Plantae (macroalgae), Bryozoa, Porifera, Mollusca, Crustacea and Annelida. Of the Annelids, twenty four (24) polychaete species belonging to ten (10) families were identified: Ampharetidae, Dorvilleidae, Eunicidae, Hesionidae, Nereididae, Phyllodocidae, Sabellidae, Serpulidae, Syllidae and Sigalionidae. Eleven (11) of these species were first records for the islands and three (3) invasive polychaetes are now confirmed: *Hydroides dianthus*, *Lysidice ninetta* and *Branchiosyllis exilis*. Trinidad and Tobago is a major trans-shipment hub (including serving the Americas) and foulers may be easily transported between ports. Potential invasives can cause severe disruption by clogging and reducing efficiency of the intake pipes associated with a number of coastal industries. In fact, this occurred here with an invasion by *Perna viridis* (the green mussel) in the early 1990's at the Point Lisas Industrial Estate (the main industrial port). Additionally, fouling of propellers may lead to increased maritime maintenance costs. This research has provided the first species list of macrofaunal foulers of recreational boats for Trinidad and Tobago, some first record of species and confirms that recreational vessels are indeed vectors of invasive species.

Mitochondrial Genomes to the Rescue? – Phylogeny of interstitial annelid Taxa.

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Several interstitial annelids (i.e., Diurodrilidae, Nerillidae, Polygordiidae, Protodrilida) are generally characterized by a small body size, weak segmentation, few or no appendages, parapodia or chaetae, and ventral ciliary gliding bands. For a long time, it was discussed whether these taxa represent primitive annelids, so called "Archiannelida". But recently, they are regarded as a polyphyletic assemblage of highly derived but secondarily simplified annelid taxa adapted to their interstitial realm. A lot of these taxa lack several characters, which are typical for larger annelids, and this lack causes the problem to differentiate between primary absence or secondary loss, which often leads to conflicts between morphological and molecular investigations. For example, within Annelida "Dorvilleidae" exhibit the greatest number of paedomorphic taxa. That means taxa which retained ancestral larval or juvenile characters in the adult stages of their descendants. Based on similarities to eunicidan larvae and investigations of parasite-host relationships Dinophilidae was placed within "Dorvilleidae" assuming paedomorphosis, whereas molecular investigations based on whole mitochondrial sequence data do not support such a relationship. Diurodrilidae lacking common annelid characteristics had been excluded from Annelida and placed in a closer phylogenetic relationship to playzoan taxa based on both morphological data and nuclear rRNA data. However, given the weak support for the exclusion the question remains whether the absence of common annelid characteristics in Diurodrilidae is a primary situation, or a secondary one due to loss as an adaptation to the interstitial habitat. To resolve this question we determined the complete mitochondrial genome of *Diurodrilus subterraneus*, and analyses of sequence and gene order data clearly placed Diurodrilidae within Annelida with strong support. Sequence and gene order data of whole mitochondrial genomes has the potential to address phylogenetic questions concerning different interstitial annelid taxa.

Syllidae abundance and diversity on rocky shores of Rio de Janeiro (Brazil) [Poster]

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The family Syllidae hosts a great diversity of species and occupies a wide variety of environments such as sandy and rocky shores. Rocky environments are considered, by the Brazilian government, a permanently environmental protected area. There are few studies about the rocky shore fauna, and even fewer about the diversity of polychaetes. There are no specific studies on the Syllidae's fauna from Rio de Janeiro. Studies will aim to increase the knowledge of the associated fauna from these environments and could be the basis for the management of these localities. The main objective is to do a study of diversity and abundance of Syllidae from the rocky coast of Rio de Janeiro (Brazil). The material was collected scraping the rocky shores between algae and *Phragmatopoma* sp. colonies in Rio de Janeiro (Vermelha beach, 22°57'16.51"S / 43°9'52.32"W; Vidigal beach, 22°59'27.57"S / 43°13'51.43"W; Urca beach, 22°56'51.70"S / 43°9'48.69"W) and Niterói (Itaipú beach, 22°58'24.32"S / 43°2'47.70"W). The specimens were anesthetized, fixed in 4% formaldehyde, preserved in 70% alcohol, and screened under a stereoscopic microscope. Specimens were identified at the specific level when possible. Were collected a total of 285 specimens belonging to three subfamilies Syllinae, Exogoninae, Autolytinae respectively referred to the genus *Syllis* (279), *Exogone* (5) and *Proceracea* (1). Of this total were collected at Itaipú beach (41 *Syllis* spp.), Vermelha beach (20 *Syllis* spp.), Vidigal beach (198 *Syllis* spp., 3 *Exogone* sp. and 1 *Proceracea* sp.) and Urca beach (20 *Syllis* spp. and 2 *Exogone* sp.). Two new records were reported for the state, *Syllis magellanica*, with occurrence only for the state of São Paulo and Paraná, and *Syllis* sp. n. 2, not yet formally published, only registered for Ilha do Mel in the state of Paraná.

Molecular phylogeny of echiuran worms (Annelida): implications for evolution of feeding mode and sexual dimorphism [Poster]

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Echiurans (spoon worms or innkeeper worms) are a group of marine worms, most of which live in burrows in soft sediments. This animal group was previously considered as a separate phylum because of the absence of segmentation. However, recent molecular analyses have placed it within the annelids as the sister group of Capitellidae (Polychaeta). In this study, we elucidate the interfamily relationships of echiurans and their evolutionary pattern of feeding mode and sexual dimorphism, by performing molecular phylogenetic analyses using one mitochondrial (COI) and three nuclear (18S, 28S, and H3) genes of representatives of all echiuran families. Our results suggest that echiurans are monophyletic and comprises two unexpected groups: [Echiuridae + Urechidae + Thalamematidae] and [Bonelliidae + Ikedidae]. The members of the former group are sexually monomorphic and have paired gonoducts, whereas those of the latter show marked sexual dimorphism involving dwarf males and have unpaired gonoducts. Within the former group, the sister group relationship of Echiuridae and Urechidae is highly supported. These two families share the character of having anal chaetae rings around the posterior trunk as a synapomorphy. The analyses also suggest that deposit feeding is plesiomorphic for echiurans and that filter feeding is apomorphic for Urechidae. Our results did not support the traditional order-level classification, especially in that Echiuroinea is polyphyletic.

Polychaete abundance and diversity inside a deep-sea submarine canyon

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Submarine canyons are unique and fascinating environments, biomass hotspots for polychaetes in the deep-sea. These major topographic features are difficult to sample due to the rugged terrain and dynamic conditions found inside them. Canyons are also major sources of habitat heterogeneity on continental margins. This increased heterogeneity, when compared to that of the adjacent slope and abyssal plain, is believed to enhance deep-sea benthic biodiversity. However, increased species diversity has not been universally supported by all studies, perhaps reflecting different physical processes acting inside canyons. Polychaete species living inside submarine canyons must adapt to the unstable and often violent environments. The Whittard canyon is located on the Irish margin in the North East Atlantic, and encompasses water depths from 200 m to 4000 m. In this talk, I will present results from an analysis of benthic polychaetes. Three sites were sampled inside the canyon and one on the adjacent slope, all at a depth of 3500 m. Interesting patterns in abundance and diversity of polychaetes were revealed. The abundance of polychaetes was highest in the Eastern branch of the canyon (3557 individuals/m²) and lowest on the Slope (1387 individuals/m²). Polychaete family diversity was highest on the slope and lowest in the Eastern branch of the canyon. Twenty-eight polychaete families were identified. Amphinomidea were the dominant polychaete family, found in very high numbers throughout the canyon. Spionidae, Paraonidae, Cirratulidae and Opheliidae were also abundant. Polychaete composition differed between sites inside the canyon, relating to the variable conditions inside the canyon itself. Further investigation into polychaete species level identification is ongoing. This project will contribute to the understanding of polychaete abundance and diversity inside the dynamic environment of deep-sea submarine canyons.

Evolution of Siboglinid Annelids and their Symbiotic Relationships revealed by Transcriptome Data.

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Several aspects of annelid evolution are becoming better understood, and evolution of some worm taxa appears to be tied to certain environmental features or organismal associations. Among such taxa, Siboglinidae, which comprising four main lineages (vestimentiferans, frenulates, and the genera *Sclerolinum* and *Osedax*), are noteworthy. As adults, all lack a functional gut, mouth and anus, but instead derive energy from bacterial endosymbionts. Whereas vestimentiferans have received considerable attention due to their prominent occurrence at vents and seeps, symbiosis in the more common and diverse frenulates has only been cursorily examined. Previous siboglinid endosymbiosis studies have focused on microbial diversity and physiology, but understanding from the perspective of the host has been more limited. Additionally, frenulates remain highly understudied in these areas. To more fully explore the diversity of symbioses within siboglinids, we have employed transcriptomic and genomic approaches using “next-generation sequencing” methods on several siboglinid taxa. We have used such an approach to examine:

- evolutionary origins and sister taxon relationships of siboglinids
- phylogenetic history of within the group using complete mitochondrial genomes,
- evolution of hemoglobin chains across siboglinids
- genomic evolution of endosymbionts
- and possible candidate genes that help maintain the symbiosis.

Genomic signatures of divergent selection and adaptive evolution in *Hediste diversicolor*

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Investigating the genetic basis of local adaptation to environmental gradients can reveal signatures of divergent selection and the potential for non-allopatric speciation. Strong selection for metal tolerance in populations of the estuarine polychaete *Hediste diversicolor* was studied as a model of adaptive evolution. An Amplified Fragment Length Polymorphism (AFLP) genome survey was used to investigate patterns of genetic structure in populations from 5 sites in Cornwall, UK, with different levels of copper pollution. Toxicity tests confirmed a gradient of tolerance to copper in *H. diversicolor*, corresponding with contamination levels. Correlation between genetic variation and tolerance indicated that population differentiation and structure was the result of selection rather than isolation by distance. Lower genetic diversity in tolerant populations suggested a bottleneck. Genetic distance between *H. diversicolor* populations was not high enough to propose separate species but there was evidence of divergent selection and the early stages of ecological speciation despite gene flow. Bulk segregation and outlier analysis of the AFLP genome scan identified a small number of highly divergent loci linked to adaptive tolerance to copper, against a background of neutral loci suggesting absence of reproductive isolation. Divergent loci of interest were present for both tolerant and non-tolerant phenotypes, reflecting a trade-off cost of tolerance and competitive advantage in non-tolerant populations. In the light of current concerns about anthropogenic impacts on marine habitats it is important to understand the genetic foundations of phenotypic responses to changing environments and new niches. Studying the effects of relatively recently introduced copper pollution on the population genetics of *Hediste diversicolor* offers a good model system for exploring rapid evolutionary adaptation to stress in natural populations.

Polychaetes associated with marine debris from the 2011 Japanese tsunami: preliminary results [Poster]

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Floating marine debris typically carries a neustonic community dominated by pelagic Lepas barnacles. In contrast, some of the larger pieces torn away from Japanese harbors by the 2011 tsunami were covered by a fairly intact coastal community of algae and invertebrates when they arrived in Oregon and Washington, USA. A large dock from Misawa Harbor had at least 40 species of polychaetes. The serpulid *Hydroides ezoensis* and several syllid species were most abundant. Other families represented on the dock were Nereididae, Phyllodocidae, Polynoidae, Terebellidae, Oeonidae, Spionidae, Orbiniidae, Chrysopetalidae, and Acroirridae. In March 2013, the replacement docks in Misawa Harbor were sampled to determine if the fauna found on the docks in the USA was equivalent to that found in Japan. An additional trip will be made in 2014 to continue the comparative study.

Dense *Ditrupa arietina* (Polychaeta: Serpulidae) Populations – are they a distinct faunal assemblage?

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Dense populations of the free living serpulid *Ditrupa arietina* were first recorded to the west and north of the Shetland Isles in the 1920s and have been subsequently reported from that area, the Celtic and North Seas, the Mediterranean and the Azores. These dense populations of many thousands per square metre numerically dominate the benthic fauna, and the tubes provide sites of attachment for a range of other species. Dead tubes are also occupied by other animals, and tube fragments can contribute significantly to biogenic carbonate sediments, both Recent and fossil. Dense *Ditrupa* populations have been the subject of detailed autecological research over the last 15 years but in spite of the apparent ecological importance of the species, it is not reflected in the European Nature Information System (EUNIS) or other NE Atlantic habitat classifications. This paper provides a synthesis of the environmental conditions where high densities of *Ditrupa* have been found, with new data from seabed samples and photos, and includes a consideration of whether faunal assemblages dominated by *Ditrupa* are chance ephemera or sufficiently persistent and repeated to warrant inclusion in habitat classifications.

The evolution of myoanatomy in Annelida as revealed by immunohistochemical investigations

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Body plan diversification within annelids and allies are as diverse as the habitat types these lophotrochozoans live in. Therefore, it is necessary to investigate a huge variety of annelid taxa to understand character evolution for several organ systems. One such prominent character complex is the muscular system. Although representing a distinct character complex, our knowledge concerning possible ground patterns and different character manifestations within annelids and related taxa is still sparse (Tzetlin and Filipova, 2005). A body wall musculature formed by an outer circular layer and longitudinal muscles situated beneath is considered to represent the plesiomorphic condition of annelids. Nevertheless, recent investigations on the myoanatomy of several members of Annelida suggested a different story. Many species investigated so far are lacking circular muscle fibers (Tzetlin et al. 2002; Tzetlin and Filipova 2005; Purschke and Müller 2006), even though the discussion whether absence of this character is either primary or secondary is still unresolved. Furthermore, the presence, general occurrence and characteristics of additional muscle complexes, e.g., bracing muscles or the parapodial muscle complex, are still incompletely investigated.

To extend our knowledge regarding the variability of muscular patterns within Annelida, and to reconstruct a hypothetical muscular ground pattern valid for annelids, we analyzed the distribution of f-actin, a widespread element of muscle fibers, within different annelid taxa using phalloidin labeling in conjunction with confocal laser scanning microscopy (clsm). Using a backbone of the annelid phylogeny of a recent phylogenomic analysis we reconstructed ground patterns for major nodes of the tree. Our investigations extend the knowledge concerning the evolution of muscular characters in lophotrochozoans and provide implications for the evolution of muscular patterns in annelids.

Polychaete biodiversity in the soft-bottoms of Términos Lagoon, Southern Gulf of Mexico, Mexico [Poster]

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In order to investigate the polychaete fauna inhabiting the soft bottoms devoid of vegetation in Términos Lagoon (the largest lagoon-estuarine system in Mexico, located at the southern end of the Gulf of Mexico), 24 stations were sampled covering this habitat. The macrobenthic samples were collected at 0.5 to 4.2 m depth with a Van Veen (0.06 m²) or Ekman (0.053 m²) grab and sieved through a 0.5 mm screen. As a result, a total of 3,398 specimens belonging to 32 families and 120 species of polychaetes were collected and identified. The families Onuphidae (10 spp.), Polynoidae, Nereididae and Spionidae (with 9 species each), were the most diverse, but 50% of the families (16) were represented by only 1 or 2 species. A large spatial variability in polychaete composition was observed in the area, the highest number of species being recorded in the middle and southern zones of the lagoon. Only *Aphelocheata* sp. 1 (13 stations), *Scoloplos texana* (12 stations) and *Paraprionospio yokoyamai* (10 stations) were found in more than 40% of the sampling sites. The bathymetric distribution of those species was also restricted, since 76 species (63%) were distributed in depth ranges smaller than 1 m. The 120 polychaete species identified in this study represent a significantly higher diversity in these bottoms than the 91 species recorded previously in seagrass beds or the 44 species found so far in the mangroves that border the lagoon.

Distributional patterns of Terebellids from Northern Australia

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Extensive collecting trips were made to Ningaloo, Kimberleys, Lizard Island and Heron Island during the past 5 years as part of Creefs and Woodside Kimberley expeditions. These trips provide an opportunity to examine the distribution of terebellid polychaetes across northern Australia, an area not previously well collected. All terebellids were identified to species and a diverse fauna is present, with some species appearing to be widespread whereas others are restricted to a particular site. New species are present amongst these collections. These records are compared with the existing known distributions and comments are made about range extensions. To date these patterns are based upon morphological data but material of some of these species is available for subsequent molecular work and it is anticipated that some of the widely distributed species may represent suites of species as is being found for other polychaete families in Australian waters.

Population Structure of *Marphysa moribidii* Idris, Hutchings and Arshad, 2013 (Polychaeta: Eunicidae) in Morib mangrove, Straits of Malacca, Malaysia

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The population of *Marphysa moribidii* Idris, Hutchings and Arshad, 2013 was studied for 19 months between June 2011 and December 2012 in Morib mangrove, Malaysia using systematic transects and stratified sampling. A total of 914 individuals were collected during study period. *Marphysa moribidii* can be found in zones dominated with mangrove plants *Rhizophora apiculata*, *Avicennia alba* and *Sonneratia caseolaris*. No worm of the species was found in the mudflat area. The temporal density of the species was fluctuated greatly between zones and across the research site. The average density in the quadrat's transect varies from 0 ind/m² in December 2011 to 6 ind/m² in July 2012. Majority of the worms collected falls between 2.38 – 10.12mm body widths at chaetiger 10 (without parapodia). The regression analyses between biometric data showed significant relationship between unbroken body length and number of chaetigers ($y = 0.63x + 1.67$; $R^2 = 0.61$; $n = 135$), body width at 10 chaetiger and peristomium width ($y = 0.65x + 0.11$; $R^2 = 0.52$; $n = 913$), total length and length of first 10 chaetigers ($y = 0.33x + 0.35$; $R^2 = 0.35$; $n=136$), between peristomium width and wet weight ($y = 3.52x + 1.46$; $R^2 = 0.70$; $n = 136$) and between body width at chaetiger 10 and number of chaetiger the branchia emerged ($y = 0.74x + 0.89$; $R^2 = 0.26$; $n = 136$). Inter relationships between *Marphysa moribidii*'s populations with environmental parameters, as well as habitat partitioning with another *Marphysa* species are discussed.

Description of new species of *Marphysa* Quatrafages, 1865 (Polychaeta: Eunicida: Eunicidae) from the West Coast of Peninsular Malaysia with a review of *Marphysa* Group A from the Indo-West Pacific and Indian Ocean [Poster]

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A survey of commercially important polychaete species in the Peninsular Malaysia revealed a new species belonging to the genus *Marphysa* Quatrafages, 1865: *Marphysa moribidii* sp. nov. The new species is the second species belonging to the *Marphysa* group A (*M. mossambica* group), which only possesses limbate chaetae in the sub-acicular position on all chaetigers. Found in the mangrove forest along the west coast of Peninsular Malaysia, *M. moribidii* n.sp., differs from *M. mossambica* (Peters, 1854) in the following characters: the branchia enumeration and origin, body pigmentation, origin and number of pectinate chaetae. This finding has increased the number of species within the *Marphysa* group A, and refutes the concept that *M. mossambica* is a widely distributed species in the Indo-Pacific. *Marphysa mossambica* from Mozambique and Australia were reviewed and compared with *Marphysa moribidii* using both morphological characters and biometric analysis. Some notes on the biology, ecology and commercial aspects of *M. moribidii* are presented.

Phylogeography of the Christmas Tree worm *Spirobranchus corniculatus* (Annelida, Serpulidae) from the Coral Triangle, Australia, and Fiji.

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Christmas Tree Worms is a common name given to a group of large and colourful serpulid polychaetes of the genus *Spirobranchus* that are obligate symbionts of hermatypic corals commonly found in tropical and subtropical regions world-wide. While current taxonomic species delimitations of these worms are based almost exclusively on the morphology of opercular structures, particularly the number and shape of calcareous opercular horns, high levels of intraspecific variation in this morphological feature have made species boundaries within the genus difficult to resolve. Molecular work to differentiate serpulid worms has long been hampered by the availability of informative markers. Recent work on *Hydroides*, however, has facilitated the use of COI barcoding in serpulids, which, in conjunction with existing nuclear and mitochondrial markers, can provide a robust interpretation of phylogenetic relationships within *Spirobranchus*. Here, we present a multi-gene phylogenetic reconstruction of the *Spirobranchus corniculatus*- a species complex that tentatively includes three morphospecies: *S. corniculatus* s. str., *S. cruciger*, and *S. gaymardii*. Samples spanning the Coral Triangle (Indonesia and the Philippines) as well as Australia and Fiji were included to determine the geographical distribution of putative lineages. Morphological analyses of opercular structure variability were used to test the hypothesis that the *S. corniculatus*-complex includes three genetically distinct lineages identifiable by their opercula. Haplotype diversity measures revealed higher levels of diversity within the central Coral Triangle region and lower diversity measures at peripheral locations, indicating recent colonization of these areas or, alternatively, a high extinction rate of haplotypes at these sites.

Testing the serpulid fossil record by ultrastructural analysis of the tube

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In paleontology generic attribution of serpulid polychaetes is based on comparisons of general morphology of fossilized tubes with that of Recent calcareous tubes. However, unlike mollusk shells, serpulid tubes are not genuine exoskeletons, and thus, are not well-integrated with the soft body. This inevitably leads to weak correlations between tube morphology and soft body characters. Therefore, classification of fossil material in terms of Recent taxonomy that is based on soft body, is always problematic. We tested the interrelation of fossil and Recent species classified within the genera *Filogranula* and *Nogrobs* using tube ultrastructural analysis. Attribution of several common Mesozoic species (Jurassic "*Serpula runcinata* J. de C. Sowerby, 1829", "*Serpula cincta* Goldfuss, 1831") to *Filogranula* is widely accepted among paleontologists, while *Nogrobs* is a name originally provided for fossil tetragonal free-lying coiled tubes, and accepted by zoologists for a single Recent species having similar tubes (ten Hove, Kupriyanova, 2009). Ultrastructural investigation has shown that all seven studied species of Recent *Filogranula* (including previously described as *Chitinopoma*) are characterized by the same ultrastructure type (IOP *sensu* Vinn et al., 2008), while Jurassic "*Serpula runcinata*" shows SP structure. In the case of *Nogrobs*, studied fossil material, probably belonging to the type species of the genus *N. vermicularis*, again demonstrates SP structure, while Recent "*Nogrobs grimaldii*" has a multi-layered tube with IOP to SOIOP structure. The primary nature of fossil SP ultrastructures is confirmed by preservation of growth-lines on crystallites and by the high stability of ultrastructure within a large set of related forms. Close examination of tube morphology also clearly separated fossil and Recent species attributed to *Filogranula*, while for *Nogrobs* the difference is not so obvious. The present study shows that direct comparisons between fossil and Recent forms should be made with caution and should be when possible controlled by ultrastructural studies.

Spirorbin tube ultrastructures as a tool for empty tubes determination [Poster]

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Over last ten years much data was obtained on tube ultrastructure variety among tube-dwelling polychaetes with calcareous tubes (e.g. fam. Serpulidae, some Sabellidae and some Cirratulidae; see Vinn et al., 2008a,b; Vinn, 2009). However, until now species of the serpulid subfamily Spirorbinae were almost completely excluded from this study. An extensive analysis made by the authors on a large collection of spirorbids, counting 68 species (covering 52% of the total Recent biodiversity), allowed to estimate several basic types of ultrastructures. Spirorbin tubes show significantly lower variation, than other serpulids - they show only irregularly oriented prismatic (IOP), spherulitic prismatic (SPHP) and simple prismatic (SP) types sensu Vinn et al. (2008a), arranged in 1 to 3 layers. However, in all cases more detailed ultrastructural characteristics (precise appearance of crystallites, exact number of layers and their position in the wall, etc.) are well correlated with classical soft-body taxonomy, and allow to recognize all 6 tribes, some of which may be characterized by several structural groups. On the generic level the correlation with ultrastructures is satisfactory, but not always obvious. In most cases forms with certain ultrastructural characteristics cover several closely related genera (e.g. *Metalaespira* and *Helicosiphon*), in other cases one genus (e.g. *Spirorbis*, *Pileolaria*) comprises more than one ultrastructural group. These "groupings" within genera may outline the groups of closely related species, validating further subdivision. For several species unique ultrastructural characteristics were estimated, allowing determining these species by tube ultrastructure only (e.g. *Romanchella quadricostalis*; *Pileolaria invultuosa*). The results of our investigation show that ultrastructural study of spirorbin tubes is quite an effective tool - either when dealing with Recent empty tubes, or when estimating generic affinity of fossil material, which now can not be reliably classified according to the system of Recent forms.

