

# National Shellfisheries Association Quarterly Newsletter



Est. 1908

2022(4)

## President's Message



As I look back on my previous contributions to the *Newsletter*, I see that climate change has been a recurring theme. Let me start this one in the same vein. I just got back from a taxing hiking trip to Marble Canyon, AZ. While there, we spent some time on the banks of the Colorado River and Lake Powell. The lake now contains about 25% of its full volume and if the water level continues to decrease there will be water shortages and rolling power blackouts all across the Southwest. You might want to reconsider retirement in Phoenix. I found some quagga mussel (*Dreissena rostriformis*) and New Zealand mud snail (*Potamopyrgus antipodarum*) shells at a boat washing station at Lee's Ferry, just upstream of the Grand Canyon. Invasive species are everywhere. Here in Louisiana, the low water level in the Mississippi River has stalled shipping and revealed several previously submerged shipwrecks. The low water has raised new discussions about the benefits and negative aspects of diversions of river water into some coastal marshes to reclaim lost land. How all of this plays out (along with sea level rise) in the next twenty or so years will be quite interesting.

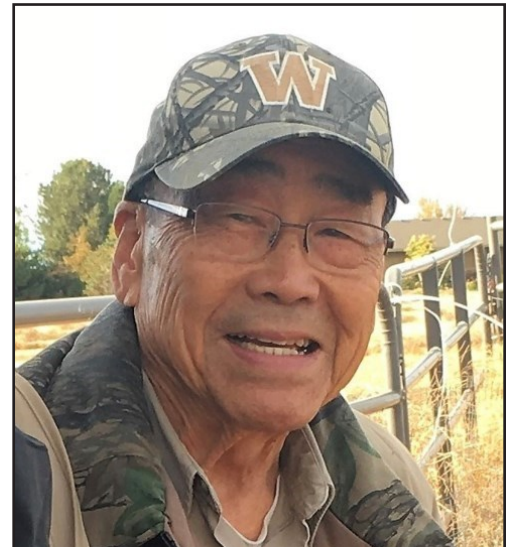
Meanwhile, the NSA moves forward. I am anticipating a fine annual meeting next March in Baltimore. It will be my final one as your President, and I would like to thank the other officers, members of the Executive Committee, the staff, and our membership for the privilege of serving you. The Association will continue to be in capable hands when the newly-elected officers assume their duties. The staff of the NSA deserves special recognition in that they have managed rescheduling of both the Baltimore and Charlotte (2024) meetings with aplomb. The *JSR* and *Newsletter* were delivered on schedule, as well. Time is growing short for the submission of abstracts for the Baltimore meeting (deadline is 12/15) and you can check out the schedule of special paper sessions and the plenary speakers on our website. There will also be a Scallop Gallop at the meeting, so bring your running or walking shoes. Remember to renew your membership for the year ahead, and round up items for the auction.

Finally, the Awards Committee is exasperated with the paucity of applications from students for the awards that the Association funds. The process is simple, and the NSA has always been extremely supportive of students. I have, however, heard some comments about re-directing some of the funds for the awards since there seems to be so little interest. The ball is in your court, people. With that, I have to get to work on my abstract, and I will see everyone in Baltimore.

**Lewis Deaton, President**

## Kenneth K. Chew

October 29, 1933 – September 24, 2022



An *In Memoriam* will be published in a future issue of the *Journal of Shellfish Research*.

<https://www.dignitymemorial.com/obituaries/seattle-wa/kenneth-chew-10945726>

### In this issue:

- **Abstract Deadline: December 15, 2022**
- **New On-line Oyster Aquaculture Business Planning Tool**
- ***Nautilus* Population Research**
- **Shellfish Donations Needed**
- **Probiotics & Larval Oyster Survival**

## *A Call for Action from the NSA Student Endowment Fund Committee*

As part of the 115<sup>th</sup> Annual meeting of the National Shellfisheries Association, to be held in Baltimore, Maryland, from March 26 – March 30, 2023, the NSA Student Endowment Fund (SEF) Committee is supporting great opportunities for graduate student members of the NSA that plan to present their original research.

### **Student Travel Awards**

To assist with the costs of attending this meeting, the SEF provides a lottery-based system that offers waivers for either registration costs or accommodation costs. The application deadline to participate is **December 15, 2022** and the application form is available at: [https://shellfish.memberclicks.net/assets/docs/2023sefapplication\\_word.pdf](https://shellfish.memberclicks.net/assets/docs/2023sefapplication_word.pdf)

### **Student Presentation Awards**

The NSA will also be adjudicating competitions for both its Thurlow C. Nelson (Outstanding Oral) and Gordon Gunter (Outstanding Poster) Presentation Awards. The winner/s of these awards will receive two years membership in the NSA. Graduate students wishing to participate in these competitions should do the follow:

- Submit their abstracts by the conference deadline of **December 15, 2022**
- Email Peter Kingsley-Smith ([kingsleysmithp@dnr.sc.gov](mailto:kingsleysmithp@dnr.sc.gov)) indicating their wish to compete for one of these awards no later than **December 31, 2022**. You must include your name, presentation type (oral or poster), and presentation title
- Ensure current membership status by either joining the NSA or renewing their student membership no later than **December 31, 2022**

More information about the travel and presentation awards can be found at: <https://www.shellfish.org/sef-student-presentation-and-travel-awards>

**Calling judges!** Finally, if you are willing to help judge oral and/or poster presentations by graduate students wishing to compete for the Nelson and/or Gunter Awards, please contact Peter at the email address above.