Morphology and phylogeny of *Pelagobia longicirrata* Greeff, 1879 (Lopadorrhynchidae): preconditions for revision [Poster]

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Pelagobia longicirrata Greeff, 1879 (Lopadorrhynchidae) is a common cosmopolitan inhabitant of the marine pelagial. Despite its wide distribution, morphology and biology of this species are not studied well enough yet. Specimens of *P. longicirrata* from the Drake Passage (Antarctic Ocean) and South China Sea (Vietnam) were investigated using light and scanning electron microscopy; molecular phylogenetic analysis was performed using the 18S RNA gene. We have observed a very special glandular aggregation on the ventral surface of the anterior end of this worm. The shape of this organ in *P. longicirrata* from the Antarctic Ocean differs from one in *P. longicirrata* off the Vietnam shore. Several ciliated stripes on the prostomium and peristomium were observed for the first time. These characters can be used in further analysis. Variation of other characters, such as the ratio of body length and number of segments, has been investigated. The significance of this character is supported by the molecular data. Specimens from the Antarctic Ocean differ from specimens from the SE Atlantic and Vietnam genetically as well as morphologically. *P. longicirrata* could be a complex of at least three species.

The problem of origin of the excretory tree of Vestimentifera [Poster]

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The excretory system of all vestimentiferans is organized by a general plan and consists of the excretory tree (organ of filtration), excretory ducts and excretory pores, which open on the dorsal side. Our current knowledge about the structure of the excretory system of vestimentiferans does not solve the problem of the origin of the excretory tree. Several assumptions exist, some authors decided that the excretory tree is a coelomoduct split into many tubes (Land, Nørrevang, 1977, Gardiner, Jones, 1993), which open into the space between the connective tissue elements or into the obturacular coelom. Other authors concluded that the excretory tree of vestimentiferans is modified protonephridia (Малахов и др., 1996; Schulze, 2001 a). According to our data of the structure of the excretory tree of *Oasisia alvinae* we deny the possibility of a direct connection between the tubes of the excretory tree and the coelom. The tubes of *O. alvinae* are blind-ending, the same was shown for *R. pachyptila*. The fact, that the excretory tree is tightly adjacent to the sinus valvatus allows to conclude that this part of the blood system is the place of filtration. The well known fact, that Vestimentifera have hemoglobin not only in the blood system, but also in the coelomic spaces (Toulmond et al., 1994; Zal et al., 1996 a, b), is an additional factor that there should not be a direct intercommunication of the excretory tree with the coelomic spaces. In the case that we concede such intercommunication, then Vestimentifera would lose their hemoglobin. Additional data of origin could be obtained by comparative analyses. Such, the excretory organs of pogonophorans are complex nephridia, which consist of partly reduced metanephridia, which open to the protocoel and mesodermal protonephridia, which provide filtration out of the ventral blood vessel. We suggest that excretory organs of pogonophorans have originated from paired nephridia of sedentary polychaetes, and excretory organs of Vestimentifera develop out of complex pogonophoran nephridia by the way of funnel reduction.

The polychaete fauna of Darwin Harbour prior to major urbanization and industrialization

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The 1993-4 Dry-Wet Season survey of Darwin Harbour resulted in an extensive, quantitative collection of benthic invertebrates, including about 7500 polychaete samples from 204 stations. Darwin Harbour is one of Australia largest deepwater harbours encompassing approx 1000 km² of open water; surrounding the Harbour is one of the fastest growing cities in Australia. Since the late 1990's the harbour has experienced a series of major marina and port developments, the latter to service a burgeoning offshore oil and gas industry. The 1993-4 polychaete samples were identified with the aim of characterizing polychaete communities prior to significant harbour disturbance. Polychaetes are important for understanding environmental changes because they contain both tolerant and intolerant species, and have a greater range of trophic and reproductive strategies than other taxa. Many authors consider the group to be a good indicator of the environment quality. In order to reduce taxonomic workload, polychaetes were identified to species level from a randomly chosen subset of 70 Dry-season stations representing the full range of subtidal and low intertidal benthic habitats in Darwin Harbour. The determination yielded a total of 3075 individuals. Eleven stations were completely defaunated and 12 stations presented only one organism each. The families that dominated in terms of abundance percentage were: Syllidae, Spionidae, Nephtyidae, Paraonidae and Cirratulidae. Univariate and multivariate statistical analyses were used to investigate the structure of the assemblages and to relate them to the main environmental variables. Spatial patterns of species distribution are discussed. No significant differences in community structure were detected among different parts of the harbour including the area directly adjacent the city of Darwin. However, a gradient in community distribution could be recognized, which is related to the typical estuarine salinity gradient. The results should be used as a reference basis for future monitoring.

Why are Chaetae in the Parapodia organized in Rows?

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Chaetae in polychaete parapodia are usually arranged in straight, curved, crescent or spiral rows. Throughout the worm's life chaetae may renew for a number of reasons: larval metamorphosis, as a result of regeneration, epitoky or simply with age. As a rule, formation of new chaetae is limited to one edge of the row in the formative site. Newly forming chaetae enter the row and push the older ones out; therefore, individual chaetae move gradually from the formative site to the opposite edge of the row where the degenerative site may occur. We have examined the ultrastructure of the chaetal sac and chaetal replacement and displacement of capillary chaetae, hooked chaetae and uncini in the polychaete families Oweniidae, Maldanidae, Terebellidae, Sabellidae and Serpulidae. The chaetal sac is covered by the basal membrane and may contain one or more chaetal rows, each row having its own formative site. The formative site is present in each chaetal row, whereas the degenerative site is difficult to identify and may be absent in some species. Generally, distinguishable degenerative sites were described for hooked chaetae in chaetal rows in Maldanidae and Capitellidae and in chaetal patches in Oweniidae. Perhaps, the efficiency of formative and degenerative sites depends on the chaetal sac structure.

Reproduction and Larval Development of *Pseudopolydora* cf. *kempi* and *P. reticulata* (Polychaeta: Spionidae) in Gamo Lagoon, Northeastern Japan [Poster]

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Pseudopolydora cf. *kempi* is one of the most common species inhabiting estuaries in Japan and the species has been reported to occur dominantly in the Gamo Lagoon which is located at the mouth of the Nanakita River in Sendai Bay. In the present study, *Pseudopolydora reticulata* which resembles *P. cf. kempi* morphologically was found in the Gamo Lagoon for the first time in Japan. On the other hand, almost all of the planktonic larvae of the genus *Pseudopolydora* collected from the Gamo Lagoon were identified as *P. reticulata* by using 18S rRNA gene analysis. To examine the pattern of larval development of the two species, a rearing experiment was conducted. The adults of *P. cf. kempi* and *P. reticulata* were reared in petri dishes containing filtered sea water and dry sand in the laboratory. Egg capsules of these two species were successfully obtained and embryogenesis and larval development of these species were observed. Many nurse eggs were observed in each egg capsule of *P. cf. kempi* and they were rapidly broken up into separate yolk granules on which the larvae fed. The larvae of *P. cf. kempi* were released from capsules at the 12-chaetiger stage. In contrast, almost all larvae of *P. reticulata* developed simultaneously and were released from capsules at the 3-chaetiger stage. Therefore, the larval development patterns of the two species in Gamo Lagoon were determined to be direct development in *P. cf. kempi* and planktonic development in *P. reticulata*.

Polychaete diversity in the Norwegian Sea – new insight based on extensive seabed sampling and mapping by the MAREANO project

Kongshavn presenting: Bakken, Torkild¹, Katrine Kongshavn*², Eivind Oug³, Jon Anders Kongsrud² and Tom Alvestad⁴

Refer Bakken for abstract.

The Polychaete fauna associated with the Arctic Loki's Castle hydrothermal vent field [Poster]

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The Loki's Castle hydrothermal vent field at 2350 m depth on the Arctic Mid-Ocean Ridge in the Norwegian Sea was discovered in 2008, and represents at present the only known black smoker vent system in the Arctic region. Fauna at Loki's Castle have been collected by use of ROV in 2008, 2009 and 2010, and preliminary results indicate the presence of an endemic fauna. At present, 12 species of benthic polychaetes have been identified from the vent habitat. Parts of the sulphide mound surrounding the vent field are characterised by fine sediment with a more diffuse flow of hydrothermal fluids. These areas are densely covered by the siboglinid *Sclerolinum contortum*, a species also known from deep-sea methane seeps in the area. Other tube-dwellers, such as the recently described maldanid *Nicomache lokii*, form thick mats of tubes filtered together at the base of the chimneys, as well as in between the tubes of *Sclerolinum* in the sedimentary areas. A number of free-living invertebrates, including several polychaetes, are found in between the mats formed by the tube dwellers. Some of the species recorded, e.g. *Nicomache lokii*, *Amphisamytha* sp. nov. (Ampharetidae), *Grasleia* sp. nov. (Ampharetidae), are closely related to species known from vent sites in the northern Pacific. This may indicate a previous connection between vent fauna in present Arctic and Pacific areas through the Baring Strait. The present study aims to describe the polychaete fauna associated with the Loki's Castle vent field. Faunal characteristics are discussed with regard to the geobiology of the vent field. Further, some implications for phylogeography are considered.

Review of lesser-known Amphinomidae (Annelida, Amphinomida) with the description of a new Genus [Poster]

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The Amphinomidae (Annelida: Amphinomida) presently includes 17 genera of which at least six are incompletely known, including: *Bathychloeia* Horst, 1910; *Bathynotopygos* Kucheruk, 1981; *Benthoscolex* Horst, 1912; *Chloenopsis* Fauchald, 1977; *Parachloeia* Horst, 1912; and *Sangiria* Horst, 1911. Four of the above genera are monotypic; the remaining two are each represented by two known species. Except for *Bathynotopygos*, the type species of each genus is re-described and illustrated. *Bathychloeia* is emended, and *Parachloeia* is determined to be a junior synonym of *Notopygos* Grube, 1850. While the types of *Bathynotopygos* are not readily accessible, we tentatively refer Kucheruk's taxon to *Bathychloeia* since it has bifurcate harpoon chaetae. A new amphinomid genus is described from a specimen originally collected by the *Siboga* expedition and previously identified by Horst (1911) as *Sangiria hystrix*.

Cryptic sympatric Species across the Australian Range of the Global estuarine Invader, *Ficopomatus enigmaticus*

Kupriyanova presenting: Styan, Craig A¹, Claire F McCluskey², Elena K. Kupriyanova*³, Ty Matthews²

Refer Styan for abstract.

Written in Stone: History of Serpulids through Time and Space

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Serpulidae is a large and highly successful group of polychaetes with a cosmopolitan geographic and wide bathymetric distribution ranging from the intertidal to the abyssal zones. Serpulidae have the best fossil record among annelids due to their calcareous tubes. However, this fossil record, especially for the Mesozoic, is biased towards Europe that has been studied most thoroughly. Until recently there was a controversy on the time of first appearance of Serpulidae. Some authors considered spirorbins, a group of small serpulids inhabiting spirally coiled tubes, to be the most plesiomorphic group that originated already in the Ordovician (485.4 to 443.4 Mya). Others doubted the Palaeozoic origin of Serpulidae, suggesting Jurassic age (201.3 to 145 Mya) for the group. Tubes of Serpulidae, in addition to their characteristic features of external morphology, have distinctive ultrastructures that set them apart from similar tubes of other animals. Recent ultrastructural studies have shown that the Paleozoic spirorbiform fossils belong to a group of extinct lophophorates. Thus, the earliest undisputable Serpulidae appeared in shallow tropical seas of the Middle Triassic (247.2 to 235 Mya). In late Triassic they became common in shallow waters of Europe and had achieved a global distribution by the late Mesozoic. Although the earliest deep-sea serpulids are known from the Early Cretaceous, this could represent a sampling bias and deep-sea colonization may have occurred earlier in the Jurassic. Chemosynthetic communities of hydrocarbon seeps have contained Serpulidae since the Late Jurassic-Early Cretaceous. Recent serpulids split into two major clades that presumably diverged in the Mesozoic. The earliest definite representatives of genera of both major clades are known from the Jurassic. Ongoing studies strive to unravel the complex evolutionary history of serpulids by combining the data on external tube morphology and ultrastructures for identification of serpulid fossils that are used to calibrate molecular phylogenetic trees.

Polychaete assemblages of Singapore intertidal mudflats [Poster]

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Polychaetes form a major group of invertebrates living in tidal mudflats of Singapore. Preliminary indications from an on-going marine biodiversity survey (between November 2010 and 2015), showed that there were some 27 families represented by 38 genera, with possibly 46 morphospecies living up to 30 cm below the surface in muddy or sub-sandy substrata over a tidal range of 0.3 to 1.7 m. New records for Singapore were members of the families Orbiniidae and Pectinariidae, as well as species from the genera *Cirriiformia* (Cirratulidae), *Nematonereis* (Eunicidae), *Eranno* (Lumbrineridae), *Onuphis* (Onuphidae), *Armandia* (Opheliidae) and *Polydora* and *Malacoceros* (Spionidae). The occurrence of the nereidid *Leonnates crinitus* outside Australia, and of the eunicid *Nematonereis* sp. within the South China Sea region were also documented for the first time. Not unexpectedly, members of the family Nereididae were found to be most widespread, occurring at 18 out of 21 locations surveyed. Other common families that were found in at least ten out of 21 surveyed locations included Glyceridae, Eunicidae, Lumbrineridae, Polynoidae, and Terebellidae. The highest diversity with at least total 18 polychaete families was documented from an estuarine mudflat in the Johor Strait separating the island of Singapore from peninsular Malaysia. Preliminary data showed that there was no direct correlation between substratum grain sizes and polychaete family diversity. Based on published literature, the number of families found at each location and total number of families observed in Singapore were generally lower than other mudflats in Southeast Asia, possibly due to the highly disturbed nature of the Singapore coastline.

Nervous system and musculature in *Polygordius appendiculatus* (Annelida, Polygordiidae) – a model for the annelid ground pattern?

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The systematic position of Polygordiidae is still under debate. Formerly regarded to belong to the now abandoned Archiannelida, they have been assigned to various positions among the polychaetes. However, recent molecular analyses indicate, that they might well be part of a basal radiation in Annelida. This may lead to the assumption that certain morphological characters might represent primitive character traits adopted from the annelid stem species. To prove this hypothesis an investigation of the nervous and muscular system by means of immunological staining and confocal laser scanning microscopy was conducted. The nervous system is entirely basiepidermal consisting of the brain, the ventral nerve cord and several smaller longitudinal nerves. These are connected by a number of ring nerves in each segment. The circumoesophageal connectives form a wide arc around the mouth and unite to form the ventral nerve cord. It is made up of closely apposed connectives, a median nerve and two larger lateral ones. Despite of a clearly segmental pattern of serotonergic somata and ring nerves, distinct ganglia are lacking. The muscular system mainly consists of longitudinal fibers forming an almost complete cylinder only interrupted by the ventral cord. The longitudinal fibers form a right and a left antagonistic unit separated in the dorsal midline. Other main muscle systems are regularly distributed oblique muscles and the strong septa. Anteriorly the longitudinal musculature proceeds into two pairs of bundles passing the brain and terminating anteriorly within the prostomium. There is no musculature in the palps. In contrast to earlier observations regularly arranged minute circular fibers are also present. These observations indicate that very likely a basiepithelial and non-ganglionic organization of the ventral nerve cord as well as an orthogonal nervous system are plesiomorphic characters in annelids. With respect to the musculature the same applies for the predominance of longitudinal fibers.

Species Distinction in *Polygordius* (Annelida): Ultrastructure of photoreceptor-like sense organs as an additional character? [Poster]

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Members of Polygordiidae Czerniavsky, 1881 are typical and often dominant inhabitants of coarse sediments subjected to strong currents, "*Polygordius*-Schill". They occur worldwide and have mostly been reported from the intertidal and the continental shelf. Polygordiidae currently comprises only *Polygordius* with 15 nominal and two subspecies. These nematode-like animals are small and lack external signs of segmentation, parapodia and chaetae as well as external ciliation. Thus the number of morphological characters for species distinction is limited to the shape and structures of the prostomium and pygidium. In earlier descriptions, however, less reliable characters as size, color, presence/absence/color of "eyespot", and arrangement of blood vessels were also used. As a result identification of *Polygordius* species is difficult and some of the so-called cosmopolitan species may actually comprise several cryptic species whereas others appear to be invalid. For better distinction among species and understanding of the phylogeny, evolution and biogeography of the group we used an integrative approach using molecular and morphological methods, i.e. DNA-sequencing and LM, SEM, TEM, and cLSM. In order to evaluate whether the photoreceptor-like sense organs previously described for *Polygordius appendiculatus* Fraipont, 1887 provide additional characters of taxonomic value, the ultrastructure of these organs was studied in two other species, *Polygordius erythrophthalmus* Giard, 1880 and *Polygordius lacteus* Schneider, 1868. These organs occur in comparatively large numbers and comprise different types of sensory cells, one rhabdomeric and two ciliary, which are variously combined to form small sensory organs. Whereas differences are negligible between *P. erythrophthalmus* and *P. lacteus*, major structural differences can be observed for *P. appendiculatus*. These results are in accordance with our molecular and morphological studies indicating that *P. erythrophthalmus* represents a junior synonym of *P. lacteus*. Moreover, these results also show that ultrastructural data may significantly contribute to species distinction in morphologically similar taxa.

Population dynamics of Polychaeta from a southeastern Brazilian Coastal Lagoon [Poster]

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The aim of this study was to evaluate the population dynamics of polychaete species from Visgueiro lagoon (Jurubatiba Sandy Coastal National Park, Quissamã, Rio de Janeiro: -22°21'10, 72°S -41°49'25, 77°W). This coastal lagoon is hypersaline, reaching twice the sea salinity in the driest periods and can even be totally dry. The samples were collected fortnightly for a year (March/2013 to February/2013). We sampled five stations on the shore line and five on the most shore line distance. The sediment was collected using a van-Veen grab (0,054m²) and was washed in a 500 e 1000µm mesh sieve to separate the polychaetes, which were fixed in a 4% formalin solution. Plankton samples were collected by a 50µm mesh net to evaluate the polychaete larvae, and fixed with 4% formalin solution. Abiotics data were also collected, as transparency, temperature, salinity, dissolved oxygen, pH, granulometry, total organic matter, chlorophyll-*a*, and water to analyze phosphorus and nitrogen concentrations. A total of 6,269 specimens were collected, belonging to the species: *Boccardiella ligerica*, *Heteromastus similis*, *Laeonereis culveri* and *Sigambra grubei*. The mean salinity was 61.72‰, ranging between 38‰ and 119.8‰. When the salinity reached the highest levels, the number of specimens was lower than in the months when the salinity reached low levels. *Sigambra grubei* was the first species to be sampled when the salinity reached about 68.05‰, and when the salinity reached about 55.34‰, the most common species to be sampled was *L. culveri*. We think that salinity is probably the most important variable affecting the polychaetes, according to some studies that showed the salinity influence on the biological development of the polychaetes.

Histological aspects of regeneration in *Sabella spallanzanii* and *Branchiomma luctuosum* from the Mediterranean Sea [Poster]

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Many aspects of the regenerative ability of Annelida are yet to be determined, in particular the mechanisms of tissue restoration and the origin of the involved cells. Epidermal cells, coelomocytes and muscle cells, have been suggested to have a role in the blastema formation during the early reparative phase of regeneration in polychaetes. The family Sabellidae is a particularly interesting clade for comparative studies of regeneration, as its members vary in regeneration potential, with some even lacking this ability completely. Within the family data concerning histological investigations of regenerating taxa are available only for *Bispira melanostigma* and *Branchiomma nigromaculatum*.

In a previous study we compared the morphology of the regeneration process in *Sabella spallanzanii* and *Branchiomma luctuosum*, two species belonging to closely related genera. These species use different mechanisms to restore lost anterior body parts: in *S. spallanzanii* both morphallaxis and epimorphosis appear to be important in anterior end regeneration, whilst *B. luctuosum* relies only on epimorphosis.

Present results from histological investigations in regenerating individuals of *S. spallanzanii* and *B. luctuosum* confirm what was previously suggested by morphological analysis. The occurrence of epimorphosis to restore the entire anterior end in *B. luctuosum* was indicated by the formation of an intersegmental septum delimiting coelomic cavities in correspondence of the newly formed thoracic chaetigers which, contrarily to the underlying abdominal segments, were completely devoid of coelomocytes. The presence in *S. spallanzanii* of a single coelomic cavity as a result of the disappearance of the original septa in correspondence of pre-existing abdominal segments indicates that part of the anterior end is regenerated by morphallaxis. During regeneration, new septa may be reconstituted probably by cells deriving from internal epithelium of the coelom.

Regional taxonomic standardization and intercalibration: how to achieve it?

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California has some of the most comprehensive environmental regulations in the US. The Southern California Bight has four major POTW's, three large ports, coastal bays and harbors, and open ocean which require a variety of marine environmental studies to insure their protection. As a result, there is a great amount of benthic sampling in coastal and ocean environments. That means taxonomic work! There are many government laboratories (municipal, county, state) and private consulting companies involved in producing benthic invertebrate community data (identification and abundance). A need for standardization and intercalibration of taxonomic name usage between Southern California laboratories was recognized and the Taxonomic Standardization Program was established by the Southern California Coastal Water Research Project in 1973. The demise of that program led to the formation of the Southern California Association of Marine Invertebrate Taxonomists (SCAMIT) in 1982. From the outset, the goal of SCAMIT was "promoting the study of marine invertebrate taxonomy in Southern California and developing a regionally standardized taxonomy". To accomplish this, SCAMIT provides a regular monthly forum to address problems in taxonomy, organizes taxonomic workshops, hosts a website, produces taxonomic aids, and maintains a regional species list. In addition, SCAMIT has a discussion email list server and provides members with access to publication grant funds. A web based taxonomic database combining several information sources is in development. The organization's activities contribute to the scientific value of the many surveys of marine benthic invertebrate communities conducted in Southern California by assuring standardized taxonomy and compatibility between various taxonomic data sets.

Professor Elis Wyn Knight-Jones FLShc – pioneering marine biologist and polychaete taxonomist (1916-2013)

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Wyn Knight-Jones became one of the leading British marine biologists following the 1939-45 war. He was heavily involved in the creation of the Marine Biology Station at Menai Bridge in 1950, and became Assistant Director. His laboratory study of gregariousness in barnacle larvae (1953) became a classic work in experimental biology. Three years later he moved to the then University College of Swansea as the first Professor of Zoology, a position he held until his retirement in 1981. His research interests were wide-ranging and he supervised students working on ciliary action, larval settlement and behaviour, zooplankton and pressure, enteropneusts, fish, marine leeches and, of course, spirobin serpulids. Wyn was a pioneer of using SCUBA diving in marine biological research and it was through this activity that he met his second wife, Phyllis. Together, they became the foremost taxonomic experts in the spirobin polychaetes of the world. They travelled the world researching all aspects of spirobins and it always tickled him that these tiny, coiled, worms essentially supported their careers - ridiculous as it may have appeared. Research grants from the Royal Society supported their 3-month visit to Australia in 1983 and enabled them to attend the First International Polychaete Conference in Sydney. Impeccably turned out in his smart blazer and neat trousers, Wyn was the epitome of the scholar and gentleman that everyone recognised. Nevertheless, his enigmatic smile and the twinkle in his eye betrayed a keen sense of humour, something that had led him into a number of colourful escapades in his earlier student days! Wyn was always a 'free-spirit' and, even as a University Professor, often eschewed the formalities of the position. He led by example and, in lectures, would use his vast experience and knowledge - and his humour, sometimes dry, sometimes risqué - to enthral student audiences.

"For she has made me the laily worm, That lies at the fit o the tree."

Cirratulidae (Polychaeta) from the Northern Mariana Islands of Guam and Saipan, northwestern Pacific [Poster]

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Polychaetes from the Mariana Islands of Guam and Saipan have been characterized in previous studies but a thorough taxonomic study of the cirratulids has only been possible recently. Samples from throughout the islands of Guam and Saipan were collected in 2001 by the Environmental Monitoring and Assessment Program (EMAP) and most recently at Apra Harbor, Guam (2010) in a project to evaluate the community structure before dredging activities. All sampling and processing followed standard EPA procedures. A total of ten cirratulid species were identified, two multitentaculate and eight bitentaculate species. The multitentaculate species *Timarete cf. punctata* (Grube, 1859) is broadly distributed in the Pacific and Atlantic oceans but specimens from Saipan differ slightly from other Indo-Pacific material examined (Hawaii, Indonesia, Marshall Islands) in respect to coloration of body, branchiae and tentacles. *Cirriformia cf. chrysodermoides* Pillai, 1965 is newly recorded outside its type locality and unique in the genus by the presence of only two pairs of feeding tentacles and small size. The bitentaculate genus *Tharyx* is well-represented with three possibly undescribed species, one of which is unique with aristate chaetae on posterior neuropodia. Other bitentaculate species identified were *Aphelochaeta saipanensis* Magalhães and Bailey-Brock, 2013, a recently described species from Saipan, *Aphelochaeta* sp., *Caulleriella bioculata* (Keferstein, 1862), *Dodecaceria laddi* Hartman, 1954, and *Monticellina* sp. from Guam.

Polychaete assemblages associated with the invasive alga *Avrainvillea amadelpha* and unvegetated sediments in Oahu, Hawaii

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Avrainvillea amadelpha is one of the most wide-spread invasive algae on Hawaii's reefs and efforts to remove it from south shore reefs have been ongoing with some success with more than 30 tons manually removed from shallow reef flats. The macrobenthic assemblages associated with this invasive alga are scarcely known and this study aimed to provide baseline data on the polychaete worms associated with *A. amadelpha* mats and nearby bare sediment patches prior to removal efforts. Sixteen sampling stations were selected, ten stations were distributed in areas where the invasive alga occurred abundantly ('A' stations) and six stations were placed on bare sand patches ('S' stations). Three replicates of approximately 475 cm³ each were collected in March 2010 at each station by hand using a nalgene corer (11 cm in diameter by 5 cm deep). Based on the comparison between *Avrainvillea amadelpha*-dominated bottoms and the surrounding sediment patches, our study demonstrates that these habitats support a diverse and abundant polychaete assemblage with 2,621 individuals and 84 species. The species *Sphaerosyllis densopapillata* (34.14 %), *Phyllochaetopterus verrilli* (8.32 %), *Protocirrinieris mascaratatus* (5.9 %), *Exogone longicornis* (4.9 %), and *Typosyllis cornuta* (4.47 %) were the dominant taxa. The non-metric multidimensional scaling separated clearly the 'A' stations from the 'S' stations. ANOSIM has shown that stations within the *a priori* defined group 'A' are significantly dissimilar from the stations in the group 'S' (R = 0.527; p = 0.1 %). SIMPER analyses have confirmed the slight but greater dissimilarity in between algae and sediment stations (average dissimilarity = 60.12) than within either algae (52.27) or sediments stations (52.04). Therefore, polychaete assemblages associated with *A. amadelpha* mats are significantly distinct from those of nearby bare sediment patches and the removal efforts to get rid of invasive algae might destabilize these invertebrate assemblages.

New records of Fauveliopsidae (Polychaeta) from off Honolulu, Hawaii [Poster]

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Fauveliopsid polychaetes have been collected at dredge disposal sites off Honolulu from 397-507 m depth. Two species have been identified and provisionally named as *Laubieriopsis* sp. 1 and *Laubieriopsis* sp. 2. The former has 15 body segments, first four chaetigers with two thin and two thick unidentate acicular chaetae per ramus, all other body segments with one thick acicular and one capillary chaeta per ramus, acicular chaeta from the last segment elongated and extending beyond pygidium, and unpaired genital papilla present on the right side of chaetiger 6. This species is most similar to the *L. brevis* (Hartman, 1967) complex from the Atlantic and *L. hartmanae* (Levenstein, 1970) and *L. brevis japonica* Imajima, 2009 from the Pacific Ocean. However, it differs most noticeably by the reduced number of body segments (15 rather than 16) observed in all 23 specimens examined and in relation to the absence of companion chaetae on the last two chaetigers (*L. brevis* and *L. hartmanae* has capillary besides acicular chaetae). *Laubieriopsis* sp. 2 has 21 body segments, first four segments with strongly bidentate acicular chaetae, posterior neurochaetae slightly thicker than notochaetae, chaetae from the last segment not reaching end of the body, and unpaired papillae observed on the right side of chaetiger 8. *Laubieriopsis* sp. 2 resembles *L. cabiochi* (Amoureux, 1982) but a detailed examination of specimens with SEM is necessary to confirm this identification. *Laubieriopsis* sp. 1 has been collected in 15 sampling stations while *Laubieriopsis* sp. 2 has only been found in five stations with a total of 15 specimens.

Combined morphological and molecular data reveal new species in the *Namalycastis abiuma* species group from India

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The *Namalycastis abiuma* (Grube, 1872) species group comprises a complex of morphologically similar forms around the world. The present account unveils a new approach to better define species limits within the complex and resolve taxonomic confusion by the combined means of conventional as well as DNA Barcode (Mitochondrial COI gene). There are five *Namalycastis* species presently known from India, they are *N. abiuma* species group, *N. indica* Southern, 1921, *N. fauveli* Nageswara Rao, 1981, *N. glasbyi* Fernando and Rajasekaran, 2007 and *N. jaya* Magesh et al., 2013. Further, recent sampling along the SW Indian coast has uncovered variant specimens of *N. abiuma* (species group) and a few specimens resembling the type of *N. abiuma* from Brazil. In order to evaluate both molecular and morphological variability, 60 specimens of the *N. abiuma* species group were sampled. The mitochondrial COI data were analysed using DNA Sequence Polymorphism software (DnaSP 5.10) and yielded six different haplotypes. Phylogenetics of different haplotypes were also analysed, following Neighbor-joining and Maximum parsimony methods. Specimens in each haplotype also showed significant intra-specific morphological variations *ie.* eye position, occurrence of the notochaetae, parapodial type. Furthermore, this work also identified a lineage of closely similar forms that appear to have evolved in different coastal niches in SW India including the recently described new species *Namalycastis jaya*.

On the enigmatic symbiotic polychaete "*Parasyllidea*" *humesi* Pettibone, 1961 (Hesionidae): phylogenetic, taxonomic, and behavioural overview

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The hesionid genus *Parasyllidea* could be distinguished from *Ophiodromus* in lacking median antennae. It was originally described to include a single species, *P. humesi*, known only from its original description, based on material from Pointe-Noire (Republic of Congo, West Africa). Lately, the genus included *P. blacki* and *P. australiensis*. A fourth species, *P. delicata*, is not valid according to the ICZN (and, apparently, it seems to belong to a different genus). A new population of *P. humesi* was recently found in the Gulf of Cádiz (SE Atlantic, Iberian Peninsula), which coincided with the African population in living endosymbiotically with bivalve hosts (*Scrobicularia plana* and "*Tellina nymphalis*", respectively) in shallow coastal waters (salt marshes and mangrove swamps, respectively). Some Iberian specimens, however, revealed the presence of a small papilla-like central antenna associated with the antennal furrow, which raised some doubts on the validity of the *Parasyllidea*. A phylogenetic analysis based on the mitochondrial COI and 16S, together with nuclear 18S and 28S genes confirms *Parasyllidea* as a junior synonym of *Ophiodromus*. Therefore, in this presentation, *P. humesi* is fully re-described as *Ophiodromus humesi* new comb. In addition, the observation of living specimens during sampling and laboratory handling enabled detailed observations of the host-entering behaviour of the species, which are also described and illustrated. The worm has never been reported as free-living and the association does not occur with any other coexisting bivalve in the region (i.e. *Cerastoderma edule*, *Tapes decussatus*, and *Mytilus galloprovincialis*), which suggests that the association may be an obligate symbiosis, closer to parasitism. This is further supported by the observation of differences in relative biomass in infested and non-infested hosts. Finally, the significance of the intraspecific attacks observed in experimental conditions is discussed.

Our current understanding of annelid evolutionary relationships

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Understanding the early diversification of Annelida presents major challenges for evolutionary biologists. Over 15 years ago, efforts to construct a molecular phylogeny of this ancient, diverse, and ecologically important group based on a short gene fragment for 20 taxa led to the hypothesis that clitellates, siboglinids, and echiurids are derived annelids, rendering "Polychaeta" paraphyletic. Subsequent studies based on much increased gene sequence data and expanded taxon sampling show support for an echiurid-capitellid sister grouping, and Siboglinidae nested within Annelida, as well as monophyly of many traditional families. This is the case for our most recent analyses of three nuclear coding genes for ~ 100 annelids and over a dozen outgroups. As with other molecular analyses, however, placement of myzostomids and sipunculids remains poorly supported on our trees, although SOWH tests do not reject hypotheses of their inclusion in Annelida. Annelid researchers are now applying the next generation of molecular tools to better estimate annelid phylogeny; high-throughput sequencing is underway, and micro-RNA families are being surveyed. The first phylogenomic analyses (34 annelids, ~ 50k amino acids) support the traditional split between Errantia and Sedentaria, and basal positions for myzostomids, sipunculids and chaetopterids. On the other hand, parsimony analysis of presence/absence data from early micro-RNAs surveys with very limited taxon sampling supports myzostomids as derived annelids, and Sipuncula as sister to Annelida. Phylogenomic approaches provide access to enormous amounts of data, but they can suffer from problems associated with missing data, taxon choice, and gene function, etc.; microRNA profiling suffers from its own pitfalls. I will discuss the need for corroboration among data sets with much expanded taxon sampling before well-founded assertions regarding basal annelid taxa, reconstructions of ancestral conditions, and placement of Annelida among other lophotrochozoans can be made.

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Who are they, where do they come from, how did they get there?

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Approximately 14'000 large seamounts rising more than 1000 m above the seafloor have been identified worldwide using bathymetric data. Most of them are found in the Pacific Ocean, but they are present in uneven densities in all oceans. Although there is a growing interest in studies of the seamount fauna, only limited knowledge has been gathered and the questions 'What species are found on seamounts, where do they come from, how did they get there?' raised by Hubbs already in 1959 still need to be answered. Subject of the talk are the results from a study of the spionid fauna of the Great Meteor Seamount and adjacent seamounts in the Atlantic Ocean. The majority of the species found was new to science. For two of these species new genera needed to be erected as they could not be assigned to any of the existing spionid genera. Moreover, the placement of the two newly described genera within Spionidae was not straight forward based on the commonly applied methods in taxonomy, and histological studies were undertaken in addition to detailed morphological and genetic studies. The results lead to questions concerning generic definitions and character evaluation within Spionidae. In conclusion, the species composition of the Atlantic seamounts is discussed in regard to biogeography and species ecology. Our view of seamounts as either hotspots of biodiversity, stepping-stones or evolutionary traps is debated.

Do symbiotic polychaetes migrate from host to host?

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Obligate symbiotic animals are well adapted morphologically and behaviorally to be associated with their hosts, while extremely vulnerable to predators being free. Nevertheless, it has been demonstrated in several species of crabs and ophiuroids that host-to-host migrations are characteristic features of their life cycles (e.g. Castro 1978, Bruyn et al. 2009, Fourgon et al. 2007). Host switching has also been shown in the territorial scale worm *Arctonoe vittata* (Britayev, Smurov 1985). We hypothesized that host-to-host migration caused by intraspecific competition is a wide spread phenomenon in symbiotic polychaetes with territorial behaviour. To test this hypothesis we studied population characteristics of the symbiotic scaleworm *Paradyte crinoidicola* (Potts, 1910), widely distributed in the Indo-West Pacific, and performed recolonization experiments with one of their crinoid hosts *Himerometra robustipinna* (Carpenter, 1881) in the Bay of Nhatrang, Vietnam. The percentage of infested hosts was 67%, and abundance reached 26 symbiont individuals per host. However large adult animals were found solitary on crinoid individuals or individual arms, thus indicating their territoriality. High frequency of small traumas of cirri and parapodia (39% of worms) is evidence of aggressive interactions between symbionts. Experiments demonstrated high rate of crinoid recolonization by juveniles and adults symbionts independently of hosts' spatial distribution (aggregated or dispersed). This suggests the long distance host-to-host migrations. The sex ratio of symbionts in experiments differed from that in control, and deviated from expected 1:1 in favour of males, suggesting that searching of mates is also a motive for host switching.

Staining techniques for examining polychaetes with microCT [Poster]

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Imaging soft-bodied invertebrates like polychaetes with microCT is difficult as their tissues are often X-ray transparent. Resulting images often lack enough contrast to be able to determine internal anatomy. However a range of stains is now used to improve the contrast with the result that internal morphology can be more easily seen. The drawback to many such stains is that they are often general in their uptake, therefore it can be difficult in some situations to be able to differentiate types of tissue. This can be confusing if the internal anatomy is not already known from more traditional studies. In this poster we present a study looking at a range of different stains adapted from those used in traditional histology, particularly silver nitrate used to identify nerves and iron stain, which has previously been used in the study of insect soft-tissue histology. We present the results, looking at the chemistry behind the staining process, and provide a summary of the advantages and disadvantages of the current range of stains available for microCT studies in polychaetes.

Changes in Mediterranean *Posidonia*-associated polychaete assemblages due to a new alien Australian seaweed [Poster]

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The Mediterranean Sea is particularly affected by biological invasions. Alien seaweeds of the genus *Caulerpa* cause various direct and indirect negative effects on native Mediterranean biota, including changes in benthic assemblages. The north-eastern Australian algae *C. taxifolia* var. *distichophylla* is a recent invader recorded along the Turkish and southern Sicilian coasts, especially on rocky bottoms and seagrass meadows. The impact of this newcomer on the native Mediterranean benthic communities has not yet been assessed. Herewith the results of the survey carried out in summer 2013, aiming to evaluate the effects of the invasion on the native polychaete assemblages associated to the endemic Mediterranean seagrass *Posidonia oceanica* are presented. Samples were taken by hand corers on *Posidonia* meadows borders (mattes) in southern Sicily, where the alien appeared particularly abundant, at invaded and non invaded sites. Polychaetes were more abundant at the impacted sites, while diversity was higher at control sites. Both univariate and multivariate analyses indicated that the composition and structure of the polychaete assemblages in impacted sites was significantly different from those in the control ones. Tolerant capitellids *Peresiella clymenoides* and *Pseudoleiocyathella fauveli* and other tolerant species such as *Euclymene oerstedii*, *Glycera tridactyla*, *Tharyx marioni*, *Myriochele oculata* and *Sabellaria* spp characterized the impacted location. Differences in Eh and RPD in the mat-associated sediment might be responsible for the observed pattern. Our results raise serious concern about the possible negative effects of the new alien invader on the native macrobenthic fauna.

Biosecurity surveillance of the New Zealand's invasive polychaete; *Sabella spallanzanii* [Poster]

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NZ has a history of adventive marine polychaetes making their home there. Serpulid worms and polydoridae worms are examples of marine pests firmly established. One recent invader; the Mediterranean fan worm (*Sabella spallanzanii*) has firmly established itself in some of New Zealand's ports. This poster describes recent biosecurity surveillance and outcomes.

First record to *Glycerella magellanica* (Polychaeta: Glyceridae) to the South Atlantic, associated with *Solenosmilia variabilis* (Anthozoa: Caryophyllidae) [Poster]

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Glycerids are divided into three genera: *Glycera*, *Hemipodia* and *Glycerella*, with diagnostic characters based on features of parapodia, branchiae (when present), chaetae, proboscideal papillae, and aileron. Species belonging to *Glycerella* share a prostomium with four rings bearing four distal appendages, and a proboscis with rod-like aileron. They also have the first two parapodia uniramous, while the following are biramous, with dorsal and ventral cirri; their notopodia have simple capillaries, neuropodia in the upper part with spinigerous and in the lower part with falcigerous compound chaetae. *Glycerella magellanica* has been reported from the southwest Indian Ocean, South Pacific, North and Central Atlantic. Here, we report the first record of this species from the southeast Atlantic, specifically the northeast coast of Rio de Janeiro, in the Campos Basin. The specimen was collected during the ECOPROF project coordinated by CENPES/PETROBRAS. One specimen was collected in a dead fragment of the coral *Solenosmilia variabilis*, at 745 m depth. Morphologically the specimen is very similar to the one used in the original description. The prostomium has four annuli with the distal annulus bearing 4 appendages and the basal annulus with a pair of nuchal organ. The proboscis is covered with digitiform papillae, which have a straight, median, longitudinal ridge and cilia at the top. In the aileron we observed a structure slightly enlarged, like a remnant of an interramal plate, resembling that of a young specimen. The parapodial shape is similar that of specimens from the original description, nevertheless, the neurochaetae vary in length along of the body, with the blades becoming shorter and distally curved on posterior parapodia. In addition, the shaft end of all neurochaetae has an accessory tooth in one side. Perhaps this feature was overlooked in other material. Additional material and comparisons with the type series will be necessary to guarantee proper identification.

Polychaetes associated with deep-sea coral reefs from the SE Brazilian coast

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Cold-water coral reefs are of great ecological importance, they can support a great diversity, by offering a sheltered, three-dimensional, micro-habitat to many species. Studies involving the Brazilian deep-sea coral reefs, and the fauna which composes it, are recent and still scarce. These reefs were studied only in terms of the species of coral which composes it, and their distribution on our coast. Two projects, CAP-BC and ECOPROF, coordinated by CENPES/PETROBRAS, surveyed the Campos Basin, with the objective of studying this environment. On each project samples of the reef-building corals were collected with a ROV, at depths from 300 to 1100m. Five species of coral were surveyed: *Solenosmilia variabilis*, *Lophelia pertusa*, *Enallopsammia profunda*, *Madrepora oculata* and *Errina sp.*, and fixed in formalin 10%. Afterwards, they were sorted for the examination of the associated fauna. Here, we present the first, qualitative, results from the polychaetes found in association with the coral reefs in this area. Specimens belonging to five species, all new to science were discovered one for each of the following families: Polynoidae, Sigalionidae, Hesionidae, Sabellidae, and Dorvilleidae. Specimens identified as *Glycerella magellanica*, *Harmothoe gilchristi*, *Phalacrostemma sp.*, *Eunice gracilicirrata*, *Eunice prognatha*, *Syllis sp.*, *Haplosyllis cf. ohma*, and *Nicon maculata*, are new records for the Brazilian coast. Two other species, *Filogranula revizee* and *Notopygos cf. crinita* had their range of occurrence extended. Specimens of *E. prognatha* were the most abundant, followed by *H. gilchristi* and *H. sp. nov.* Many tubes of Serpulidae were found attached to coral skeletons, unfortunately few of them had the specimen inside. The majority of polychaetes were found associated with the coral *S. variabilis*, followed by *E. profunda* and *L. Pertusa* whilst both *M. oculata* and *Errina sp.* were the corals least associated polychaetes.

The first record of the genus *Ophryotrocha* (Polychaeta: Dorvilleidae), associated with *Lophelia pertusa* (Linnaeus, 1758) (Anthozoa: Caryophyllidae), on the Brazilian coast, with notes on its reproduction [Poster]

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Dorvilleidae is composed predominantly of small polychaetes, which bear a complex oral apparatus and have about 130 species, arranged in 34 genera; *Ophryotrocha* being the best studied one. However, even species in this genus have hardly any distinguishable morphological characteristics and are hard to identify. Species in this genus occur from shallow to deep waters, mainly in organically rich environments, associated or not with other animals. Here, we report the first record of a species of *Ophryotrocha* to the Brazilian waters. Specimens were found associated with the coral *Lophelia pertusa* at a depth of 300 meters, and were collected during activities of the project ECOPROF, coordinated by CENPES/PETROBRAS. Ten specimens were collected alive and maintained in the laboratory. The species, which we were unable to fit to any of the diagnosis and consider to be new to science, has about 25 segments, all of them with ciliary rings or tufts; two internal eyes; uniramous parapodia, with supra-acicular, spiniger heterogomph chaeta, and sub-acicular spiniger homogomph. Mandibles are semi-fused and have a slightly serrated cutting plate. P-maxillae formed by five, spoon-shaped, maxillary plates with serrated borders and a basal plate. K-maxillae composed by two unidentate forceps and by seven pairs of spoon-shaped, semi-articulated, anteriorly serrated, maxillary plates, supported by a narrow shaft. In a small aquarium we observed the reproductive behavior, which is similar to that described for *O. puerilis*; that a cocoon is produced with about 360 eggs per spawning. The larvae leave the eggs with 3 to 4 segments, with long anal cirri and pigdial stylus. Our sample specimens are more similar to the ones used in the descriptions of *O. puerilis puerilis*, *O. adherens* and *O. eutrophila* although these all have chaetae and maxillary apparatuses of different kinds. In addition, the reproductive pattern we observed differs in some aspects.

Function and morphology of abdominal lateral pouches in magelonid polychaete worms (Annelida: Magelonidae) [Poster]

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The presence and absence of abdominal lateral pouches is a useful diagnostic feature within the Magelonidae. Two types of lateral pouch have been described for the group; Σ -shaped and C-shaped. However, variation in pouch morphology and segmental distribution exists between species, and they are completely absent in many species (although their absence is sometimes incorrectly stated). The function of lateral pouches is currently unknown, but contraction and expansion associated with movement has been reported. As they are present in males, females and juveniles, it is unlikely that their function is related to reproduction, and no connection between the external pouch and the interior of the worm is apparent. Another suggestion is that their function concerns tube irrigation. In order to examine this further detailed observations of live material are made. The variation in different pouch morphologies is also investigated.

Regeneration as a novel method to culture marine ornamental sabellids [Poster]

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Collection of live invertebrates from coral reefs has increased dramatically over the past two decades in response to the growing marine aquarium industry, and currently, more than 500 species (excluding corals) are traded globally. Aquaculture of ornamental species is deemed a priority solution in mitigating the effects of wild collection but is limited by bottlenecks at key life history stages. A novel culture method for ornamental sabellids, which utilises their outstanding regenerative capacity in a process similar to coral 'fragging', has been developed and survivorship after regenerative development assessed. *Sabella pavonina*, a UK temperate species, was used as a model to develop a culture technique which was subsequently transferred to a tropical species of *Sabellastarte*. Survivorship of *S. pavonina* was high ($\geq 80\%$) in individuals which had been cut into as many as eight fragments and all fragments completed regenerative development within a four week period. *Sabellastarte* species exhibited $\geq 75\%$ survivorship when cut into just two fragments, but higher mortality was recorded with increasing number of cuts, with only 20% of fragments from individuals cut into eighths surviving the duration of the experiment. Both test species were capable of regenerating cephalically and caudally within a four week period. Caudal regeneration involved the healing of the cut surface, reconstruction of the pygidium and subsequent segment addition, while cephalic regeneration was a more complex process of wound healing, reconstruction of a new mouth and the development of the branchial crown structure. It is concluded that differences in survivorship between *S. pavonina* and *Sabellastarte* sp. could be attributed to either infection, or species-specific differences in the area of section (size of the wound) in relation to the length of the fragment. Optimisation of survivorship and the speed of regenerative growth could be improved with the enhancement of the culture system.

The diversity and radiation of polynoid scaleworms (Annelida) in the Antarctic Amundsen Sea

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We report on the diversity of the Polynoidae (scaleworms) from a suite of samples in the Amundsen Sea, one of the least known regions of the world for marine fauna. We have used classical taxonomy coupled with molecular genetics and uncovered 23 species from a single region (Pine Island Bay) with at least 6 of them new to science. The molecular approach enabled us to establish the long debated status of a small polynoid *Herdmanella gracilis* Ehlers, 1908 as a juvenile of most likely several species in the genus *Austroaenilla* Bergström, 1916. Molecular data were generated for nearly half of ~60 known Polynoidae species from Southern Ocean. These data can provide insights into the evolutionary origin of the polynoid fauna of this region and the influences of past glacial maxima.

Towards an assessment of phylogenetic relationships within Polycirridae

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Polycirrids comprise a clade of Terebelliformia characterised by (1) the presence of a circular upper lip, (2) buccal tentacles of at least two types, (3) segment 2 distinctly narrower than adjacent segments, constricting the body posterior to the mouth, and (4) a general tendency toward reduction of notopodia, neuropodia and associated chaetae. Although not unique to the group, branchiae are absent. The Polycirridae currently has six genera, among which members of *Amaeana* and *Polycirrus* have both notopodia and neuropodia, members of *Enoplobranchus* and *Lysilla* only have notopodia, members of *Biremis* only have neuropodia, and members of *Hauchiella* lack both noto- and neuropodia. Notochaetae are either winged or pinnate, sometimes both types present on the same notopodium, and neurochaetae are avicular uncini of two types, except among members of *Amaeana*, which have stout spines. A phylogenetic analysis of Polycirridae was performed for the purpose of determining the status of monophyly of genera. Outgroups included a spionid (*Spiophanes modestus*), sabellariid (*Idanthyrus australiensis*), cirratulid (*Aphelocheata tigrina*), and members of seven Telothelepodidae (terebelliform sister group). The ingroup included *Polycirrus* (12 species), *Amaeana* (three species), *Lysilla* (two species), *Hauchiella* (two species), and monotypic *Biremis* and *Enoplobranchus*. One hundred fifty one external morphological characters, among 65 subjects, were used. Among the 70 minimum-length cladograms inferred, none present evidence of monophyly for non-monotypic genera, i.e. *Polycirrus*, *Lysilla*, *Hauchiella*, and *Amaeana*. *Polycirrus* is paraphyletic relative to remaining genera, *Lysilla* and *Hauchiella* are polyphyletic, and *Amaeana* paraphyletic relative to *Lysilla laciniata*.