**Ballots are on their way.  
Watch your mailbox!**

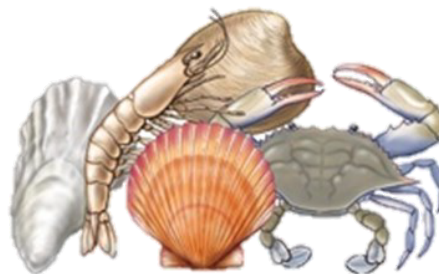


## **SHELLFISH DONATIONS NEEDED!**

Plans are well underway for the 115<sup>th</sup> meeting in Baltimore and that means we are soliciting seafood donations for the opening President's Reception – shellfish, crab, shrimp. Whole and shucked product is most welcome. A raw bar may be possible where we can feature individual growers. If not, the hotel chef will perform his magic. If necessary, the conference can cover the cost of shipping product to Baltimore. A big turnout is expected and lots of shellfish needed, so please consider sending your best! All donations support a successful meeting and all donors will be recognized.



Contact Sandy Shumway for details  
([Sandra.shumway@uconn.edu](mailto:Sandra.shumway@uconn.edu)).



## **NEW PAID LIFE MEMBER**

Thank you, Tony D'Andrea

Log-in to renew and update your membership status ([www.shellfish.org](http://www.shellfish.org)), or contact the Secretariat with any questions ([secretariat@shellfish.org](mailto:secretariat@shellfish.org))

# MEETING REMINDERS



Please consider contributing a film for our NSA at the MOVIES - these presentations will be shown continuously throughout the conference, so you can stop in any time you have a chance. Questions: Eric Heupel (eric@heupel.com)

## BOOK YOUR HOTEL ROOM EARLY:

<https://book.passkey.com/e/50358179>.

PLEASE STAY AT THE MARRIOTT - THE CONFERENCE HOTEL.  
The conference rate expires on March 3, 2023.

## REGISTER NOW FOR THE MEETING:

<https://shellfish.memberclicks.net/annual-meeting---registration>

Early-bird rates expire on January 18, 2023.

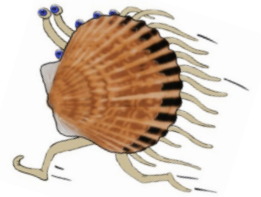
The **ABSTRACT DEADLINE is DECEMBER 15, 2022**. Submit your abstract now ([www.shellfish.org](http://www.shellfish.org))!

**STUDENTS:** Remember to enter the lottery for room and registration waivers.

**DEADLINE is DECEMBER 15, 2022**. Download your application now:

<https://www.shellfish.org/sef-student-presentation-and-travel-awards>.

Questions: Missy Southworth (melsouth@vims.edu)



The **SCALLOP GALLOP** will take place under the watchful eye of race organizer President Deaton. Watch for details.

Don't forget your **AUCTION** items. Bring them to the meeting or, if you cannot attend, send ahead to Sandy Shumway (address on back of the *Newsletter*) before March 15, 2023.

## Sneak Peak of Auction Gems



Shower curtain



Bring your truck!

## Are Nautiluses Increasing in Population as Commercially Fished Teleost and Cartilaginous Fish Disappear from the Mesophotic Zone?

Six years ago, the important American journal *Science* printed a surprising story: “World octopus and squid populations are booming (<https://www.science.org/content/article/world-octopus-and-squid-populations-are-booming>). The first paragraph of this counterintuitive report (surprising in that any wild marine populations are increasing in light of climate change, overfishing, and ocean acidification) even analogized the world’s cephalopod populations to those wild animals that have not only survived, but thrived amid human civilization and cities, such as rats, racoons, coyotes, and pigeons. Reports from many sites of the global ocean report, in the six years since this surprise, indicate that the numbers of squid, cuttlefish, and octopus continue to enlarge. One reason for this success, according to the 2016 report, was the short lifespan of cephalopods, noting: “Like rodents, cephalopods are highly adaptable to changes in their environment, researchers say—in large part because most species live just one or two years, dying as soon as they give birth. That allows them to respond rapidly to disturbance.”

So much for the “dibranchiate” cephalopods? How about those with four gills rather than two, and hard shells on their backs? What about the cephalopods that are not rapid reproducers with short lives, such as the nautiloids? Enter new observations of the longest lived of cephalopods: the species of *Nautilus* and *Allonautilus*.