The polychaete fauna occurring on Sandstone Reefs off the states of Paraíba and Pernambuco, northeastern Brazil

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Sandstone reefs off northeastern Brazil are colonised by a large number of benthic organisms living on the rocks and the nodules of calcareous algae. Several microhabitats are found, such as colonial sponges, cnidarians and ascidians, tufts of algae and similar structures, occupied by a rich fauna of vagile forms, including crustaceans, gastropods and polychaetes. Polychaetes are usually one of the most important groups in terms of both benthic biomass and species richness, and they are particularly abundant in the sandstone reefs off northeastern Brazil, but very few studies have been conducted in the area and even fewer of taxonomic scope. So, the present is a taxonomic inventory of the polychaetes occurring at the intertidal zone of sandstone reefs off the states of Paraíba and Pernambuco, northeastern Brazil. Collections were made at peaks of low tide from reefs off fifteen beaches along those states. Algae and sponges, ascidians, mussel beds and similar substrates were scraped from the rocks, examined under stereomicroscope, polychaetes were sorted, relaxed in menthol solution, preserved in 4% formaline solution and later rinsed in fresh water and transferred to 70% ethanol. Around 15000 specimens of polychaetes were obtained, belonging to 130 already identified taxa (genera and species), including 28 families. Syllids were the most abundant and diverse polychaetes, with around 7729 specimens, belonging to 68 taxa already identified, but terebellids (2206 specimens, 12 taxa), eunicids (1370 specimens, 9 taxa), sabellariids (871 specimens, not identified), cirratulids (579 specimens, not identified), and nereids (503 specimens, 12 taxa), were also well represented. Of those 130 already identified taxa, 12 species and 1 genus are new records for the Brazilian coast and 29 species are new to science.

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The faunal changes and the present situation of polychaetes in sandy shores after the 3.11 earthquake, Japan [Poster]

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The massive earthquake and tsunami struck Japan on March 11, 2011. The earthquake and tsunami damaged organisms drastically. The native habitat of the organisms was changed by land subsidence. The organisms were passed by the tsunami. We focused on the faunal changes of polychaetes in sandy shores of Miyagi and Fukushima Prefectures after the 2011 off the Pacific coast of Tohoku Earthquake. We examined the inhabitation of polychaetes in the Mangoku-ura Inlet in Miyagi Prefecture and the Matsukawa-ura Inlet in Fukushima Prefecture for qualitative and quantitative research from May 2011 to July 2013. The intertidal zone around the Mangoku-ura Inlet changed into a subtidal zone by the land subsidence of 80 cm at Oshika Peninsula. After the earthquake, when we investigated in May for the first time, although the habitation of polychaetes was confirmed, the density was low. After that, the density increased. The dominant species were *Ceratonereis erythraeensis* and *Scoletoma* spp. in Mangoku-ura Inlet after the earthquake. In Matsukawa-ura Inlet, the organisms that had lived there were swept away with sand by the tsunami of 8 m. After the earthquake, when we investigated for the first time in May, the habitation of polychaetes was not confirmed. The density was 1.6 individuals m⁻² in June. In July, we confirmed an increase in density which was represented by recruitment of *Hediste diadroma*. The dominant species in the first year after the earthquake was *H. diadroma* in Matsukawa-ura Inlet. The results of this study indicated that tsunami and land subsidence after the earthquake caused many disturbances to coastal ecosystem. The Mangoku-ura Inlet and Matsukawa-ura Inlet showed different types of damages. Population recovery in some species was also observed. It is considered that the population size after the earthquake was related to the reproductive modes and the lifecycles of dominant species.

Phyllodocidae Örsted, 1843 (Polychaeta: Annelida) from southern and southeastern Brazil [Poster]

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The Phyllodocidae currently includes 20 genera and 350 valid species. Twenty species have been cited for Brazilian waters. Most of these records are doubtful or available only in unpublished theses. Based on newly collected material and museum collections, we present herein a taxonomic survey of phyllodocids from shallow waters, continental shelf bottoms and canyons off southeastern and southern Brazil. 1030 individuals belonging to 13 genera and 49 species were examined. 37 are new species, 8 are new records and 4 were already known from the region. *Phyllodoce* is the most diverse genus, with 8 new species, 4 new records (*P. cf. hartmanae*, *P. longipes*, *P. pettiboneae* and *P. armigera*) and the previously reported *P. madeirensis*. *Anaitides tamoya* Nonato, 1981 *nomen nudum* is referred to *P. hartmanae*. Four new species of *Hypereteone* are described, including material previously identified as *H. alba*, which actually corresponds to a new species. Four new species of *Paranaitis* are described. Four new species of *Eulalia* are described and *E. mexicana* is recorded for the first time in Brazil; *E. myriacycla*, previously reported from Brazil, was also found. *Eumida* is locally represented by two new species, of which *Eumida* sp. n. 1 had been mistakenly recorded as *E. sanguinea*. *Nereiphylla mimica* is newly reported for Brazilian waters and a previous record of *N. castanea* is corrected to *N. fragilis*. Two new species of *Mystides* and two new species of *Protomystides* are described, together with *P. bidentata*, previously known from the region. A new species of *Pseudomystides* and five new species of *Hesionura* are also reported, together with the previously recorded *H. laubieri*. *Sige belizensis* is the first record of the species and the genus in Brazil. New species of *Pirakia* and *Pterocirrus*, genera previously unknown from Brazil, are described. Nine out of the 20 species previously known for Brazil had been in fact misidentified in previous works and six were not found in this survey.

Panmixia of a meso- to bathypelagic gelatinous zooplankter, *Poebius meseres*

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Poebius meseres is abundant, gelatinous, holopelagic polychaete and an important detritivore in the bathypelagic zone. In situ video observations of *P. meseres* from twenty years of remotely operated vehicle (ROV) dives off central California illustrate a bimodal distribution centered around 400 and 1800 meters depth. To determine population structure between these depths, we sampled 169 individuals from around three depths (400, 1200, and 1800 m) using samplers mounted on the ROV *Doc Ricketts*. Observations were made on sex, maturity, and body size. Larger individuals and mature males increased in abundance with depth while juveniles were more abundant at 400 m. Reproductive females occurred at all three depths. Population genetic analyses were performed using mitochondrial COI and 16S sequences from sampled individuals in addition to a few specimens from the Oregon coast and Gulf of California (GOC), Mexico. This study reveals a panmictic population throughout the full depth of their water column distribution off Monterey Bay, California. Preliminary results indicate that the population in the GOC may differ substantially in both these genes compared to the population off California and Oregon.

Original material and type localities of early described Polychaeta from Norway, with particular focus on species described by O.F. Müller and M. Sars

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A large number of polychaete species was described from the North Atlantic during the early history of scientific studies in the 18th and 19th century. The descriptions were often short or referred solely to general characteristics, which by today's standards are inadequate for species discrimination. As a result, a number of taxa among the so-called 'well-known and widely distributed' species have later been confounded with morphologically similar species. More than one hundred presently valid species were described from Norwegian waters before 1900. This study reviews the early described species from Norwegian waters with focus on basic requirements for re-assessing their characteristics, in particular by clarifying the status of original material and locating sampling sites. The most prolific contributions were made by O.F. Müller with about 20 species in 1771-1776 (e.g. *Glycera alba*, *Hediste diversicolor*, *Eunice pennata*, *Scoletoma fragilis*, *Pista cristata*,) and Michael Sars with more than 50 species in 1829-1872 (e.g. *Nothria conchylega*, *Flabelligera affinis*, *Notomastus latericeus*, *Terebellides stroemi*, *Euchone papillosa*). Other authors were A. Ørsted, A.J. Malmgren, H. Rathke, and G. Armauer Hanssen. Descriptions were mostly in Latin (diagnosis) with specifications and details in Norwegian, Danish or Swedish, often in separate publications. Original material from O.F. Müller is not known to exist. Original material of M. Sars and contemporary scientist is mostly existing, but often not identified as original ('syntypes') and occasionally deposited in several museum collections. Locating original sampling localities ('type localities') has been undertaken by combining information from various literature sources, labels of original material (when extant), and knowledge of historic place names. Designating type localities is essential for collecting new material, in particular with regard to characterisation of species by molecular genetic methods. In this study, the species are accounted for as far as their state has been ascertained.

Recent divergence and species diversity of *Diopatra* (Onuphidae) from intertidal zones along the Brazilian coast

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Up to now, 14 species of *Diopatra* have been reported from the Brazilian coast, with *D. cuprea* (Bosc, 1802) being the most cited in ecological and taxonomic surveys, possibly due to the problematic taxonomy of several similar species that encompass the *D. cuprea* complex. Herein we used morphological characters and mitochondrial DNA sequences (610 bps of COI and 219 bps of ND4) of 132 and 73 specimens, respectively, to investigate the pattern of distribution of intertidal species from the *D. cuprea* complex along the Brazilian coast. For phylogenetic and phylogeographical reconstructions, Maximum Likelihood (ML), Bayesian Inference (BI) and Haplotype Network (HN) approaches were used. Morphological results indicated the occurrence of three new species on the Brazilian coast: *Diopatra* sp.1 (with high variability), *Diopatra* sp.2 and *Diopatra* sp.3. Maximum Likelihood analysis using both genes (separated and concatenated) recovered 4 monophyletic groups, including the same obtained through morphological analysis plus a pair of cryptic species (A and B) within *Diopatra* sp.1. *Diopatra* sp.1A was recovered as paraphyletic in BI topology. The haplotype network (COI) revealed the same clusters defined in ML analysis. *Diopatra* sp.2 and *Diopatra* sp.3 differ from the haplotype of *Diopatra* sp.1B by 82 and 95 mutational steps, respectively, while *Diopatra* sp.1A and *Diopatra* sp.1B are separated by 11 steps. A molecular clock hypothesis was not rejected for the *Diopatra* sp.1A/*Diopatra* sp.1B split with divergence dating to 180,000 years past. This divergence may be the result of historical events associated to shifts in currents patterns during a glaciation sea-level fall (120m) and coastal geomorphology. Species restricted to intertidal zones presented a narrower geographical range (150 to 1,800km) than those also found in subtidal zones (3,000km). Present day patterns of distribution of intertidal species of *Diopatra* seem to be maintained by geomorphological/oceanographic differentiation and to intrinsic dispersal abilities associated to reproductive biology.

Utilization of *Wawo* Worms (Annelida, Polychaeta) in Ambon Island, Indonesia [Poster]

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Wawo, more popularly known as 'laor' among Ambonese people, is a group of different species of polychaetes which annually swarm in Ambon and its surrounding waters to reproduce. For centuries, wawo worms have been utilized by natives of Ambon Island, Province of Maluku, as their "annual"-traditional food source. 'Timba laor', i.e. the traditon of catching wawo, takes place either in February, March or April every year. During full moon and the two consecutive nights after that, from about 06.00 p.m. to around 09.00 p.m., a huge number of wawo worms will usually rise in certain water columns. At that time, the locals will usually attempt to collect as many worms as possible by using fishing nets, to be further cooked or sold at some traditional markets. In 2009, we found headless worms (schizogamous epitokes) abundantly in Alang waters (Ambon), presumed as the same species as Pacific *palolo*. Several species with heads (epigamous epitokes) that belong to Family Nereididae were also found, i.e. *Neanthes cf. gisserana* Horst, 1924, *Neanthes unifasciata* Willey, 1905, *Perinereis helleri* Grube, 1878 and *Perinereis nigropunctata* Horst, 1899. In addition, two species that belong to Family Eunicidae, i.e. *Eunice* sp. and *Lysidice* sp. were found. While the tradition of catching wawo has been considered as part of Indonesian cultural heritage, we are concerned that harvesting reproducing polychaetes continuously over generations could lead to local extinction.

Polychaetes of the Segara Anakan Mangrove Forest, Central Java, Indonesia [Poster]

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Indonesia has the largest area but also the highest loss rate of mangroves worldwide. The Segara Anakan lagoon harbors the last large mangrove-fringed estuarine system in Java. The aims of this research were to (1) study the polychaete community structure of the Segara Anakan mangrove forest (SAMF), and (2) compare polychaete species richness, density and distribution in relation to environmental parameters (pore water salinity, sediment water content, sediment texture). Seven stations were sampled which were located in the eastern and central parts of the forest. At each station, a line transect of 140 m length was defined perpendicular to the water edge, and was divided into three transect points with a distance of 70 m between them. Eight replicate sediment samples (10 cm depth) were taken per transect point and were sieved. In total, 19 species and 3 juvenile stages belonging to 11 families were found, with a total abundance of 1173 individuals. Species richness and mean density of polychaetes in the eastern SAMF (18 species and 679 ± 859 ind./m², respectively) were significantly higher than in the central area (5 species and 242 ± 311 ind./m², respectively). Polychaete density did neither differ significantly among transect points nor between depths. One new species belonging to Family Spionidae was recorded in this study. *Paraprionospio* sp. and *Prionospio* sp. 2 (Spionidae) were abundant and exclusively found in the eastern SAMF, while *Dendronereides* sp. (Nereididae) was abundant and exclusively found in the central area. *Leitoscoloplos* sp. (Orbiniidae) and *Polymastigos* sp. (Capitellidae) were abundant in the eastern and rare in the central area. Differences in community structure were best explained by pore water salinity which was much higher in the eastern SAMF.

Abundance and distribution of selected polychaete families around Iceland (BIOICE project) [Poster]

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Because of its location, Iceland is of great relevance for the study of marine biodiversity and biogeography patterns in North Atlantic waters. The BIOICE project began in 1992 with the aim of improving the knowledge on benthic biodiversity in the waters around Iceland, by means of a number of oceanographic expeditions. The sampling area covered a depth range from 20 to 3,500 m on both sides of the GIF Ridge, above which the waters are generally less than 500 m deep, and which constitutes the boundary between the relatively warm North Atlantic Ocean and the much colder Nordic seas of the Arctic Ocean. Indeed, there have been detected differences in faunal composition between the north and south areas of the Ridge, at least for some invertebrates. Examination of polychaete material collected during the BIOICE expeditions has led to several papers on taxonomy and ecology, including descriptions of a number of new taxa. Our work has mostly been focused on oweniids, opheliids, pectinariids, ampharetids and trichobranchids. These are among the most widespread and abundant polychaetes in samples collected by means of a modified Rothlisberg-Pearcy epibenthic sledge (ca. 30000 specimens and 60 different taxa). Ampharetidae was the most speciose family (30 species), followed by Opheliidae (9), Oweniidae (8), Trichobranchidae (8) and Pectinariidae (3). Here, we describe the composition and distribution of the assemblages of the aforementioned polychaete families according to relevant environmental parameters, and with special focus about their presence in relation to the GIF Ridge.

Species of Autolytinae (Annelida, Polychaeta, Syllidae) occurring off the states of Paraíba and Pernambuco, northeastern Brazil [Poster]

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The subfamily Autolytinae occurs worldwide and currently numbers 11 genera and about 90 species, with representatives found worldwide. Despite being a relatively easily recognizable subfamily of syllids, due to the common presence of a sinuous pharynx and absence of the ventral cirri, identifications to species level are more difficult, as important taxonomic characters, such as the number of denticles in the trepan and pigmentation patterns, can be difficult to evaluate in preserved material. The present study is a taxonomic survey of the species of Autolytinae collected by the project "Diversity of Polychaeta (Annelida) on hard substrates off the States of Paraíba and Pernambuco, northeastern Brazil". Collections were made at neap tide from sandstone reefs of nine beaches off Paraíba and Pernambuco. Algae, sponges, ascidians, mussel beds and similar substrates were scraped off from the rocks and examined under stereomicroscopes; syllids were sorted, relaxed in menthol solution, preserved in 4% formalin solution and later rinsed in fresh water and transferred to 70% ethanol. Around 300 specimens of Autolytinae were obtained, belonging to 2 genera and 5 species. Among those, 2 are new to science (*Proceraea* sp. n., *Myrianida* sp. n.); 2 are new records to the South Atlantic Ocean (*P. cf. anopla* and *P. cf. madeirensis*); and 1 species is a new record to the northeastern Brazilian coast (*P. cf. rubroproventriculata*). The latter species was found in association with sponge and differs from material from the southern Brazilian coast on the patterns of ciliation, what may indicate the case of a complex of sibling-species. Molecular studies are necessary to elucidate this issue. The two new to science species are more closely related to *Proceraea fasciata* and *Myrianida pachycera*, because of the colour pattern.

Species of Exogoninae (Syllidae) with ventral brooding from Brazil [Poster]

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Exogonines are a common subfamily of syllids characterized by having relatively small bodies; short dorsal cirri, present on all chaetigers or absent on chaetiger 2; and by the palps, which are totally fused to each other or with a short distal notch. The present study is a taxonomic survey of the species of Exogoninae collected by the project "Diversity of Polychaeta (Annelida) on hard substrates off the States of Paraíba and Pernambuco, northeastern Brazil" and "Polychetes associated to algae in a rock shore from Vitória, southeastern Brazil". In the first project, collections were made at neap tide from sandstone reefs of nine beaches off Paraíba and Pernambuco. Algae, sponges, ascidians, mussel beds and similar substrates were scraped off the rocks and examined under stereomicroscopes; syllids were sorted, relaxed in menthol solution, preserved in 4% formaline solution and later rinsed in fresh water and transferred to 70% ethanol. For the second project, the algae *Arthrocardia gardneri*, *Hypnea musciformis*, *Sargassum* sp., *Centroceras clavulatum*, *Colpomenia sinuosa* and *Ulva fasciata* were scraped off the rocks off Vitória, state of Espírito Santo. Around 1300 specimens of Exogoninae with ventral brooding were obtained, belonging to 4 genera and 15 species. Of those species, three are new to science (*Parapionosyllis* sp. n., *Exogone* sp. n.1, *Exogone* sp. n.2), one is a new record for the Atlantic (*Brania* cf. *articulata*), two are new records for Brazilian waters (*Parapionosyllis minuta* and *P. floridana*), and nine species are new records for the northeastern Brazilian coast (*Brania arminii*, *Exogone africana*, *E. arenosa*, *E. brevantennata*, *E. dispar*, *E. naidinoides*, *E. simplex*, *Parexogone anseforbansensis*, and *P. exmouthensis*).

Searching for apomorphies: using microCT to investigate pharyngeal anatomy in the Articulata

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The ongoing refinement and application of molecular analyses has produced rapid advances in studies of the evolution of polychaetes. However, until recently these advances were not matched by our understanding of the development of morphological traits and organ systems. The improvement of the availability and resolution of micro-CT scanners has now started to provide an approach that enables researchers to undertake wide ranging anatomical surveys, quickly and without recourse to specimen dissection and lengthy histological preparation. As a result specimens can be examined without destructive sampling, opening up museum collections for such studies. In this presentation we set out the preliminary results of a study undertaken to examine the anterior gut and pharyngeal anatomy of errant polychaetes. While previous more traditional studies have determined some of the gross morphology of the pharynx in some members of the Articulata clade, our studies indicate that there is a wealth of characters that have still to be assessed. Our study focuses on the major muscles systems associated with pharyngeal function and with the basic anatomy of the pharynx and anterior gut, comparing exemplars from each of the families within this clade. We will discuss also the advantages and problems involved in such comparative anatomical studies.

Population dynamics of *Perinereis anderssoni* (Kinberg, 1866) in Praia de Itaipu, Rio de Janeiro, Brazil [Poster]

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Nereidid polychaetes are conspicuous at a wide range of depths, either on hard or soft bottoms and despite of that the population dynamics of many species remains poorly known. The purpose of this work is to study the population dynamics of *Perinereis anderssoni*, usually found on rocky shores and sandy mud beaches, with a distribution ranging from México to the State of Paraná, Brazil. Monthly samples were taken at the intertidal zone in Praia de Itaipu, Niterói (22° 52' 30" S 42° 08' 30" W, State of Rio de Janeiro, Brazil), between April 2009 and April 2010, and between March 2011 and April 2013. Individuals were collected through scraping algae and *Brachidontes* sp. beds, narcotized with menthol crystals, taken alive to the laboratory, fixed with 4% formalin and then transferred to 70% alcohol. Both complete and broken individuals had the width of the 10th chaetiger measured, excluding the parapodia. This measurement was used to estimate growth rate (K), longevity and mortality using the software FiSAT II. A total of 1669 individuals were organized monthly in frequency-size histograms of 0.5 mm class intervals. Histograms show an increase of population size from winter to spring and in early summer in both time intervals. In late summer the population size decreased, probably due to semelparous reproduction. Although smaller classes were found during most of the studied time, their frequency was higher in late summer, probably associated with a reproductive peak. The growth rate was estimated as 2.36 per year, longevity was estimated as 1.2 years and mortality was estimated as 9.99. These parameters were similar to estimates made for closely related species and genera.

Epitoke stages of *Perinereis anderssoni* (Kinberg, 1866) [Poster]

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Bringing the worms back to a mudflat: Efforts to promote an intertidal polychaete community

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The Western Treatment Plant (WTP), Victoria, is a major sewage treatment plant, treating up to 420 ML sewage per day, which for over 100 years has discharged secondary-treated effluent into Port Phillip Bay through four ocean outfalls. This effluent discharge has altered the ecology of intertidal and nearshore areas adjacent to the WTP: increasing macroalgae, microphytobenthos, phytoplankton and zoobenthos biomass. Almost certainly as a result of these changes the WTP intertidal attracts large numbers of shorebirds and this was a significant factor leading to the WTP being included in a Ramsar wetland of international significance in 1982. Drought and changes in the management of effluent discharged from the outlets of the WTP reduced the flows into Port Phillip Bay from 2004. The effluent particularly through Particulate Organic Carbon (POC) and ammonia has been shown experimentally to be influential on growth and reproduction of infauna and there have been changes in community structure, species composition and abundance of the local intertidal community, which has changed from one dominated numerically by polychaetes to one dominated by amphipods. These changes are likely to have an impact on shorebirds relying on this area as a foraging ground as there has been an overall reduction in both diversity and biomass of prey, since polychaetes have a higher energy content per prey item than do amphipods. As an alternative to the existing large outfalls, an alternative arrangement that directly applies effluent to the mudflat has been trialled and is being developed with the aim of nourishing the benthic infaunal community such that it is capable of supporting high numbers of foraging shorebirds.

Long-term incubation of *Nereis virens* in metal-spiked sediment: behavioural, biochemical, cellular and genotoxic responses

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Nereis virens is an ecologically and commercially important polychaete of intertidal soft sediment and an ideal species to investigate long term effects of metals. Using a spiked sediment approach, juveniles are being incubated for nine months in environmentally relevant concentrations of sediment (5 kg per box) spiked with copper, zinc and copper and zinc together at low (copper: 70 mg kg⁻¹, zinc: 200 mg kg⁻¹), medium (copper 120 mg kg⁻¹, zinc: 270 mg kg⁻¹) and high (copper 575 mg kg⁻¹, zinc: 1160 mg kg⁻¹) concentrations. These concentrations are based on an extensive sampling regime of sediment, pore water and worms from seven sites with different levels of copper and zinc contamination in the UK. Worms are being fed during the experiment, but maintained under ambient conditions (temperature and photoperiod) in a flow-through seawater system. Throughout the period, feeding and activity levels will be recorded using video and at 3, 6 and 9 months boxes will be sampled. Using BCR sequential extraction, labile concentrations of metals in the sediment will be assessed in addition to pore water and tissues. The effects of these metals will be measured using a suite of biochemical, cellular, genotoxic and molecular endpoints. Scope for growth and metabolic profiles (e.g. lipid, protein and carbohydrates levels) will assess the trade-offs between growth and responses to metal toxicity. Metallothionein concentrations, acetylcholinesterase activity, lysosomal membrane stability, micronucleus and comet assays and expression levels of key regulatory genes will all be used to build a 'global' picture of the effects of these metals on this species. It is expected that this study will show for the first time the relationship between biomarkers at different levels of organisation and their relative sensitivity and, ultimately how these responses directly link to population effects.

Cryptic and introduced lineages of the "cosmopolitan" polynoid *Harmothoe imbricata* (Linnaeus, 1767) [Poster]

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The common temperate scaleworm *Harmothoe imbricata* (Linnaeus, 1767) is reported to occur across numerous temperate, boreal, and arctic marine localities. Published distributions range from intertidal and shallow continental shelf to depths of 275 meters. Diverse reproductive strategies have been attributed to several studied populations, ranging from brooding and direct development to broadcast spawning. Diameter of oocytes from females across distant regions has been demonstrated to vary widely. In a recent barcoding survey of Canadian polychaetes a significant level of mitochondrial diversity was documented across arctic *H. imbricata* populations. This combined evidence has led polychaete workers to suspect that global populations may not represent merely a single taxon; however the morphology of the group is so highly convergent as to perplex taxonomists as to how to segregate distinct species. By examining and sequencing mitochondrial DNA of specimens collected from the type region and populations across the northeastern Pacific, the northeastern and northwestern Atlantic, the White Sea, and the Mediterranean and also by comparing this with mitochondrial sequence of the closely resembling *Harmothoe praeclara* from southern Australia and Japan, it has been confirmed that numerous cryptic evolutionarily distinct lineages occur across the eastern and western hemispheres and that some lineages are likely to have been anthropogenically introduced. Population diversity measures allow for hypotheses as to why some northeastern Pacific populations have closer affinities with Atlantic populations than with their sympatric populations. A small set of characters are proposed for consideration in unison to distinguish adult forms of three northeastern Pacific lineages.

A new serpulid genus, (Polychaeta; Serpulidae) from the Caribbean [Poster]

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A newly discovered serpulid genus from the Caribbean is described. The type-species exhibits a varying amount of thoracic chaetigers, ranging in number from 7 to 16. The new serpulid secretes helically coiled (2-3 cm diameter) tubes, which are fixed to the undersides of large rocks in shallow water near the mangroves in Hurricane Hole, St. John, United States Virgin Islands. The suite of morphological characters of the new genus presents a challenge to the traditional taxonomy of the family.

Considering small macrofauna in biodiversity research: polychaetes of the Joseph Bonaparte Gulf, Timor Sea, Australia

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Northern Australia has been the focus of recent marine biodiversity research to support resource management for both industry and conservation. Much of this research has targeted habitat-forming sessile invertebrates and charismatic megafauna, but smaller macrofauna and infauna must also be considered due to their important roles in ecosystem functions. In this study, a Smith-McIntyre grab was used during two surveys of the Joseph Bonaparte Gulf in 2009 and 2010 to collect sediment samples which were then elutriated over a 500µm sieve. The associated polychaetes were identified to species-level. A total of 2224 individual polychaetes were collected from 133 grabs and represent 43 families, including several new species, at least one new genus (Pilargidae) and many new distribution records. Biodiversity patterns were also analysed according to environmental and spatial factors (grain-size, carbonate, total organic content, depth, distance offshore) in order to inform predictive models and further our understanding of ecosystem processes in the region. These patterns differ from those of larger epifauna collected on the same surveys, highlighting the need to consider small macrofauna in biodiversity research and associated marine management.

Systematics, Evolution and Phylogeny of Annelida – a morphological perspective

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Annelida, traditionally divided into Polychaeta and Clitellata, is an ancient and ecologically important group usually considered to be monophyletic. However, there is a long debate regarding the in-group relationships as well as the direction of evolutionary changes. This debate is correlated to the extraordinary biodiversity and evolutionary diversification of the group. Although annelids may generally be characterized as organisms with multiple repetitions of identically organized segments and certain other characters such as a collagenous cuticle, chitin chaetae or nuchal organs, none of these is present in every subgroup. This is even true for the annelid key character, segmentation. The first morphology-based cladistic analyses of polychaetes were not published until 1997 (Rouse and Fauchald, *Zool Scr.* 26: 139) showing Polychaeta and Clitellata as sister groups. The former were divided into Scolecida and Palpata comprising Aciculata and Canalipalata. This systematization definitely replaced the old concept of dividing polychaetes into Errantia and Sedentaria, whereas the group Archannelida was already abandoned earlier. Irrespective the fact, that Aciculata and Errantia comprise the same subtaxa, main critics came from a contradicting hypothesis relying on scenario based plausibility considerations regarding Clitellata as highly derived annelids forming a polychaete in-group and rendering the latter paraphyletic. In this hypothesis the absence of typical polychaete characters was regarded as losses rather than as primary absences, although thus far attempts failed to unambiguously identify the sister group of Clitellata. Thus, two hypotheses on the last common ancestor have been put forward either seeing an oligochaete-like burrowing animal or a parapodia-bearing epibenthic worm as stem species. These attempts are reviewed and discussed in the light of new morphological evidence such as photoreceptor cell and eye evolution as well as evolution of the nervous system and musculature. Moreover, reliability with recent progress in molecular phylogenetic analyses is also considered.

Molecular mechanisms of larval attachment and metamorphosis of *Hydroides elegans*

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The polychaete *Hydroides elegans* (Serpulidae, Lophotrochozoa) is a problematic marine fouling organism in tropical and subtropical coastal environment. Competent larvae of *H. elegans* undergo the transition from the swimming larval stage to the sessile juvenile stage with substantial morphological, physiological, and behavioral changes. This transition is a critical process of controlling population dynamics in this species. In the recent years, we have studied molecular mechanism of larval attachment and metamorphosis of *H. elegans*. At the genomic level, we successfully identified 21 genes that were more highly expressed (up-regulated) in competent larvae than in pre-competent larvae, indicating those genes are very important for larvae to attain their competency. We also identified 218 genes that showed different expression levels between competent larvae and metamorphosing juvenile, indicating their possible involvement in larval attachment and metamorphosis. After mapping those differentially expressed genes to their relevant signal transduction pathways, we then selected some of those genes, such as p38 MAPK and calmodulin, and further confirmed their expression patterns in different larval stages using real-time PCR, located their expression sites in whole-mounted larvae using *in situ* hybridization, and revealed their putative roles in the process of attachment and metamorphosis using gene-specific inhibitor bioassay. We concluded that both P38 MAPK and calmodulin related signal transduction pathways likely regulate larval attachment and metamorphosis of *H. elegans*. Since transcriptome contains the set of all the RNA molecules, including mRNA, rRNA, tRNA and other non-coding RNA produced in an organism, and reflects the genes that are being actively expressed at any given time, we examined global transcripts expression levels (transcriptome profiling) of pre-competent larvae, competent larvae, and adults using the most advanced 454 pyrosequencing platform. We predicted 136,490 open reading frames (ORFs, useful for gene prediction), of which 38,259 were matched to known genes, whereas other 98,231 ORFs had no matches in database. Bioinformatic analysis of transcriptomic database revealed many genes and pathways (including p38 MAPK and calmodulin pathways) that were differentially expressed between competent larval and metamorphosing juvenile, suggested their important roles in larval attachment and metamorphosis. Furthermore, since biological functions are often executed through protein expression rather than gene or transcript expression, we studied larval settlement and metamorphosis at the proteomic level (large scale study of proteins, particularly their structure and function), using both the 2D gel-based and gel-free proteomic techniques. We successfully identified many differentially expressed proteins and phosphoproteins at different larval stages. We concluded that the proteins responsible for energy metabolisms and stress responses as well as enzymes involved in TCA cycle and cytoskeleton processes played very important roles in larval attachment and metamorphosis of *H. elegans*. Overall, our results showed that 1) larval attachment and metamorphosis required up- or down-regulation (that is, increase or decrease in expression) of different sets of genes, transcripts, and proteins in *H. elegans*; 2) p38 MAPK and calmodulin genes and their relevant pathways played very important roles in larval attachment and metamorphosis of *H. elegans*; and 3) TCA cycle, and cytoskeleton were important for attaining larval competency while energy-metabolism and stress-response related proteins were important for larval attachment and metamorphosis. In conclusion, identification of differentially expressed genes, transcripts, and proteins and transduction pathways in pre-competent, competent larvae, and newly settled juveniles, allowed us to reveal the genes, proteins and pathways that regulate specifically larval development (attaining competency), attachment, and metamorphosis of *H. elegans*. These genes and proteins can serve as the specific molecular targets for screening non-toxic antifouling compounds, which can aid the development of environmentally friendly antifouling coatings.

Sipunculids (Phylum Sipuncula) from Isla Fuerte, Colombian Caribbean

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Sipunculans are a phylum of marine invertebrates known as “peanut worms” due to their appearance when the body is contracted. They have been commonly placed as a separated phylum, and as sister group to annelids. Nevertheless, recent phylogenetic analyses based on molecular analyses and confirmed with some morphological characters, place them within Annelida, together with Echiura, without any taxonomic category suggested. Sipunculans appear near to Orbiniidae (Scolecida) and Nereididae (Aciculata). Herein, Sipuncula will be considered as Annelida, but with no taxonomic treatment or implications yet. This was a two-stepped research; firstly, we created a list of sipunculans recorded, reported and/or described from the Gran Caribbean Province, which extends from South Carolina to the northern Brazilian littoral, including the Gulf of Mexico, Lesser and Lower Antilles, as well as Central and South American coasts. Secondly, we identified and described the specimens extracted in fragmented coralline rocks collected at 1-5 m depth, from Isla Fuerte, southern Colombian Caribbean. The list has shown 83 species names, 18 as names of valid species, 55 as nominal species and appearing as synonyms, and 10 names with inconsistencies referred as wrong spellings, combinations or with doubts because of incomplete or lacking taxonomic information. Finally, 13 species are not presented with species names, but considered as undescribed (as “sp”) species. All these names are being corroborated with the most recent study that states that many of the names in sipunculans are invalid and that the diversity could be lower. Finally, this research is the first carried out in Colombia on Sipunculans, and shows the lack of information, even for the Caribbean.

The Origin and Evolution of Spionidae (Annelida)

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Previous inferences of phylogenetic hypotheses between the Spionidae and other polychaetes, and among spionid taxa, using morphological characters, have provided ambiguous results. Analyses using nucleotide data have been inconsistent regarding relationships among spiomorph polychaetes but all agree that Spionida is polyphyletic as currently defined, and that *Apistobranthus*, *Chaetopterus*, and *Magelona* are not closely related to Spionidae. They confirmed the close relationships between Spionidae, *Poecilochaetus* and *Trochochaeta* but were not able to resolve these relationships. Molecular analyses suggest sister-taxon relationships between Spionidae and Sabellidae/Sabellariidae, contrary to morphological analyses suggesting few derived characters shared by members of these groups. Two major conclusions can be drawn from these previous studies: 1) Morphological analyses of phylogenetic relationships between families of the Annelida were based on incorrect homologue hypotheses that produced erroneous results, and 2) Phylogenetic relationships between Spionidae and other polychaetes so far cannot be inferred correctly based only on morphological data because of a) numerous evolutionary transformations of the original characteristics within annelid families, and b) numerous homoplasies obscuring these relationships and misleading phylogenetic inferences. Parsimony analysis of morphological, ecological and reproductive characteristics of the type species of genera of the Spionidae is undertaken in the present study. The Spionidae is defined and hypotheses about ancestral characters and evolution of important characteristics within the family are presented.

Morphology and Biology of two commensal *Polydora* (Annelida: Spionidae) Species from the South China Sea, Vietnam [Poster]

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Morphology, reproduction and larval development of two commensal *Polydora* species from the South China Sea, Vietnam is described and illustrated. *Polydora latispinosa* Blake and Kudenov, 1978 bores into shells of bivalve and gastropod molluscs, while *Polydora vulgaris* Mohammad, 1972 was found boring only into shells of bivalve molluscs. Both species are simultaneous hermaphrodites with spermatozoa developing in the anterior segments and oocytes developing in the posterior segments. Females deposit eggs in capsules which attach by thin stalks to the inside wall of their burrows. In *P. latispinosa*, larvae develop inside capsules until 4-chaetiger stage and then hatch and complete development in the plankton. In *P. vulgaris*, the majority of laid eggs do not develop and are used as food for developing larvae; two groups of larvae have different rates of development and hatch from capsules at 4-6-chaetiger stages and about 16-chaetiger stage. The reproductive biology of the two *Polydora* species is discussed in relation to their ecology.

Reciprocal *Boccardia* (Annelida, Spionidae) Invasions in North and South America [Poster]

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The California mudworm *Boccardia proboscidea* Hartman, 1940, is widely reported in North America from British Columbia south to California, and, in the western Pacific, from Japan, Korea, China, Australia, Queensland and New Zealand. *Boccardia proboscidea* is a likely introduction to Hawaii and South Africa and possibly northern Spain and England. The species is unknown from the northwest Atlantic or southeast Pacific but appears to have been recently introduced to the southwest Atlantic, as larvae in ballast water or by other mechanisms. An explosive development of *B. proboscidea*, discovered near the sewage outfall of Mar del Plata city, Buenos Aires Province, Argentina in 2008, was followed by intertidal populations discovered all along the coast of northern Patagonia, Chubut Province in 2010. These Patagonian populations produce dense beds of silty tubes in muddy substrata or bore into friable sedimentary rocks where they greatly alter the native communities. Progressive invasions of *B. proboscidea* in Argentina are accompanied by an apparent decline of its close relative, *Boccardia claparedei* (Kinberg, 1866) which occupies the same ecological niche. *Boccardia claparedei* is native to Brazil, Chile and Argentina and was previously unknown outside of South America. However, dense colonies of *B. claparedei* were discovered in 2010 and 2013 in sea-water drains of the Hatfield Marine Science Center, and the Oregon Coast Aquarium that flow into Yaquina Bay, Newport, Oregon, USA. Despite massive larval production by the drain channel populations, adult *B. claparedei* have not been found in Yaquina Bay. Moreover, Yaquina Bay remains densely populated by *B. proboscidea*. *Boccardia claparedei* is a likely introduction to Oregon as a hitchhiker with aquarium objects from South America, or perhaps a rare and widespread introduction that has been captured and amplified in the aquarium seawater systems that draw from Yaquina Bay.

The use of polychaete annelids as a model for environmental impacts assessment in contaminated areas [Poster]

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The use of living organisms as indicators or biomonitors of marine contamination by changes at the cellular level, molecular, physiological, morphological or biochemical parameters has been the target of several studies. Among the indicators observed in benthic communities, parameters related to changes in the genetic composition of the population, accumulation of toxic substances in the tissues, changes in the birth rate, the appearance of malformations and/or anomalies, presence or absence of some species or groups and changes in structure of the benthic community can be used (Peso-Aguiar, 1995; and Marques Barbosa, 2001). The polychaete annelids have a great ecological relevance, being found from the intertidal zone to seven thousand feet deep, and are also abundant in contaminated and uncontaminated areas (Waring et al, 2006). In addition, they have a wide distribution and can indicate the sediment conditions and the interstitial water quality (Niencheski, 2006), being also of great importance to determine the contaminants effects in higher trophic levels, in the food chain, contributing to 80% of the volume of food eaten by some fish species with economic importance (Amaral and Migoto (1980). Biomonitoring using organisms allows the determination of environmental quality and the detection of changes in various compartments of the ecosystem (Thomas, 1993). The efficiency of polychaetes as a biomonitor organism was tested by detecting morphological and physiological changes in individuals and changes in the community structure, and geochemistry characterization of sediment. These data were compared using triad in order to prove that the associated fauna in the sediment undergoes changes since the level of the individual to the community and this model can indicate the quality of the environment with respect to the levels of contamination and pollution.

First discovery of a New Zealand polychaete-echinoderm association – a previously unknown hesionid living with the clypeasterid “sand dollar” *Fellaster zelandiae* [Poster]

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A number of hesionid and polynoid taxa make use of echinoderms as dwelling places, although no prior instances of this behaviour have been reported for New Zealand. Thus, after analysis of Kaipara Harbour benthic samples suggested the close association of an undescribed ophiuroid hesionid with the common shallow-water echinoid *Fellaster zelandiae*, the nature of the relationship was further investigated. The hesionid was discovered to be present winter and summer, mostly as single individuals, on up to 40% of the intertidal population of the echinoid in the northern region of New Zealand. Taxonomy, ecology, and observations of behaviour are reported.

Molecular Phylogenetics of the Polychaete *Neanthes acuminata* Complex [Poster]

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The polychaete *Neanthes acuminata* comprises a species complex which is cosmopolitan in distribution. Populations from the eastern United States are referred to as *N. acuminata*, southern California as *N. arenaceodentata*, Europe as *N. caudata* and Asia as *N. crigognatha*. All are morphologically identical and have the same unusual reproductive characteristics. The female reproduces once then dies, but the male is capable of reproducing as many as nine times. Populations from Connecticut, Portugal, and six locations in southern California have been cultured at California State University, Long Beach through many generations. Two mitochondrial gene regions (cytochrome oxidase subunit 1 and large ribosomal subunit; *cox1* and *rrnL*) and one nuclear locus (ITS1) were sequenced from representatives of these populations plus collections from two localities in Baja California, Connecticut and Hawaii. Trees resulting from maximum likelihood analyses of these data suggest the southern California specimens represent two clades. One clade comprises most specimens sampled from Los Angeles Harbor and Newport Bay, while the other includes most specimens sampled from Venice Lagoon, Alamitos Bay San Gabriel River and Estero Punta Banda (Baja California). Relationships between these California specimens sampled from Connecticut, Portugal and Hawaii varied somewhat across the individual trees. Worms from Los Angeles Harbor and Newport Bay differ from the other populations by having red eyes and bright orange ova in contrast to black eyes and pale yellow ova (unknown from Estero Punta Banda).

Proteomic characteristics of the reproductive stages of the Polychaetous *Neanthes arenaceodentata*

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Neanthes arenaceodentata is the southern California member of the *Neanthes acuminata* complex. All the species in this complex are morphologically identical and have the same reproductive characteristics. Same sexes fight and opposite sexes lie side by side until egg laying. The female dies after laying eggs, and the male fertilizes the eggs and incubates the embryos for 3-4 weeks. The male can reproduce up to 9 times. Since this method of reproduction is unusual in polychaetes, the objective of this research was to determine if there is any set of proteins which influences this method of reproduction. Two-dimensional gel electrophoresis was used to identify differences between male and females proteins before and after reproduction. A total of 145 protein and 81 phosphoprotein spots were detected of which 36 proteins and 19 phosphoproteins were identified. The protein pattern was similar before and after fertilization in the male. The female loses about 75% of its weight following egg laying and is unable to resume feeding and either dies or is eaten by the male. The protein structure is very different in the female as a result of spawning. There was a 44% and 16% decrease in the number of detected proteins and phosphoproteins in spent females, respectively. Identified proteins were actin-binding molecules involved in many cellular pathways regulated by multiple regulatory binding proteins and their modifications. Further, the down-regulation of muscle proteins and expression of specific set of actin isoforms after spawning suggested their regulatory role during the reproductive period in *Neanthes* worms.

Rediscovery of an intertidal Sabellaria Reef in Malaysia: first Record of the Polychaete Community and Insights on Reef Dynamics [Poster]

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The presence of a sabellariid reef on the intertidal shore of Jeram, on the west coast of the Malay Peninsula, has been reported in geological studies by Coleman et al. (1970) and Seilacher (1984). A preliminary description of the present state of this reef was recently provided (Ribero & Polgar 2012). Recent surveys documented dramatic temporal fluctuations of the reef's extension. A well-developed reef surrounded by muddy substrates was observed in December 2010, while the reef almost entirely disappeared and shell lag deposits covered large areas in August 2012. Only four months later, the reef's extension and average height increased again, and the lag deposits were partially covered by mud. This rapid expansion was also associated with compositional changes of the polychaete community. In agreement with Seilacher's model (1984), this reef seems to experience periodical phases of growth and destruction, associated with different sedimentological regimes, possibly determined by monsoons. Qualitative sampling of the polychaete community in selected zones of the reef revealed the presence of Sabellariidae, Spionidae, Terebellidae, Nereididae, Onuphidae, Eunicidae, Polynoidae, with the latter two families including four likely new species. A preliminary checklist is here presented. Preliminary data of the height of the clumps, tube density and diameter are also provided. In view of the general lack of information on tropical polychaete reefs, more ecological and taxonomic studies are needed, to sustainably manage and conserve these unique communities.

Spatio-temporal variability of polychaete settlement along a gradient of acidification at volcanic CO₂ vents (Italy)

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Settlement of polychaete species was studied along a pH gradient occurring at a shallow, coastal volcanic CO₂ vent area (Castello Aragonese, Ischia Island, Italy), by placing two different kinds of artificial collectors (attached to the substrate and in the water column) for one month *in situ* exposure in different seasons. Results revealed three key dominant species, *Amphiglena mediterranea* (Sabellidae), *Syllis prolifera* (Syllidae) and *Platynereis dumerilii* (Nereididae), that were present along the gradient in all seasons and often had significantly higher abundances in the most acidified areas. This suggests there is high tolerance and possible pre-adaptation to very low pH among these polychaete species.

For all species in all sampling periods, there were more individuals in the substrate collectors than the water column collectors, which is likely due to the spatial contiguity of the collectors with the natural substratum. All species exhibited similar temporal variability, with highest abundances in May (water column collectors) or June (substrate collectors), and lowest abundances in March (both collectors). This temporal trend is consistent with the life cycle and reproductive features of the species. All three dominant polychaete species may represent good model organisms to study capacity for adaptation to ocean acidification.

Venom evolution in glycerid polychaetes

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Over the course of evolution, venom systems evolved in a broad phylogenetic range of animals several times independently. Thereby, different proteins have been convergently recruited into the venom of phylogenetically distant taxa. Today, toxins are found widespread in many different groups of animals and they fulfill predominantly defensive functions or are used for predation. Glyceridae (bloodworms) are venomous annelids that possess an eversible pharynx bearing four teeth, which are connected to venom glands. The venom cocktail of these venomous animals is hitherto only investigated on the protein level. In a study by Meunier et al. (2002, EMBO Journal 21: 6733-6743) a neurotoxin produced by *Glycera tridactyla* named α -glycerotoxin (Gltx), has been examined more precisely. This glycoprotein causes the specific activation of presynaptic $Ca_v2.2$ channels and its effects seem to be dose dependent and completely reversible. So far, this unusual toxin seems to be restricted to members of the glycerid polychaetes. In recent studies, we established transcriptome libraries of venom gland tissue from different *Glycera* species using Illumina sequencing technology. Our analyses revealed the existence of several convergently recruited proteins in the glycerid venom cocktail. Moreover, we were also able to identify for the first time the coding sequence of the Gltx-gene. Initial analysis shows that this gene might be member of a larger gene family. The origin of this interesting protein remains unclear as no larger known domains could be identified and an evolution in the glycerid lineage seems reasonable.

Lacydoniidae from Brazil: first family record and description of three new species including a key to species of *Lacydonia* [Poster]

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Lacydonia is the only genus representing the Lacydoniidae family, which is composed of polychaetes that are scarce to find. Knowledge on biological or ecological features in this group is almost non-existent. About 13 species are formally described in different parts of the world; however, this is the first record of this family in Brazil. The examined material is from two campaigns established during the Project Habitats/Petrobras – Heterogeneidade Ambiental da Bacia de Campos coordinated by CENPES/Petrobras when R/V *Gyre* and R/V *Miss Emma MacCall* were utilized. Samples were collected from continental shelf, canyons and slope. Polychaetes and others benthic organisms were taken from sediment, washed and fixed in 4% formalin solution, conserved in 70% alcohol and then identified. The depths where lacydonids were captured ranged from 25 to 3,250m. Five described and three new species were found (*Lacydonia anapaulae* sp. nov., *Lacydonia brasiliensis* sp. nov. and *Lacydonia jacki* sp. nov.) in the Campos Basin at depths between 100 and 2,500 m. An identification key including all known species of *Lacydonia* and a revision of morphological characters is presented.

Polychaete Tubes and Oligochaete Cocoons: an Evolutionary Link?

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Despite their divergence over several hundred million years, polychaetes and oligochaetes both produce tube-like structures; specifically, polychaetes secrete protective dwellings and/or brood tubes for reproduction, while oligochaetes secrete egg cases, or cocoons. Cocoon secretion in oligochaetes is preceded by hypertrophy of glandular Type II/III cells in a specialized region of the epithelium known as the clitellum. Histological data from the polychaete *Phragmatopoma californica* identified morphologically similar cells in parapodia that may be responsible for the tube sheath that lines the worm's sandcastle home. Further, both tubes and cocoons appear to display similar physical properties. For example, both remain stable when challenged against thermal variation (e.g., extreme heat/cold), proteases, and chaotropic agents. Finally, the ultrastructure of tubes/cocoons appears to be related. Oligochaete cocoons comprise a fibrous cocoon wall sealed at each end with opercula (glue-like plugs). Likewise, the polychaete tube sheath from two independent species (i.e., *P. californica* and *Neanthes* sp.) comprises fibrous shards similar to that observed in the aquatic leech, *Erpobdella obscura*. We hypothesize that the secretory cells and biomaterials that characterize oligochaete cocoons were derived from an ancestral, tube-dwelling polychaete that acquired the ability to seal the ends of its tube.

On the state of taxonomy and world fauna of Spirorbinae

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Traditionally the family Serpulidae has been divided into three subfamilies: Spirorbinae, Serpulinae, and Filograninae. Pillai (1970) elevated the Spirorbinae to the family status, but results of recent phylogenetic analyses of morphological and molecular data showed that Spirorbinae is nested inside Serpulidae, and a number of authors concluded that the family status of Spirorbidae is unjustified. As a result, former subfamilies within Spirorbidae were suggested as tribes (Rzhavsky et al., 2013). However, a number of important characters, have not been taken into account, and thus, additional analyses are needed to corroborate this conclusion. An elaborated taxonomic system of spirorbins also needs to be revised. The accepted classification of spirorbins based on methods of brood protection should be retained, but taxonomic status of these groups as well as generic limits and diagnoses should be critically reviewed. Currently genera inside tribes are grouped based only on the number of thoracic chaetigers plus one or two additional morphological characters; moreover, normally only one character, sometimes showing significant variability is used for sub-generic classification. Phylogenetic relationships within spirorbins are poorly understood and both traditional schemes and the results of the only cladistic analysis (Macdonald 2003) of morphological characters do not look convincing. The main problem for the spirorbin cladistic analysis is a small number of morphological characters. The world fauna of Recent spirorbins includes over 130 species. Although North-East Atlantic, Arctic and North Pacific are the best studied regions, new species are being described and records new for those regions are being reported. Strangely enough, the spirorbin fauna of the North-West Atlantic is one of the most poorly studied in the world. Like other serpulids, spirorbins have a good fossil record, with earliest true spirorbins known from Lower Cretaceous. However, attribution of fossils to recent taxa is problematic and further studies are needed.

The present state of aquatic organisms supplied as fishing baits in Japan [Poster]

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Human-mediated introduction of aquatic organisms beyond their native range has long been of great interest for ecologists. Recently aquatic organisms used as live fishing baits have been imported around 1,000 tons a year from Asian and European countries to Japan. However, it became the problem that there was little information about the correspondence of a commercial name of fishing bait and the scientific name. In this study, the market researches were done from 2009 to 2013 to investigate the present state of aquatic organisms supplied as fishing baits in Japan. Over thirty species of the baits including polychaete, echiuroid, sipunculid, bivalve, sea anemone, crustacean and fish, were sold at fishing bait shops. As for bait worms (polychaete, echiuroid and sipunculid), these were divided into three types based on the supply country: 1) the worms imported from foreign countries, corresponding eight species (*Perinereis aibuhitensis*, *Nectoneanthes* sp., *Alitta virens*, *Namalycastis rhodochorde*, *Glycera nicobarica*, *Marphysa* sp., *Scoletoma heteropoda* and *Sipunculus nudus*), 2) the worms supplied from foreign countries and Japan, corresponding five species (*Perinereis wilsoni*, *Diopatra sugokai*, *Marphysa sanguinea*, *Halla okudai* and *Urechis unicinctus*), 3) the worms supplied in Japan, corresponding three species (*Hediste diadroma*, *Kinbergonuphis enoshimaensis* and *Pseudopotamilla ocellata*). Of these, *Nectoneanthes* sp., *Halla okudai*, *Urechis unicinctus* and *Sipunculus nudus*, were listed in Japan by some categories of the endangered species. In addition, *Alitta virens*, *Namalycastis rhodochorde*, and *Marphysa* sp., were considered to be non-native species whose native distributional range was outside of Japan. Because these baits may have potential influences for Japanese native species, it is necessary to promote attention not to spread in the natural environments.

Spatial and seasonal variation of the Aciculata (Annelida) in the continental shelf of the Gulf of California, Mexican Pacific [Poster]

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The Gulf of California is one of the most productive and complex seas of the Eastern Pacific. In addition, as a consequence of its heterogeneous topography and highly dynamic current system, many diversified habitats exist which in turn harbor a high diversity of invertebrates. However, few studies have been carried out about polychaete distribution patterns in that region. That is why the aim of this study was to analyze the effect of spatial heterogeneity and seasonality on the composition and distribution of the Aciculata on the continental shelf of the Gulf. Benthic samples were taken in 35 stations at depths between 17 and 112 m. A total of 2884 polychaetes belonging to 119 species were identified in winter-spring, while 3134 organisms from 136 species were recorded in summer-autumn. Environmental variables such as depth, temperature, salinity, dissolved oxygen, organic matter and sand percentage were measured. Variations in the species composition were analyzed using a four-factor design (including: "season", "latitudinal region", "coast location" and "depth") and permutational multivariate analysis of variance (PERMANOVA). The relationships between species composition and environmental variables were explored using the BIO-ENV procedure. Significant differences in species composition were observed between seasons: the higher number of organisms and species observed in the summer-autumn season is linked to the inflow of water from the Pacific Ocean during the summer, allowing the establishment of species with tropical affinities. In both seasons, significant differences in the fauna were observed based on bathymetry: in shallow waters, the most important species was *Aglaophamus verrilli*. In summer-autumn, differences in species composition were observed in a latitudinal gradient, as well as between the continental (eastern) and peninsular (western) coasts, but no particular pattern could be identified. In summer-autumn, the best variable combination which explains the biotic variations involved temperature, salinity and sediment type.

A new species of *Aberranta* from Brazil and first occurrence of this genus from the Southern Hemisphere [Poster]

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Aberrantidae is a small group, morphologically homogeneous and rarely seen. Adults measure a few millimetres, have about 40 chaetigers, living specimens are transparent, yellowish-brown with a dark alimentary channel and reddish eyes. The few records of *Aberranta* are from mud, sandy, sandy-mud and coarse sand, 30-300m and known species have been recorded from the eastern USA, Mediterranean and China. The examined material is from two campaigns established during the Project Habitats/Petrobras – Heterogeneidade Ambiental da Bacia de Campos coordinated by CENPES/Petrobras when R/V *Gyre* and R/V *Miss Emma MacCall* were utilized. Samples were collected from the continental shelf, canyons and slope. Polychaetes and other benthic organisms were seized from sediment, washed and fixed in 4% formalin solution, conserved in 70% alcohol and then identified. The depths where aberrantids were captured ranged from 25 to 3,250m. The new species, *Aberranta bella* sp. nov., is characterized by the combination of the following characteristics: three kinds of neurochaetae: a) capillary thick and smooth, b) capillary of intermediate length and with long marginal serration, and c) one lyriform chaeta, presenting a smooth shaft and with distal projections with the same length. The prostomium presents eyes, smooth antennae and stout palps reaching maximally to chaetiger 2. The first peristomial annulus is reduced, with a small rounded triangular portion visible dorsally. Branchiae are present from chaetiger 3, the pygidium is small with a small midventral conical papilla and a pair of lateral cirri of similar shape and structure to postchaetal lobes.

Mesoscale assessment of shallow water polychaete assemblages in the north-western Mediterranean Sea.

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The shallow waters of the north-western Mediterranean have been subject to a long history of studies by taxonomists and ecologists being today among the best known regions worldwide. Benthic macrofaunal assemblages (10 to 50 meter depth) of this area were assessed during the course of the REDIT I (1998) and REDIT-II (1999) campaigns covering a portion of the coast between Valencia (Spain) and the mouth of the Rhone River (France). Four main soft-bottom communities were detected in the area: Littoral Fine Sands (LFS), Littoral Coarse Sands (LCS), Littoral Sandy Mud (LSM) and Terrigenous Coastal Mud (TCM). The Polychaete fauna was used as a surrogate for the entire community. More than 250 species of polychaetes were identified, around 25 % of the whole range of polychaete species recorded in the western Mediterranean Sea. With the recent introduction of the European Marine Strategy Framework Directive (MSFD) (2008/56/EC), the assessment of biological diversity at different temporal and spatial scales became a prerequisite when criteria and methodological standards on Good Environmental Status (GENS) of European marine waters need to be evaluated following the Directive. In this context, the aim of the present paper is to describe the distributional pattern of the pool of species present in the region with the description of its community characteristics (species diversity, abundance/biomass, dominance and trophic structure) as well as to assess the present condition of these communities, exploring the possibility to be used in its evaluation for GENs.

Morphology, molecular sequence analysis and shell infestation characteristics of *Polydora* (Polychaeta: Spionidae) from East Asia

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Accurate species identification is required to trace and monitor the harmful shell borers, *Polydora* species (Polychaeta: Spionidae), which transport worldwide accompanying commercially important mollusk shells today. The nuclear 18S rRNA gene sequences of shell boring *Polydora* in east Asian aquaculture, *Polydora brevipalpa*, *P. uncinata*, *P. aura*, *P. websteri*, *P. calcarea*, *P. haswelli*, and *P. onagawaensis* were determined from Japan, Korea, and north China. A wide range of morphological variation, particularly with regard to pigmentation, is observed among these species. Not only species differentiation but also intraspecific pigmentation variation was clarified in these morphologically complex species. Black pigmentation pattern on the palps is suggested to be a key characteristic for species determination. *Polydora uncinata* and *P. aura* which possess special notochaetae in the posterior chaetigers were sister species, and the other species which do not possess any special posterior notochaetae made the other group in the phylogenetic tree. *Polydora websteri* and *P. haswelli*, and *P. onagawaensis* and *P. calcarea* were sister species, respectively. Both morphology and molecular analysis of the 18S rRNA gene are suggested to be useful and effective for *Polydora* species identification and phylogenetic discussion. This is the first record of *P. brevipalpa* and *P. onagawaensis* from China, and the shells of Chinese scallop and abalone were seriously damaged by *P. brevipalpa* infestation. *Polydora uncinata* was suggested to be one of the most dangerous species in Japanese and Korean mollusk aquaculture especially in land-based cultured abalone.

Analysis of the phylogeny of Canalipalpata using four nuclear protein-coding genes [Poster]

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Siboglinidae is a group of tube-dwelling worms that inhabit diverse deep-sea environments and rely on bacterial endosymbionts to provide nutritional/energy sources. Recent analyses of molecular data have indicated a possible sister group relationship between Siboglinidae and Oweniidae. We are attempting to resolve the phylogenetic history of Siboglinidae using data from the myosin II heavy chain gene. This conserved nuclear coding gene has been shown to be a useful phylogenetic tool for deep-level analyses, with a homogenous rate of change across many species and homogeneity in nucleotide frequency. We are expanding the existing myosin II heavy chain data set to include over 25 taxa representing Terebellida, 19 Sabellida taxa and 13 Spionida, along with five Siboglinidae and representatives of Oweniidae and Magelonidae. We will present our evaluation of the current competing hypotheses regarding the placement of Siboglinidae based on these data. Thus far, maximum likelihood analyses of ~70 taxa show strong support for traditionally recognized taxa including Spionidae, Sabellariidae and Sabellidae; however, hypothesis testing has shown that the myosin II heavy chain data reject monophyly of Terebellida, Sabellida and Spionida. Monophyly of Siboglinidae + Oweniidae is only weakly supported by the myosin II heavy chain data, but it cannot be rejected. (This work was supported by NSF Assembling the Tree of Life DEB-1036530 to FEA and DMH).

Latest news from the WormNet II Community Sequencing Project

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Under the umbrella of the NSF funded ATOL grant, "WormNet II: Assembling the Annelid Tree of Life" we are offering a community-based sequencing service for annelids. The project is intended to resolve phylogenetic relationships among closely related annelid species and to investigate genetic diversity within selected species and complexes of cryptic species. The service is available at no charge to researchers who can supply appropriately preserved material. We offer sequencing of the two mitochondrial markers cytochrome c oxidase subunit I and 16S ribosomal RNA and, in some cases, additional mitochondrial and nuclear markers. We also assist with data analysis, deposition of voucher material in museum collections and collaborate on publications. We will present several ongoing and recently completed projects, spanning amphinomids, sabellids, serpulids, flabelligerids and nereidids. Some of these projects focus on intraspecific diversity whereas others address phylogenetic questions. With regard to intraspecific diversity we encountered high genetic diversity in most cases, but we also have examples of genetic homogeneity throughout a species' distribution range. We will discuss the merits and the limitations of our approach.

Patterns of population discontinuity of the invader *Alitta succinea* on the Brazilian coast as revealed by meristic data of paragnaths and ISSR molecular markers [Poster]

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Alitta succinea has a cosmopolitan distribution and is considered common in marine, tropical and temperate habitats. It is probably native to North Sea ecoregion. Currently, only United States, Australia, Colombia and Brazil are the countries that consider *Alitta succinea* as invader. The introduction of this species occurs by ships' ballast water, due of its fouling on hulls of boats and also as the result of shellfish culture. The aims of this study were to assess the morphological diversity and population connectivity of *Alitta succinea* on the Brazilian coast by meristic data analysis from paragnaths and by genetic cohesiveness using Inter Simple Sequences Repeats (ISSR) markers. Specimens of *Alitta succinea* were collected at five points along the Brazilian coast. Both data sets were supported among each other by cluster analysis, MDS, neighbor-joining and maximum parsimony topologies, as well as by Bayesian structuring and population genetic parameters. The data indicated the divergence between populations and the presence of two genetic-geographically distinct groups, one comprising north-northeastern populations and another composed by south-southeastern populations. The area III divided the samples into two geographical groups. The data set failed to support wide-ranging larval transport along the area. On the contrary, the data suggested a strong population discontinuity possibly associated with the presence of two major biogeographic barriers that affect the transport of eggs, larvae or individuals of *A. succinea* in its dispersion process: Underwater Chain of Vitória and Trindade (state of Espírito Santo) and the cold water resurgence in Arraial do Cabo, state of Rio de Janeiro.

Fine structure of agglutinated polychaete tubes (Maldanidae, Pectinariidae, Oweniidae, Terebellidae, Spionidae) [Poster]

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Polychaetes are abundant and often leading members of benthic communities known for habitat structuring. Many of the polychaetes build tubes or burrows secreting whole tubes or adhesives used for ground particles gluing. Protective buildings of investigated polychaetes vary greatly in morphological features and structure. Agglutinated tubes are built of tiny ground particles such as sand, shell pieces, or silt, fastened together with matrix - organic cement. In the current study we investigated fine tube structure of members of five families: Maldanidae, Pectinariidae, Oweniidae, Terebellidae, and Spionidae. We obtained SEM of the tubes and managed to classify tube structure types based on morphological diversity. Here we give data for 14 polychaete species. All the investigated tubes have the same organization plan. The inner surface of the tube is made of hardened organic pavement, secreted by the worm. On the outer side of the pavement, some filaments come off and blend into matrix fastening ground particles. Despite the single organization plan, a few structure types were revealed. The first type is characteristic to the inner membrane (fine pavement easily separated from the matrix) and outer tube part made of particles with matrix. This type was found in Maldanidae and Pectinariidae. The second type is shown for Oweniidae and Terebellidae polychaetes. Here the matrix makes envelopes for each sand particle, and the inner membrane is also present. Members of Spionidae build another type of tubes, with no membrane, substituted by thickened inner matrix layer. Fine particles in the outer layer are mixed with matrix, and larger particles are easily detached from the tube. We did not observe any correlation between the type of tube and chaetal types. Probably, the tube structure correlates with the mode of its construction and arrangement of mucous glands over the worm's body.

Nine new species and new records of Opheliidae (Polychaeta) from Campos Basin, southeastern Brazil [Poster]

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Opheliidae are detritivorous polychaetes that burrow actively never constructing tubes. The body may not have well-defined regions or could be divided into two or three regions. The pygidial region is the most important body region in species-level identification; it may be associated to an anal tube, anal cirrus, and marginal and ventral appendices. Currently, the family contains about 170 described species belonging to eight genera (i.e. *Ammotrypanella*, *Antiobactrum*, *Armandia*, *Ophelia*, *Ophelina*, *Polyopthalmus*, *Tachytrypane* and *Thoracophelia*). The aim of this study was to characterize taxonomically the opheliids from Campos Basin, southeastern Brazil. The examined material is from two campaigns established during the Project Habitats/Petrobras – Heterogeneidade Ambiental da Bacia de Campos coordinated by CENPES/Petrobras when were utilized R/V *Gyre* and R/V *Miss Emma McCall*. Samples were collected from the continental shelf, canyons and slope regions. Polychaetes and other benthic organisms were seized from the sediment, washed and fixed in a 4% formalin solution, conserved in 70% alcohol and then identified. The depths where opheliids were captured ranged from 25 to 3,250m. The specimens are deposited in the Polychaeta Collection from the Rio de Janeiro State University (UERJ). A total of 2,023 specimens belonging to 19 species distributed into five genera were identified: *Ammotrypanella*, *Armandia*, *Ophelia*, *Ophelina* and *Thoracophelia*. Among these, five species of *Ophelina*, two of *Armandia*, one of *Ophelia* and one of *Thoracophelia* are likely to be new species to science, while the genus *Ammotrypanella* and the species *Ophelia assimilis* Tebble, 1953 are new records from Brazil. Opheliids were more abundant in the continental shelf with 52% of the total, followed by the slope stations with 24%, mouth of Paraiba do Sul River with 17% and submarine canyons with 7% of the total. *Ophelina abranchiata* was the most abundant species in the study, representing 55% of the total number of opheliids collected.

Capitellidae from southern Brazil [Poster]

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The family Capitellidae has been the object of many ecological and taxonomic studies on the Brazilian coast. However, only 25 species belonging to 16 genera were recorded, compared to 150 species and 40 genera considered as valid. At the moment, we are studying the taxonomy, bathymetric distribution and phylogeography of this group. We identified 2915 specimens of Capitellidae collected under the scope of HABITATS (Campos Basin Environmental project, coordinated by CENPES/PETROBRAS), by means of a box-corer and van Veen grab, in 149 samples covering a depth between 12 and 3301m in southern Brazil (21°18'S and 23°00'W). The species *Mediomastus californiensis* was responsible for approximately 60% of the total abundance of Capitellidae in the shallower region, between 20 and 80 m depth. In this bathymetrical range, the genus *Notomastus* was also abundant, represented by *N. cf. aberrans*, *N. cf. magnus*, *N. cf. teres* and *N. latericeus*. Some genera were found mainly in shallower depths, as *Mastobranchus*, *Mediomastus*, *Scyphoproctus* and *Capitella*, while others were predominant in deeper regions (>300 m) as *Barantolla*, *Capitomastus*, *Neoheteromastus*, *Peresiella* and *Pseudomastus*. *Baldia* and *Leiocapitella* were restricted between 120 and 160 m depth, while *Capitellethus*, *Heteromastus*, *Parheteromastus* and *Neomediomastus* were found only on the continental slope, between 400 and 2000 m depth. This is the first report of the genera *Mastobranchus*, *Dodecamastus*, *Notodasus*, *Neoheteromastus*, *Barantolla*, *Parheteromastus*, *Peresiella*, *Pseudomastus* and *Neomediomastus* from Brazil. In respect to the problem regarding the identification of *Capitella capitata*, we are conducting a phylogeographic approach to understand the taxonomy and distribution of this complex of cryptic species along the Brazilian coast.

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Two new species of *Syllis* Lamarck, 1818, including a viviparous species, associated with aquaculture species in South Africa

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Here we describe two new species of *Syllis*. Both were found outside abalone farms; a viviparous species was found mainly feeding on holothurians in a closed culture system while the other was also found on oysters. The former is rather similar to *Syllis vivipara* Krohn, 1869, from western Mediterranean, NE Atlantic, and Caribbean, but has a bigger body, with a distinct colour pattern, and longer dorsal cirri. The latter closely resembles both *Syllis amica* Quatrefages, 1865, in the chaetae (with 1-2 thick simple chaetae by loss of blades and enlargement of shafts) and *Syllis armillaris* (Müller, 1776) in the general aspect of body, long and slender, with short, strongly fusiform dorsal cirri. Viviparity (internal brooding) is the most advanced mode of brood protection, and is not common among the polychaetes. In the family Syllidae Grube, 1850, it has been reported in five species of the genus *Syllis* (although the taxonomic status of two of them is doubtful), in two species of *Dentatisyllis* Perkins, 1981 (Subfamily Syllinae Grube, 1850), and in two species of the genus *Parexogone* Mesnil and Caullery, 1818 (Subfamily Exogoninae Langerhans, 1879). No viviparous species have been reported in any of the other three subfamilies of Syllidae. We provide a description of these new species, detailed descriptions of different stages of viviparous development, and discuss the interesting questions about the viviparity in this family of polychaetes. This is the first report of a syllid associated with a holothurian, so a general overview of the Syllidae associated with other marine invertebrates will be included.

Spatial genetic variation and population structure of three shell infesting polydorids along the southern African coast [Poster]

Simon presenting: Williams, Lee-Gavin, Conrad Matthee and Carol Simon*

Refer Williams for abstract.

Diversity and distribution pattern of Polychaetes along the Indian Coast (6° to 23°)

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Polychaetes are a key component of benthos and play an important role in the marine ecosystem functioning. Despite its importance, biodiversity studies on polychaetes from India are limited. Therefore, the present study aims to investigate the species diversity and distribution pattern of polychaetes from the maritime states of India covering a coastal area of ~8000 km (6° to 23°). Data for the present study were collected from different ecological surveys and published literature. Jaccard's similarity cluster, average taxonomic distinctness ($\Delta+$) and variation in taxonomic distinctness ($\Delta+$) were calculated. Polychaetes along the Indian coast were represented by 567 species belonging to 54 families and 244 genera. Nereididae was the most dominant family. Jaccard's cluster distinguished three assemblages: (1) island of Andaman and Nicobar and Lakshadweep (2) west coast states of Maharashtra, Goa and Kerala and (3) east coast states of West Bengal and Orissa. Total species richness was highest in Tamil Nadu (215 species) and lowest in Karnataka (23 species). Simulation test on $\Delta+$ showed that values for individual states generally fell within the 95% funnel, even though they were often below the expected mean. Biodiversity indices and cluster analyses indicate that polychaete species are dominated within certain taxonomic groups. Therefore, the observed diversity pattern may be due to the geomorphological heterogeneity of the Indian coast. However, this should be interpreted with caution since many of the coastal habitats are poorly studied and also due to the lack of taxonomic experts. Further, although India is a marine biodiversity hot spot region, the present study indicates that polychaete diversity is considerably low. Therefore exhaustive sampling is required to get a better understanding of the polychaete diversity pattern. Because of their importance in marine ecosystem functioning, understanding of the polychaete diversity pattern would greatly enhance our knowledge for better conservation plans.

Polychaetes as marine pollinators?

Solis-Weiss presenting: van Tussenbroek, Brigitta I, Vivianne Solís-Weiss* and Verónica Monroy-Velazquez

Refer van Tussenbroek for abstract.

Biodiversity of benthic polychaetes from a shallow tropical bay, Bay of Bengal, India

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The aim of this study is to determine patterns of species richness and community structure along with the influence of environmental parameters on the diversity of polychaetes collected from a shallow tropical bay named Nizampatnam bay, located in the Bay of Bengal, India. Four cruises were conducted during 2006 to 2008 covering 20 stations along the bay having a maximum depth of 40 m. Altogether 128 infaunal samples (van Veen grab 0.1 m²) were collected that represented Crustacea (61.4%), Polychaeta (34%), Ophiuroidea (1.5%), Bivalvia (1.3%) and others (1.8%) including Nemertina, Echiuroidea and Pisces. The polychaete abundance varied from 140 nos. m⁻² to 2420 nos.m⁻² with a mean of 135.8±11.22. Salinity of the bottom seawater ranged between 24.8 and 36.8 psu, temperature 25.0 and 34.1 °C, dissolved oxygen 1.34 and 5.82 ml.l⁻¹. The predominant sediment texture in the Nizampatnam bay was characterized by clayey-silt and sandy with an average mean particle diameter (MPD) of 153.7µm. Overall, sediment organic matter (%) varied from 0.26 to 2.20 mean 1.16±0.06. During this investigation, 97 polychaetes species were identified from the infauna which were dominated by *Prionospio cirrifera*, *Nephtys dibranchis*, *Diopatra neapolitana*, *Lumbrineris heteropoda*, *Cossura coasta*, *Amphicteis gunneri*, *Ancistrosyllis parva*, *Prionospio pinnata*, *Cirratulus chrysoderma* and *Nereis granulata*. Polychaete diversity indices S , N , d and H' were higher in the stations located nearer to the shoreline (depth <15m) than the stations located away from the shoreline (depth >15m). Multivariate analyses were used to define assemblages named after the most important (determining) taxon. Two polychaete associations could be recognised off the Nizampatnam bay, namely *Prionospio cirrifera* assemblage (<15m) and *Lumbrineris heteropoda* assemblage (>15m). Canonical correspondence analysis (CCA) showed that depth, sediment organic matter and sediment mean size influenced the polychaete distribution. The ratio between polychaete to nematode numerical abundance of this region was 1: 80. Temporally post-monsoon seasons supported high polychaete diversity.

***Eupolymnia nebulosa* (Montagu, 1818) revisited: Homage to Michel Bhaud [Poster]**

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Eupolymnia nebulosa (Montagu, 1818) is a sedentary, tubicolous polychaete, inhabiting shallow waters with mixed soft and hard bottoms. It has a wide geographical distribution, which includes the Atlanto-Mediterranean Europe coasts and has been reported as having different life cycles (i.e. free-spawning and egg-brooding) in different locations (Atlantic and Mediterranean, respectively). In turn, no morphological or genetic inter-specific differences have been demonstrated between these since the first attempt by Guy Lenaers and Michel Bhaud based on French English Channel and Gulf of Lions populations. Nevertheless, since then no other populations from intermediate areas have been studied to check neither their reproductive modes, nor the genetic differentiation. The objectives of this presentation are: (1) to check the postulated restriction of egg brooding in the Mediterranean and (2) to assess the possible existence of cryptic species using molecular markers, based on several Mediterranean and Atlantic populations from France, Spain, Portugal, Great Britain, and Norway. Our results support the existence of internal fertilisation and prove that egg brooding is not restricted to the Mediterranean. This is consistent with the molecular data based on sequences variation of mitochondrial (16S rDNA, COI) and nuclear (histone H3, ITS region) genes, which show four lineages (likely cryptic species). In the Mediterranean three of these clades exist sympatric: one is exclusive to the Mediterranean, one occurs in the SW Iberian Peninsula (La Herradura and Portugal), and one is widely spread (from Madeira and Britain to NW Mediterranean). The fourth one is a Scandinavian lineage, clearly separated and allopatric to the other three. Therefore, *E. nebulosa* appears to be a cryptic species-complex, with highest diversity in the Mediterranean, one or a few lineages spread into the Atlantic (reaching the British Isles) and then a shift to another lineage in Scandinavian waters.

Phylogeography of *Stygocapitella subterranea* (Parergodrilidae) in the Northeast Atlantic

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Stygocapitella subterranea is a small interstitial annelid inhabiting the upper intertidal of sandy beaches all around the world. However, records from tropical and subtropical regions are still lacking. As is the case for many interstitial species *S. subterranea* does not possess pelagic larval stages or good active swimming capacities as juveniles or adults. Hence, potential for long-distance dispersal is lacking and, thus, given the global distribution it is very likely that gene flow is limited between these populations. Nonetheless, no morphological differences can be found between the different populations and even analyses of sperm ultrastructure of populations from the northern hemisphere revealed no differences. This contradiction is known as the Meiofauna paradox. First molecular analyses based on RAPD data, however, found that gene flow is limited even between populations, which are close to each other, such as Kristineberg (Sweden) and List/North Sea island Sylt (Germany) and cryptic speciation occurs by isolation-by-distance. Herein we report new localities for *S. subterranea* from South Africa, Scotland, Brittany (France) and Sylt as well as sequence data of the mitochondrial COI and 16S rRNA and the nuclear ITS1 and ITS2 from populations in the Northeast Atlantic. The results show that indeed in the Northeast Atlantic cryptic speciation of *S. subterranea* was not so much driven by isolation-by-distance, but more by ecological factors such as grain size. Moreover, population-genetic analyses indicate a rapid spatial expansion of the *S. subterranea* populations into the Northeast Atlantic, which fits well with retreating ice shelves and newly established seas like the North and Baltic Seas after the maximum of the last glaciations. Hence, the evolution of *S. subterranea* is more complicated than only being an isolation-by-distance process and other factors such as grain size and glaciations are also relevant.

Phylogeography of *Stygocapitella subterranea* (Parergodrilidae) in the Northeast Atlantic

Struck presenting: Stateczny, Dave¹, Dominik Siemon¹, Jana Wegbrod¹, Julia Lange¹, Anne Rikeit¹, Günter Purschke¹, Anja Golombek^{1,2} and Torsten H. Struck^{*1,2}

Refer Stateczny for abstract.

Cryptic sympatric Species across the Australian Range of the Global estuarine Invader, *Ficopomatus enigmaticus*

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Ficopomatus enigmaticus is a serpulid worm that has invaded many estuaries around the world, causing environmental and economic harm wherever it has established. Australia has long been suggested as a likely place of origin for the species, but it is unclear whether it has been introduced here too. To assess this, we tested for genetic patterns across the range in southern Australia, predicting that a recent invader would not show evidence of (east-west) phylogeographic patterns observed commonly in many marine species in southern Australia. Unexpectedly, mitochondrial (Cyt B) sequencing and nuclear marker (iSSR) profiles suggested the presence of at least three species within Australian worms, not distributed simply as 'east' or 'west' species. Two common (and closely related) species were present in both eastern and western Australia and often found together in the same clump of worms. A third species was restricted to south east Victoria, in estuaries where neither of the other two species were found. Diversity within the two widespread species appeared great and there were suggestions of genetic differences among eastern and western populations, although analyses were limited by small sample sizes. These patterns could be the result of recent translocations within Australia and/or multiple invasions from elsewhere but more work is needed to resolve how worms overseas are genetically related to Australian taxa. Thus, while not answering whether *F. enigmaticus* is an Australian native, the patterns and diversity uncovered here should facilitate future studies assessing invasion routes and the global phylogeography of *Ficopomatus*.

Report on the genus *Anobothrus* (Polychaeta: Ampharetidae) from China seas [Poster]

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Based on material deposited in the Marine Biological Museum of the Chinese Academy of Sciences (Qingdao), a review of the genus *Anobothrus* from Chinese waters is reported in the present paper, including *Anobothrus glandularis* (Hartmann-Schröder, 1965) and *Anobothrus mironovi* Jirkov, 2008, which are recorded for the first time from coastal water of China. A key to all the four species of *Anobothrus* from China seas is given.

Lysippe Malmgren, 1866 (Annelida: Polychaeta: Ampharetidae), reported for the first time from China, with description of a new species [Poster]

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Based on material deposited in the Marine Biological Museum of the Chinese Academy of Sciences (Qingdao), a new ampharetid species, *Lysippe trichobranchiae* sp. nov., is described. The new species represent a new record of the genus *Lysippe* Malmgren, 1866 from oastal area of China. The new species differs from the congeneric ones by its grooved branchiae and large number of AU. Additionally, there are some differences on branchiae, thoracic chaetigers, and abdominal uncinigers. It was common from the Bohai Gulf, Yellow Sea and East China Sea at depth 10-40 m.

A new species of *Chaetopterus* from Hong Kong [Poster]

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A new species of *Chaetopterus* is described based on 19 specimens collected from a floating raft of a fish farm in Hong Kong. This species is small (body length: 11.5 to 35.5 mm), with 9, 5, and 10 to 16 chaetigers in region A, B, and C, respectively. It belongs to a small group of epibenthic *Chaetopterus* species with long notopodia in region C. This species can be distinguished from other epibenthic *chaetopterus* by a combination of the following features: up to 16 light brownish cutting chaetae in A4, wide neuropodia in A9, large wing-shaped notopodia in B1, 10-16 chaetigers in region C, long club-shaped notopodia and short conical dorsal cirrus in the dorsal lingule of neuropodia in region C.

Mitochondrial genome of *Capitella telata* [Poster]

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Mitochondrial genomes (mitogenomes) have been successfully used in reconstructing the phylogeny of many groups of animals. However, although Polychaeta is the most diverse class of Annelida, only few complete polychaete mitogenomes have been published, without any from Capitellidae, a large family with more than 40 genera. Based on morphological characters, Capitellidae was once considered to be the sister group of Arenicolidae and Maldanidae within Scolecida. Recent studies based on multiple genes clustered Capitellidae with Echiuridae into the same clade, and was at the root position of Clitellata. We determined the complete mitogenome sequences of *Capitella telata* through applying the long-range PCR and primer-walking strategy, and confirmed the results with sequences downloaded from the *C. telata* genome. The mitogenome is 16357 bp in length and AT rich (64.4%). It has the typical 37 polychaete mitochondrial genes including 13 protein-coding, 2 rRNA and 22 tRNA genes. However, it lacks arginine tRNA gene. Moreover, its gene order is different from that of other polychaetes, indicating conserved gene order is not a unified feature in polychaete mitogenomes. A phylogenetic analysis will be conducted using published the mitogenome sequences of annelids and the new data from *C. telata*. A hypothesis of mitogenome gene order evolution in annelids will be presented.

Shallow-water whale bones in the Southern Ocean: an interesting habitat for the study of specialized polychaetes

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Whale-falls and the invertebrate and microbial marine communities they host, are currently one of the most extraordinary and poorly sampled habitats in the world. After the accidental discovery of these communities, several studies have followed describing the invertebrate fauna that thrives in these specialized substrates. The bulk of these studies focused on polychaetes, due to the remarkable importance they play in both abundance and biodiversity. So far, the greatest proportion of investigations have been conducted in the northern hemisphere (northeastern and northwestern Pacific, and north Atlantic), at depths between 30 to about 3,000 m. Yet very little is known about these invertebrate communities in the Southern Ocean, an area highly frequented by cetaceans. To help filling the gap of knowledge for this area, during the past years, we experimentally deployed several whale bones in the shallow-waters of Deception Island (South Shetland Islands) to investigate the Antarctic organisms associated to them. Similarly as what happens in other geographic areas, polychaetes were the most represented group of invertebrates inhabiting the bones. Our findings seem to suggest that members of the genus *Ophryotrocha* (Family Dorvilleidae) are important components of organically-enriched Southern Ocean environments, as has been reported for this clade in other geographic areas. Furthermore, we have confirmed the presence of members of the genus *Osedax*, with the existence of the shallowest species in the group described so far. Amongst the organisms surveyed we also described four species pertaining to the families Cirratulidae (*Cirratulus balaenophilus*), Dorvilleidae (*Ophryotrocha oresanzi* and *O. clava*), and Siboglinidae (*Osedax deceptionensis*), while other species from the families Dorvilleidae, Terebellidae, and Nerillidae are being currently studied. Our results confirm that the study of invertebrates associated to whale-falls in the Southern Ocean is thus a very promising field that will certainly keep on growing in the years to follow.

First data on shallow-water polychaete communities associated to mammal bones in the Mediterranean Sea [Poster]

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Marine benthic invertebrate communities associated to mammal bones have lately captured a great deal of scientific attention. Once the flesh from carcasses is consumed by scavengers, sulphophilic chemoautotrophic bacteria rule these particular ecosystems making the organic matter retained in the bones available for different macrofaunal invertebrates. Polychaetes dominate these assemblages, exploiting the feeding resources that bones offer, and are also provided shelter by the bone crevices and cavities in the trabecular matrix. Of particular note is the family Dorvilleidae, and especially some members of the genus *Ophryotrocha*, which constitute one of the most diverse groups among polychaetes associated with whale-falls. Very little is known about the faunal community structure of the invertebrates that these substrates host, and this is particularly true for shallow-water environments. In order to characterize the invertebrate fauna associated to shallow-water mammal bones we experimentally deployed mammal bones of three different species (minke whale, pig and cow) on sandy sediments and rocks in the North-Western Mediterranean Sea. Here we present the preliminary results after the study of the polychaete fauna associated to these bones for a whole year period. According to our preliminary results, during the first half of the year all the bones presented a similar polychaete composition. In terms of abundance, different species of *Ophryotrocha* accounted for the greatest proportion, followed by two species of Nereididae. The presence of *Ophryotrocha* and nereids during the first half of the year is correlated with the occurrence of filamentous bacterial mats observed in different parts of the bones. Apart from *Ophryotrocha* and nereids, other groups of polychaetes were also represented, such as different members of the families Capitellidae, Syllidae, Glyceridae, Chrysopetalidae, Phyllodocidae, Cirratulidae, and Terebellidae. Significant differences, both in abundance and diversity, were observed between experiments and controls in the polychaete communities along the year.

Diversity of *Notaulax* (Polychaeta: Sabellidae) boring into rhodoliths along the northeastern Brazilian coast, state of Paraíba [Poster]

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Rhodoliths are calcareous nodules of coralline red algae growing unattached to the substrate, which provide three-dimensional hard structures as substrate for sessile organisms, increasing habitat complexity. Among the fauna inhabiting rhodoliths, polychaete worms are often the most abundant and diverse group, including forms which are able to bore into calcareous substrates, such as some taxa of Sabellidae. The largest rhodolith beds in the world are found off the northeastern Brazilian coast, but few studies have been conducted in the area, and even fewer of taxonomic scope. So, the present is a taxonomic survey of the species of *Notaulax* boring into rhodoliths off the northeastern Brazilian coast. Collections were made at peaks of low tide in five beaches along the state of Paraíba. Rhodoliths were preserved in 4% formaline and decalcified in 10% formic acid and formaline; specimens of *Notaulax* were sorted under stereomicroscope and studied under stereo, compound and scanning electron microscopes. Around 50 specimens of *Notaulax* were obtained, belonging to five species, all of them apparently new to science, each from a different beach. The morphological characters used to distinguish these species are size and color of crown, length of basal lamina and palmate membrane, number of eyespots per radiole, beginning of radiolar flanges, collar morphology, including presence and size of ventral lappets, shape of ventral shields, number of thoracic chaetigers, and arrangement of collar chaetae. There are few studies on the polychaetes inhabiting rhodoliths, especially comparing rhodolith shape and faunal composition. Future studies investigating the boring behaviour of species of *Notaulax* into the substrate using modern techniques, such as scanners micro-CT, can provide a better knowledge on the biology of these sabellids.

Five new species and new records of Oweniidae (Polychaeta) from Campos Basin, Southeastern Brazil [Poster]

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Oweniidae are tubicolous polychaetes, with the body divided into three regions: cephalic (buccal region and tentacular crown), thoracic (uniramous) and abdominal (biramous). The pygidium is simple or ornamented, and the anus is terminal. They occur from tropical to polar seas, from the intertidal to depths of over 4,000 m. Five genera are known: *Galathowenia*, *Myriochele*, *Myrioglobula*, *Myriowenia* and *Owenia*, with 55 valid species. In Brazil, only three species, *Galathowenia oculata* (Zachs, 1923), *Myriowenia californiensis* Hartman, 1960 and *Owenia fusiformis* delle Chiaje, 1844 have been recorded. This study characterized taxonomically the Oweniidae from the Campos Basin off northern Rio de Janeiro and southern Espírito Santo states. Samples were taken from April 2008 through October 2010 from the mouth of the Paraíba do Sul River, on the continental shelf and slope, and in submarine canyons. For each station, three replicate samples were taken, totaling 108 samples. The sediment was collected with a box corer or van Veen grab, fixed (4% formalin), sieved (300-500 µm mesh) and preserved in 70% ethanol. The material was inspected under a stereomicroscope and identified to the lowest possible taxonomic level using appropriate literature. In total, 861 individuals of Oweniidae in three genera (*Galathowenia*, *Myriochele* and *Owenia*) belonging to 10 species were identified. Four species represent new records for Brazil: *Galathowenia scotiae* (Hartman, 1978), *Myriochele heeri* Malmgren, 1867, *Myriochele heruensis* (Gibbs, 1971) and *Owenia johnsoni* (Blake, 2000). The continental shelf showed the highest species richness (8), followed by the area near the mouth of the Paraíba do Sul River (6) and the slope (1). The most abundant species were *Owenia* sp.1 and *G. oculata*, with 70% of the total and 19.2%, respectively. One species of *Galathowenia* and four species of *Owenia* are new to science.

The Synonymy of *Chitinopoma* and *Chitinopomoides* with *Filogranula* (Serpulidae) and Description of a new Species [Poster]

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A revision of the poorly known genera *Chitinopoma*, *Chitinopomoides* and *Filogranula* (Annelida, Serpulidae) is under way. All taxa involved are small in size (2-24 mm long, 0.2-0.8 mm wide) and some switched generic attribution a few times. In ten Hove and Kupriyanova's (2009) overview three (possibly four) taxa were attributed to *Chitinopoma* (*Ca. arndti*, *Ca. rzhavskii*, *Ca. serrula* and possibly *Ca. capensis*), one to *Chitinopomoides* (*Cs. wilsoni*) and six to *Filogranula* (*F. annulata*, *F. calyculata*, *F. exilis*, *F. gracilis*, *F. revizee*, *F. stellata*). They suggested that additional studies were needed to determine whether or not *Chitinopoma* and *Filogranula* were synonymous, but did not discuss the generic affinities of *Chitinopomoides*. The taxon *capensis* was restudied on its rediscovered holotype and subsequently placed in *Pseudochitinopoma* by Kupriyanova, ten Hove and Nishi (2013). *Filogranula* sp. A (ten Hove and Wolf 1984), from the Gulf of Mexico has now tentatively been attributed to *F. revizee*. A new species from the Seychelles will be described. Characters used to distinguish between the nominal genera such as presence/absence of repeated collar-like peristomes and brood-chambers will be discussed. On the basis of an analysis of variability within the entire set of taxa, notably the structure of chaetae and uncini as observed with SEM, the genera *Chitinopoma* and *Chitinopomoides* are synonymized with *Filogranula*.

Alien invasive serpulids in the Levant Mediterranean—an update

ten Hove presenting: Ben-Eliahu¹, M.N., A. Chipman^{1,2}, H.A. ten Hove*³, H.K. Mienis⁴ and G. Rilov⁵

Refer Ben-Eliahu for abstract.

A new species of *Polydora* (Polychaeta: Spionidae) from northeastern Japan [Poster]

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A new species of *Polydora* (Polychaeta: Spionidae), *Polydora onagawaensis*, is described from Pacific waters of northeastern Japan. Adults were observed to bore into the shells of the cultured scallop *Patinopecten yessoensis*, wild oyster *Crassostrea gigas*, and wild turban snail *Ompharius rusticus*. *Polydora onagawaensis* is a mid-sized worm measuring up to 16.2 mm long and 1.1 mm wide at chaetiger 5. It is characterized by its incised prostomium, caruncle extending up to the end of chaetiger 2 to 4 and branchial chaetigers continuing to half of body to near the posterior end. It was found to vary extensively in black pigmentation on the palps and body, but none have black bars on the palps. High frequency of adults with pigmentation was observed from January to April, especially in February when recruitment of juveniles onto the shells increased. Females deposit up to 49 egg capsules joined in a string. Each egg capsule is attached by two stalks to the inside wall of the burrow and contains 60-70 eggs. The eggs have an average diameter of 110 μm . *Polydora onagawaensis* belongs to the *Polydora ciliata/websteri* species group. *Polydora onagawaensis* closely resembles *Polydora calcarea* in many major morphological characters and pigmentation pattern and it is also related to *P. haswelli*, *P. neocaeca* and *P. websteri*. Moreover, *Polydora onagawaensis* corresponds in part to *Polydora* sp. previously reported from Japan.

Life history of *Polydora onagawaensis* (Polychaeta: Spionidae) from northeastern Japan

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Infestation by *Polydora onagawaensis* (Polychaeta: Spionidae) was observed in suspended shells of the cultured scallop, *Patinopecten yessoensis*, in Onagawa Bay, coast of Miyagi, northeastern Japan. Our research, especially on ecology and biology, was conducted in the bay from 2008 to 2010 (before the Great East Japan Earthquake). Females of *P. onagawaensis* repeatedly deposited a string of egg capsules during the period when seawater temperature was below 15 °C. The larvae developed inside egg capsules until 3-chaetiger stage for two weeks under 10 °C incubation in the laboratory. The main spawning occurred in December, recruitment of juveniles onto the shells increased from January, and most of the large worms disappeared from July to October. The life span of *P. onagawaensis* in scallop shells in Onagawa Bay was estimated to be around 1.5 years after settlement. After the earthquake, infestation by *P. onagawaensis* was observed in the shells of the wild oyster, *Crassostrea gigas*, and turban snail, *Ompharius rusticus*, in Sasuhama and Gobu-ura near the Onagawa Bay since 2011. The main spawning occurred in both November to December and April to May, and consequently two peaks of the recruitments were observed. Most large worms seemed to disappear after the main spawning occurred. Therefore, the population of *P. onagawaensis* which inhabits the shells of the wild oyster and turban snail in the intertidal zone seemed to die younger than that which inhabits the scallop shells suspended in Onagawa Bay. We discuss the difference in life history of *P. onagawaensis* depending on different habitat environments and/or host species.

Opsins, photoreceptor cells and eyes in *Eurythoe* (Amphinomidae) and *Helobdella* (Glossiphoniidae) – implications for eye evolution [Poster]

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The evolution of opsins, photoreceptor cells (PRCs) and eyes in Annelida is far from being resolved. There are ciliary, rhabdomeric and phaosomal PRCs either occurring isolated or in light sensitive organs; and each of the PRC types appears to express an own type of opsin molecule. These PRCs often occur in the same individual of a given species and, moreover, there often exist two generations of pigmented eyes in one individual, namely larval and adult eyes. Photoreceptive structures mainly occur close to or within the brain but may also be formed in various other parts of the body (e. g. tentacles, body segments, pygidium). This results in an extraordinary structural diversity with respect to the entire group. In order to shed some light on this seemingly inextricable Gordian knot of diversity and evolutionary history we decided to use a combined approach of structural, gene sequence and expression data analyses of the cell types involved. Here we present our data on an amphinomid, *Eurythoe complanata*, and the leech *Helobdella robusta*. Whereas *E. complanata* possess at least five opsins and at least two ultrastructurally identifiable PRC types, in *H. robusta* four opsins and only one PRC type were found. In a phylogenetic analysis of opsin sequences it can be shown that these belong to three different opsin families: rhabdomeric opsins, ciliary opsins and a group more closely related to G₀ opsins. Thus far gene expression investigations could not unambiguously show an expression site for each opsin found. However, the present data allow developing a hypothesis on the evolutionary history of PRCs and opsins in Annelida. Most likely a ciliary and a rhabdomeric PRC belong to the annelid ground pattern whereas the clitellate phaosomes turned out to be derived rhabdomeric PRCs. This scenario is in accordance with a recently published phylogenetic hypothesis.

Morphology, functioning and possible homology of the anterior end of *Cossura pygodactylata* Jones, 1956 (Cossuridae)

Tzetlin presenting: Zhadan Anna, Elena Vortsepneva and Alexander Tzetlin*

Refer Zhadan for abstract.

Polychaetes as marine pollinators?

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The fauna visiting the flowers of the hydrophilous dioecious seagrass *Thalassia testudinum* was studied in May 2009 and 2011 in the Puerto Morelos reef lagoon (Mexican Caribbean). The flowers release pollen embedded in a sticky mucilaginous mass in the evening, so that sampling included 1) videos with standing cameras focused on the flowers from the end of the afternoon until about 20h30 and 2) capture of the macrofauna together with the flowers (male and female) at the end of the observation and filming time. In all, 76 flowers were sampled and 313 specimens captured and identified. Of these, 252 (almost 75%) were crustaceans and 61 (about 25%) were polychaetes, the latter being only found in 56 flowers. The polychaetes belong to nine families, seven genera and 13 species, of which by far the most abundant species was *Rullierinereis mexicana* (54%), mostly as epitokes. Those represent minimum numbers due to the sampling method. The visiting time to male (with and without pollen) and female flowers was measured: the polychaetes were found to be similarly abundant in all cases, starting their visits later in the evening than the crustaceans, while the crustaceans spent more time and visited more male flowers with pollen, than female flowers or male flowers without pollen. Many polychaetes (and crustaceans) had pollen embedded in mucilage attached to their body parts after visiting a male flower with pollen. The epitokes' mouth parts were degenerating or much damaged so that they might ingest the mucilage as an alternative source of food (polysaccharides and proteins) if they are post-reproductive and unable to ingest prey or more solid food. We think that these organisms may serve as pollinators of *T. testudinum*, a fact that has never been observed or hypothesized before and which is being investigated further this year.

Syllidae (Annelida) associated with holdfasts of *Lessonia spicata* (Laminariales, Phaeophyceae) in Chilean coasts [Poster]

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The adhesive disc of kelp species represents a refuge that provides shelter from the ocean waves; competition and the influence of predators is also lower in these habitats and therefore, they constitute secure spawning areas for invertebrates. Holdfasts of large brown algae present numerous internal cavities and, as a consequence, they are usually inhabited by a great variety of invertebrate species. In the Chilean exposed rocky coasts, *Lessonia spicata* is the dominant benthonic algae of the intertidal-subtidal zone. Many ecological studies have analyzed the invertebrate communities of these structurally complex habitats and syllid polychaetes have proven to be among the most abundant taxa. The family Syllidae is one of the most diverse families of polychaetes and numerous species have been reported to live in association with other organisms such as sponges, corals and brown algae. However, the specific species that inhabit the holdfasts have never been determined. This is the first detailed analysis of the biodiversity of syllids inhabiting holdfasts of *L. spicata*. Eleven different species of the genera *Syllis*, *Amblyosyllis*, *Salvatoria* and *Proceraea* are reported living in association with these large brown algae. One new species is described and the association between Syllidae and the epibiont protozoan *Rhabdostyla sp.* is reported for the first time.

Comparative Study of Epidermal Papillae in Polychaetes (Fam. Opheliidae, Flabelligeridae, Scalibregmatidae)

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The morphological variety of epidermis and epidermal papillae of several polychaetes species from the White Sea was studied using light and electron microscopy (SEM, TEM). The studied species are *Travisia forbesii* Johnston, 1840 (Opheliidae); *Brada inhabilis* Rathke, 1843; *Brada villosa* Rathke, 1843; *Flabelligera affinis* Sars, 1829 (Flabelligeridae); and *Scalibregma inflatum* Rathke, 1843 (Scalibregmatidae). The glandular papillae of *T. forbesii* are fully embedded in the thick cuticle, they are spherical, each papilla has a peduncle which anchors the papilla body in the rest epidermal layer. The glandular papillae of *B. inhabilis* are only partly embedded in the cuticle, their apical halves protrude out of the body wall. They are oval and have nipple-shaped tips. Each papilla has a peduncle too, but in *B. inhabilis* the peduncle consists of at least two cells around the extracellular matrix (ECM) core, while there is only one c-shaped peduncle cell around the core in *T. forbesii*. Narrow cellular processes similar to nerves run inside the papilla along the ECM core of the peduncle in both *T. forbesii* and *B. inhabilis*. The glandular papilla of *B. villosa* consists of two parts: (1) spherical papilla body with glandular cells submerged under the epidermis in the thick ECM and (2) a canal protruding out the epidermis surface. The long filliform papilla of *F. affinis* contains glandular and sensory cells. The glandular cells of *S. inflatum* are mixed with supportive cells and grouped in squamos blocks. Our comparison says for the fact that the fine structure of epidermal papillae differs within investigated families and it appears that papillae were originated in evolution separately.

Three-dimensional reconstruction of the musculature of *Cossura pygodactylata* Jones, 1956 (Cossuridae) [Poster]

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Cossuridae is a small and poorly studied group of polychaetes. Musculature of juvenile and adults of *C. pygodactylata* was studied by means of phalloidin-labelling and cLSM. The body wall contains transverse or circular muscles and in total five longitudinal muscle bands: two dorsolateral, two ventral and one ventromedial. Complete circular fibers are found only in the abdominal region and they are most developed on the border of segments. Thoracic and posterior body regions contain only transversal fibers ending near ventral longitudinal bands. Almost complete circular muscles surround the terminal part of the pygidium. Musculature of the anterior end differs in adult and juvenile worms. In juveniles the main muscles in the prostomium are rostral and dorsal longitudinal muscles arising from dorsal longitudinal bands of the body wall. In adults four longitudinal bands go to the middle of the prostomium and 5-14 paired dorso-ventral muscles arise in its distal part. Adults have a well developed circumbuccal complex and muscles of the tentacular apparatus. The branchial filament contains two longitudinal muscles that do not connect with the body musculature. The parapodial complex includes strong intersegmental and intrasegmental oblique muscles only in the thoracic region; chaetal retractors, protractors and diagonal muscles of the body wall are in all body regions. Muscle fibers are developed in dorsal and ventral mesenteries and one semi-circular fiber is developed on the border of each segment; most probably it is embedded in dissepiment. The intestine has thin circular fibers along the its full length. The dorsal blood vessel has strong muscular armature in the anterior part, which is called the heart. The heart armature consists of two layers of muscle fibers. Musculature of *C. pygodactylata* has some elements which can be homologized with other polychaetes (body wall and most parapodial muscles), and several unique features, mostly in the anterior end.

Jaw replacement in ontogeny of *Mooreonuphis stigmatis* (Poychaeta, Onuphidae) [Poster]

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Mooreonuphis stigmatis, as typical for Onuphidae (Eunicida), has a complex jaw apparatus consisting of ventral mandibles and dorsal maxillae. Mandibles continue growing throughout the life, while maxillae appear to replace each other. The replacement of maxillae during the ontogeny of *M. stigmatis* was studied by light, scanning and transmission electron microscopy. *Mooreonuphis stigmatis* has at least three consecutive sets of maxillae differing in morphology and number of plates. The first set of maxillae appears in 4-chaetiger larvae and consists of two asymmetric MX1, fused caudally in a carrier-like structure, two symmetric MX2 and two MX3. The left MX1 is much bigger than the right one with numerous small denticles along the edge; MX2 are solid with denticles; MX3 are small plates of irregular shape. The second set of maxillae appears in 13–18-chaetiger juveniles and resembles adult jaws closely. The carriers are clearly paired; MX1 are paired sickle-like slightly asymmetric structures with a few denticles; MX2 and MX3 are symmetric with denticles. The third set of maxillae is typical for Onuphidae and observed in juveniles that are released to the environment and in adults. MX1 are solid sickle-like structures with smooth edges; MX2 are massive symmetric with denticles; the left elongated MX3 is well developed and carries denticles; the right MX3 is missing; MX4 are oval plates and MX5 are small plates of irregular shape. Examination of fine morphology of maxillae in different stages showed that all the elements are formed by a layer of gnathoblasts with short microvilli. Each denticle is formed by a single gnathoblast. Replacement of the first set of maxillae by the second set occurs in non feeding larvae at a stage of 13-18 chaetigers and is not synchronized in the larvae from one hatch. The second set is replaced by the third set in the free-living juveniles.

Chrysopetalid fauna (Annelida: Phyllodocida: Chrysopetalidae) from Senghor Seamount, NE Atlantic, including description of *Arichlidon reyssi* planktonic larvae [Poster]

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Seamounts are often characterised by highly rich macro and micro invertebrate communities. Morphologically diverse and often influenced by unique hydrodynamic regimes, seamounts provide a range of habitat types allied with bathymetric gradients and typified by endemic fauna and taxa of widespread cryptic species complexes. Senghor Seamount is located in the North East Atlantic Ocean, 550 km west of Senegal in the Cape Verde Archipelago. Macrofaunal sampling was undertaken during the R/V Meteor cruise M79/3 (November, 2009). A multicorer and boxcorer were used to take macrofaunal samples from four transects (North, East, South and West), from the summit ~150 m to the base of the seamount ~3500 m. Macrofaunal communities are dominated by polychaetes at all depths. Within the top five dominant polychaete families Chrysopetalidae ranks fourth. The most numerous chrysopetalid taxon, *Arichlidon reyssi*, is most evident at summit depths (~150 m). Adults and juveniles of *Arichlidon reyssi* from Senghor and *A. reyssi* planktonic larvae from the North East Atlantic coast are compared and described in detail. Six to seven chaetiger larvae can be identified to species with examination of paleal chaetal types of the posterior-most setigers.

Does marine conservation work? Evaluating management strategies for the collection of polychaetes as bait [Poster]

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Bait collection is a globally contentious issue in many coastal areas as it removes target species (predominantly the polychaetes *Nereis virens* and *Arenicola marina* in Europe), damages benthic communities, disturbs wading birds and alters the physical characteristics of the mudflat. The UK contains a number of marine protected areas which designate the protection of inter-tidal mudflats through European and national legislation. However, collection of bait remains a public right in these areas, although it can be regulated indirectly by a variety of local authority, public health, conservation and fisheries byelaws. The project was designed to evaluate the efficacy of local management methodologies (spatial and temporal zonation and licensing) at three sites in meeting the primary objectives of the MPA (protecting habitats, biodiversity and other shore users). CCTV cameras were installed to monitor bait collection (location and time spent digging per individual) and bird activity in relation to disturbance at each site over a number of tidal cycles. Biotope mapping in conjunction with macrofauna and sediment cores taken from inside and outside the managed areas were used to assess species diversity, abundance and sediment characteristics. Pollutants were also measured in individual *N. virens*, porewater and the sediment at sites with different levels of disturbance to indicate the relationship between bait collection and bioavailability of pollutants. In addition, removal rates of the target polychaete species will inform the assessment of sustainable levels of biomass export. The results of this study will determine the management of inter-tidal soft sediment resources in the context of conservation legislation in Europe and globally.

Investigation of anterior muscle regeneration in *Eurythoe complanata* (Amphinomidae, Annelida) [Poster]

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As several other annelid taxa, fire worms (Amphinomidae) show the ability to regenerate lost body parts. Nonetheless, only a few studies investigated the regeneration of organ systems during this process. For the musculature such data lacks entirely. To receive new insights into this topic and possible patterns of muscular regeneration in annelids, we analyzed different stages of anterior regeneration in *Eurythoe complanata* using immunocytochemical staining techniques combined with subsequent confocal laser scanning microscopy (cLSM). Paying attention to different stages of anterior regeneration, we used a muscular marker (rhodamine phalloidin) to reconstruct the process of tissue and body re-formation after decapitation. The regeneration of the body musculature starts with a diffuse incorporation of muscle fibers in the blastema. During the early segmentation stage these muscle fibers organize themselves to form the longitudinal muscle strands in a horseshoe-shaped structure on the ventral side. This is followed by elongation of the muscle strands along the regenerating body. Whereas longitudinal muscles redevelop soon after decapitation, circular fibers become first visible in the growth stage. Our findings help to understand the reorganization of annelid organ systems and offer continuing comparable data basis for further investigations.

On the taxonomy, phylogeny and regenerative ability of cirratulids [Poster]

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Cirratulidae are a family of sedentary annelids with a difficult taxonomic history. Due to the diverse patterns of the reproductive biology in this group, juvenile stages have been sometimes misdescribed as different species. Moreover, heterochrony seem to have obscured the systematization of this group and molecular analyses supported that, e.g. *Ctenodrilus* can be regarded as progenetic *Dodecaceria* species. Here we use molecular systematics and morphological approaches based on immunohistochemistry to describe the phylogenetic position as well as asexual regeneration of a so far non-determinable *Cirratulus* species. Molecular barcodes suggest that this species has been found on Vancouver Island and in Brittany (France) and we use it as example to highlight problems in identification and systematization of cirratulids. Moreover, we provide a detailed study of the regeneration of different organ systems in this species, which seem to have great potential to be distributed widespread due to its asexual regeneration.

Phylogenomic analyses illuminate the base of the annelid tree

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Annelida is a highly diverse animal phylum with over 15,000 described species. Whereas the monophyly of the approximately 110 higher ranked taxa, usually classified as families is well established, relationships between those taxa remain controversial. Recent studies have investigated annelid relationships supporting two major groups, Errantia and Sedentaria, comprising the vast majority of annelid diversity, named Pleistoannelida. Interestingly, Chaetopteridae, Myzostomida, and Sipuncula grouped outside Pleistoannelida as part of the basal radiation. To investigate the positions of further annelid taxa, we additionally generated 22 transcriptomic libraries covering numerous annelid families and conducted ML analyses of a phylogenomic dataset based on Sanger ESTs and next generation sequencing mRNAseq data overall covering 79 species. After filtering for about 2340 orthologous genes, matrix reduction was accomplished using the program MARE, which resulted in three datasets with different densities. With this extended taxon and data sampling we recovered a well-supported phylogeny, which remained robust among the different datasets. Strong support was retrieved for the two major clades Errantia and Sedentaria, indicating that life-history characters are phylogenetically informative. The position of myzostomids became more stable as with an increased amount of positions Myzostomida grouped within Errantia. Moreover, we found support for Amphinomidae and Sipuncula together being the sister group to Pleistoannelida. Remarkably, Chaetopteridae, Oweniidae and Magelonidae are also well supported to branch off in the basal part of the annelid tree.

Phylogeography of *Ophryotrocha* (Dorvilleidae: Polychaeta) species from different ocean basins.

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The polychaetes from the dorvilleid genus *Ophryotrocha* were long considered to be shallow-water dwellers of organically enriched environments, but recent decades of exploration of similar habitats in the deep sea have showed that the genus is not restricted to a certain depth. New species of *Ophryotrocha* have been found at whale-falls, cold seeps and hydrothermal vents as well as in sediments beneath fish farms, in the Atlantic, Pacific and Southern Ocean and at depth spans from 20 m to below 2000 m. Phylogenetic analyses of mitochondrial genes reveal interesting and complicated relationships between the species in different ocean basins, and using GenGIS to trace the collection localities of our sequenced species on a world map, we investigate the phylogeography of the genus. Further factors to explore are depth and habitat choice in an attempt to illuminate the geographical distribution pattern.

Molecular phylogenetics of Annelida based on a supermatrix analysis of publicly available sequence data: a baseline study for the WormNet II Project

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Annelida historically comprised three main groups: Polychaeta, Oligochaeta and Hirudinea. Although monophyly of the clitellate annelids (formerly Oligochaeta and Hirudinea) is well supported by molecular and morphological characters, the status of Polychaeta—particularly with respect to Clitellata, Echiura and Sipuncula—remains uncertain. Molecular studies examining annelid-wide phylogeny have differed in placement of polychaete taxa, indicating conflict among gene trees. In addition, inconsistency in gene choice across studies of annelid groups has limited the amount of data (i.e., characters and taxa) included in phylogenetic inference. Recent developments in supermatrix and supertree analysis have made collating and analyzing large and incomplete datasets more tractable. We use a sparse supermatrix approach, combining EST data with all published sequence data as of January 2013 to examine phylogenetic relationships within Annelida. We ran the initial total of ~35,000 sequences through a series of filters to eliminate redundancies and identify rogue taxa. The development of our informatics pipeline enables evaluation of patterns within the supermatrix, including (in)congruence among genes, the effects of different alignment strategies and possible cases of contamination/misidentification/incomplete lineage sorting. Our results provide an important assessment of currently available molecular data as well as a foundation for further, more data-intensive analysis of annelid phylogenetic relationships under the aegis of the WormNet II (Assembling the Annelid Tree of Life) project.

Spatial genetic variation and population structure of three shell infesting polydorids along the southern African coast [Poster]

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Polydorid polychaetes infest commercially important shellfish such as the oyster, *Crassostrea gigas*, and can cause financial losses to the industry. South African farmers import *C. gigas* larvae from Chile, Namibia and USA, and this could potentially lead to the anthropogenic introduction of non-native polydorids into the region. Oysters are then often moved among farms which can further exacerbate spread. The most prevalent southern African polydorids infesting farmed *C. gigas* are the indigenous *Boccardia pseudonatrix*, the invasive *Polydora hoplura* and an unidentified *Polydora* species. To determine if movement of oysters facilitates spread of these worms, we compared population structure among six localities along the coastline. At each site, worms were collected from 30 farmed oysters in 2011 and 2013. In 2013, worms were also collected at six wild sites within 10km of respective farms. Haplotype networks constructed using *cytochrome b* mitochondrial data show temporal similarity in haplotypes of farmed populations of *B. pseudonatrix* and *P. hoplura* collected in different years. *Boccardia pseudonatrix* from Kleinsee and Paternoster show genetic divergence, forming distinct haplotype clades at the different sites. Haplotypes for *P. hoplura* were shared by worms from Kleinsee farm, and Knysna and Port Elizabeth wild sites. *Polydora hoplura* from Saldanha farm and wild sites showed shared haplotypes, possibly indicating exchange of larvae between sites. *Polydora* sp. from Swakopmund, Kleinsee and Paternoster farms shared a single haplotype, suggesting the species is either introduced from the same source, and or extensively moved between farms. The indigenous *B. pseudonatrix* shows genetic structure among farms, suggesting independent sources of infestation. The introduced species however, show less genetic structure, indicating movement between farms (*Polydora* sp) and between farm and wild localities (*P. hoplura*). These preliminary results suggest that caution should be exercised with the movement of oysters in southern Africa.

Phylogeny of the Polynoidae: many trees, but not on the same scale

Wilson presenting: Fauchald, Kristian¹ and Robin Wilson*²

Refer Fauchald for abstract.

Infestation of the abalone, *Haliotis discus hannai*, by the burrowing worm *Polydora* sp., in South Korea [Poster]

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Heavy infestation by burrowing worm, *Polydora* sp., has been shown to cause a reduction in the production and marketability of cultured abalone. This worm is one of the most health problems of the abalone culture in Korea recently. In Korea, the abalone, *Haliotis discus hannai* is cultured very intensive and is under constant threat of burrowing worm infestation. The present study was carried out to determine the correlation with abalone mortality and burrowing worm infestation and the morphological characteristics of this burrowing worm species. Abalone samples were collected from 11 sea-caged abalone farms which is doing shipment and investigation groups were divided to shell from live abalone and shell from dead abalone under shelter. The prevalence rate of the shell from live abalone ranged from 26 % to 93% and the shell from dead abalone under shelter ranged from 4.1% to 73.3%. At the time, mortality of abalone recorded from 14.3% to 51.4%. We found some positive correlation with abalone mortality and this burrowing worm infestation. In addition, the microscope observation revealed the morphological characteristics of each stage including the egg (egg sac), larvae and adult worm.

A web-based guide to invasive polychaetes in Australia [Poster]

Wong, Eunice*, Elena Kupriyanova and Pat Hutchings

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Ship vessel biofouling is the most important vector contributing to dispersal of marine species. Invasion of pest species threatens local marine communities and biodiversity, generating substantial losses for the aquaculture, shipping and tourism industries when native commercial species are displaced. Fouling species are common in the polychaete families of Serpulidae and Sabellidae. In addition, many species of the Spionidae family burrow into shells of commercial molluscs, and are inadvertently imported/exported to new habitats. A report commissioned by the Department of Agriculture Fisheries and Forestry estimated the cost of eradicating an invasive pest polychaete species (European fan worm) in Australia at up to Aust\$260 million. It is essential that non-indigenous species are identified and controlled before they become established in local habitats. A web-based graphic guide has been developed with the aim of assisting in the identification of potentially invasive polychaete species for use by biologists, environmental consultants, quarantine and port management officers. Distinctive features of potentially invasive species in each of these three families are illustrated with macrophotography under a dissection microscope, using the large polychaete collection at the Australian Museum and collaborating institutions. This guide is essential for marine pest monitoring and management and will be available for purchase.

Diversity and Distribution of *Eunice* (Polychaeta, Eunicidae) in China Seas [Poster]

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Eunice is one of the largest polychaete genera with around 220 species in the world. The diversity and distribution of *Eunice* in China seas are not well known. Based on material deposited in the Marine Biological Museum of the Chinese Academy of Sciences, we carried out a taxonomic study on *Eunice* from China seas and identified 17 species of *Eunice* including three newly discovered species: *E. uschakovi*, *E. hainanensis* and *E. carrerai*. The results show that the species of *Eunice* in China are mostly distributed in the coral reefs and rocks, while some species inhabit in soft substrate of shallow water. For instance, there is only one species found in gravel and rock bottoms at depths of 1–33 m from the Yellow Sea; eight species from the East China Sea, where most specimens were collected from sand and muddy sand at depths of 20–162 m. In contrast, a total of 15 species were found from the South China Sea, where 12 species inhabit coral reefs in Hong Kong, Hainan Island, Xisha Islands and Nansha Islands at depths of 2–12 m, and 3 species inhabit gravel, sand and muddy sand in the Beibu Gulf and South China Sea islands at depths of 12–91 m. We conclude that most of the *Eunice* species in China belong to typical warm water species restrictedly distributed in the South China Sea, from which some of the species spread to the East China Sea and a few species even adapt to the temperate environment in the Yellow Sea.

The first neurohistological study of the peripheral nervous system of the vestimentiferan tubeworm *Riftia pachyptila* [Poster]

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Vestimentifera is a group of peculiar tubeworms living in reduced communities, they do not have a digestive tract and their nutrition relies on chemosynthetic bacterial endosymbionts. This group has an uncertain position within the Annelida group. Study of the vestimentiferan nervous system is one of the key to the phylogenetic problem of the group. Here we present results of the first neurohistological study of vestimentiferan *Riftia pachyptila* ("Siboglinidae", Annelida) with application of the method of Golgi-silver impregnation with original modifications. We have investigated the peripheral nervous system of tentacles, vestimentum, trunk and opisthosoma. For the first time we have revealed high number of primary sensory receptor cells in the epidermis of Vestimentifera (previously described only in the epidermis of tentacles). All receptor cells are poorly differentiated: their cell shapes do not differ from the surrounding supporting epithelial cells. Axons of the receptor cells form circular and longitudinal tracts and direct to nearby parts of the CNS. There is an efferent innervation of the body wall, multicellular pyriform glands and all the muscles of the tentacular region, vestimentum, trunk and opisthosoma of Vestimentifera. The source of the efferent innervation is a subepithelial nervous plexus formed by numerous multipolar nerve cells. The multipolar cells send their processes to the muscles and multi-cellular pyriform glands. Thus, despite the fact that the CNS of Vestimentifera is intraepithelial, there is a prominent tendency of immersion of the nervous elements under the epithelium and formation of a well-developed subepithelial plexus.

Diversity of *Marphysa* (Eunicidae, polychaete) on the Australian coast

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Species of *Marphysa* are popular bait for recreational fishing in Australia. Until 10 years ago, they were all considered the same species, *Marphysa sanguinea* (Montagu, 1813). However, *M. sanguinea* is not present on the Australian coast. Instead, at least five *M. sanguinea* like species are present. Of these, two have been described as new species and at least an additional one is undescribed. Also, three other species of *Marphysa* not closely related to *M. sanguinea* have been identified from south and southeast Australian coasts. Such diversity is the result of multiple colonization of the Australian coast by different *Marphysa* lineages rather than of local diversification and is being explored using both molecular and morphological techniques. The increase in knowledge about the diversity of *Marphysa* species in Australia as well as about the history of this diversity can greatly contribute to more effective conservation measures and exploitation planning of these species by the bait industry.

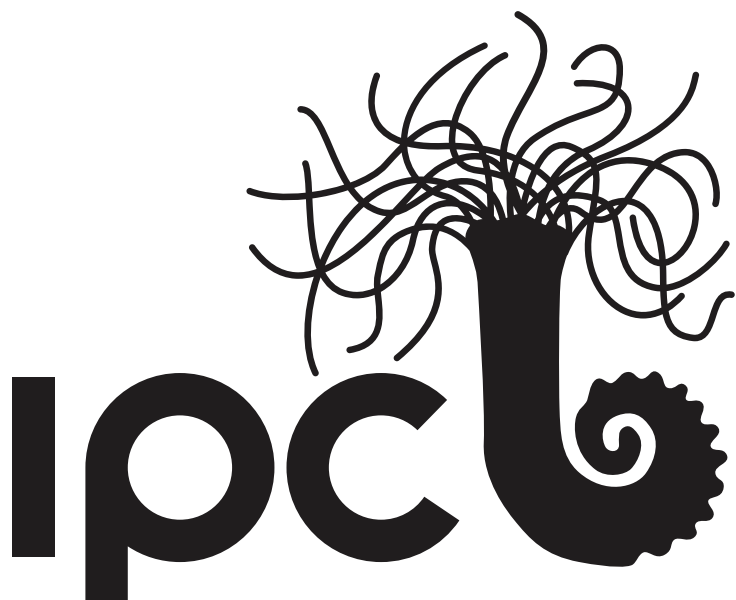
Morphology, functioning and possible homology of the anterior end of *Cossura pygodactylata* Jones, 1956 (Cossuridae)

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Cossuridae have a rather unusual type of feeding apparatus with oral tentacles attached to the dorsal wall of the buccal cavity. More than 100 juvenile and adult specimens of *C. pygodactylata* in different stages of protrusion of tentacles were studied using phalloidin-labelling and cLSM and semi-thin sectioning. Early juveniles do not possess tentacles and the circumbuccal complex. In adults 4-10 tentacles arise as paired structures. Each tentacle contains one thick and two thin longitudinal muscle filaments; thick muscle fibers from all tentacles merge forming left and right tentacle protractors rooted in dorsal longitudinal bands of the body wall. The buccal complex includes well developed upper and lower lips. They contain an outer layer of transversal fibers and the lower lip also contains inner diagonal muscles going to ventral longitudinal bands. Transversal fibers of the upper lip are attached to dorsal longitudinal bands. The lower lip is attached to the dorsal body wall by paired transversal muscles. It can be supposed that the opening of the mouth and protrusion of tentacles occurs when the dorso-ventral muscles of the upper lip and anterior unpaired fiber contract and pull the upper lip forward and up. At the same time diagonal muscles contract and pull the lower lip backward. Possibly transversal muscles of the buccal region of the body also take part in the protrusion of oral tentacles. Moving out of tentacles occurs due to relaxation of tentacle retractors. During the ontogenesis the mouth apparatus of *C. pygodactylata* with a number of dorsally rooted tentacles is formed from the soft axial proboscis of the early juvenile. A similar type of proboscis with dorsal tentacles is observed in some Opheliidae. These structures most likely evolved independently in both families. Further ultrastructural investigations and observation of feeding habits are required.



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Sydney 4-9 August 2013



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Lizard Island Polychaete Workshop

Funding for the 2013 polychaete taxonomic workshop at Lizard Island being held directly after the conference has been proudly provided by LIRRF.

This funding is part of the on-going mission of LIRRF. Most visiting research scientists who use the facilities of the Lizard Island Research Station (LIRS) are affiliated with academic or research institutions and are dependent on grants. The "bench fees" they can afford to pay are insufficient to cover LIRS operating and capital costs. The Australian Museum and LIRRF make up the gap. Every year LIRRF is having to increase the amount it collects from its donor base to



support LIRS because government funding for the Museum and academic research is in steady long-term decline.

The need to continue research at Lizard Island has never been greater. The Great Barrier Reef with its associated sand, seagrass, mangrove and inter-reefal communities is one of the largest and most diverse ecosystems on our planet. It is immensely rich in undiscovered and unexplored life forms. We need to extend our understanding of this amazing place (a) because we humans are inherently curious about other life forms, especially those as diverse as those found on the reef; (b) because research in this wonderland is yielding information of enormous practical use and potential; and (c) because the reef is at risk as a result of human activity; we need to know the scientific basis and extent of that risk and how to conserve the area for future generations.

For more details regarding the facilities available at Lizard Island check out the website <http://australianmuseum.net.au/image/Lizard-Island-Research-Station/LIRS>.

LIRS has been operating since 1973 as a facility of the Australian Museum. The Station has an extensive library and local field-guide database. The library now has over 1,600 publications based on research carried out at LIRS and the field guide database has accumulated a wealth of location-specific and species-specific information. The polychaete workshop will generate important contributions to both the library and the field guide database. It will also serve as a pilot for future workshops focusing on other taxa. This is an excellent way to accelerate the discovery and documentation of Lizard Island biodiversity.

The Foundation is very much aware that outside of the marine science community there is relatively little appreciation of the incredible number and diversity of polychaete species, their beauty, their amazing biology, their importance in the food chain, or the work they do in grooming their environment for the benefit of other life. LIRRF needs scientists and taxonomists to share the wonder, to help develop and sustain donor support. Publicity associated with the International Polychaete Conference being hosted by the Australian Museum in Sydney will assist in this regard.





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