A chambered nautilus (*Nautilus pompilius*) floats next to a fuzzy nautilus (*Allonautilus scrobiculatus*). Photo credit: Peter Ward.

nautiluses and allonautiluses that differ markedly from all other cephalopods, they do not die after first mating, but live at least five more years – and perhaps 50 more years. Like so many larger animals of the Mesophotic Zone (200-800 m), they grow slowly, live a long time, but produce few young each year.

It has not been the search for their flesh that has imperiled the nautiluses and allonautiluses with the rise of human population globally, but the desire for their gorgeous shells. The Philippines and Indonesia have for close to a century been the centers of the nautilus shell trade, and their populations have indeed crashed. But elsewhere, our recent study of nautilus populations suggests a different story. They may be increasing in numbers.

This is *perhaps* in response to their finally having received international protection through conservation laws (CITES protection in 2017, and US Endangered Species Act soon thereafter). While nautilus numbers remained low in the shell collection areas during our last surveys there (2014), elsewhere, not only are nautilus numbers equivalent to those of decades past, but seemingly increasing. Unfortunately, the same cannot be said for the allonautiluses. A genus whose shells sell for up to US\$1000 per shell does not

### *Nautilus: the Most Well-known Mysterious Animal*

The nautilus is called *kalopeu* in the local Titan language of Papua New Guinea.

Nautilus shells can sell for US \$1,000 on eBay. Between 2005 and 2014, trade data collected by the US Fish and Wildlife Service indicated that more than 100,000 whole nautilus shells and 800,000 parts were imported into the United States alone.

The earliest nautiloids had straight, conical shells, but they soon evolved the coiled spiral with interconnected internal chambers seen in nautiluses today. In their current incarnation, they’ve cruised the oceans for at least 100 million years.

While octopuses, cuttlefish, and squid die young after laying a thousand eggs, nautiluses don’t mate until they are at least 10 years old, then lay a handful of eggs that take a year to hatch.

In 2015, researchers from Australia and the United States came to study the nautilus in Ndrova, Papua New Guinea. Ward had last visited in 1984, when he and a collaborator were among the first people to examine a live fuzzy nautilus, a species belonging to a new genus that they later named *Allonautilus scrobiculatus*. Ward and his colleagues had come back to see if the fuzzy nautilus and the better-known chambered nautilus (*Nautilus pompilius*) were still there, and to try out some new research tools.

Ward and his team of researchers attached battery-powered transmitters to several nautiluses to learn more about the animal’s behavior and the surrounding water temperature. Since the two species coexist, the experiment was also a chance to investigate differences in their behavior.

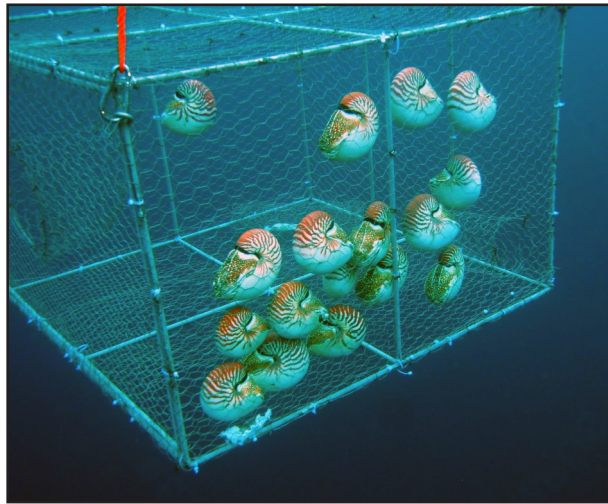
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face a viable future as long as humans with a “collecting” gene require molluscs by the billions for shell collections.

Nautilus and allonautilus are drawn to baited traps, and their keen sense of chemoreception can draw them from even kilometers away. Trap yields have long been the only means of assessing population numbers, and these in reality were simply measures of trapping effectiveness, perhaps as much due to trap design, bait choice, and the degree of bait scent dispersal around the traps, where low but constant current areas bring in more animals than either high currents, where scent molecules disperse, or no current, where only small areas around the traps draw in specimens. But in the early twenty first century, Australians began to use BRUVS (Baited Remote Underwater Video Systems) to document population numbers of many bait seeking animals – including nautilus.

Animals drawn to traps, but not entering them, could not be observed or their numbers tallied. We adapted the Australian systems and proceeded to seek to understand population numbers of these archaic animals across the vast tropical Pacific Ocean regions they occupy. So far, we have been to the Philippines, Australia, Fiji, Samoa, Palau, Vanuatu, and multiple sites across the vast expanse of Papua New Guinea.



Nautilus trap. Kavieng, Papua New Guinea, 2022. Photo credit: Peter Ward.

From 2011 to this year, we deployed these deep-water video systems, which can record the comings and goings of animals drawn to bait for up to 15 hours, thanks to the improvements in video recorder cards as well as the giant rechargeable batteries powering the strong lights pointed at the bait. The animals that made their way to bait varied. Many kinds of arthropods, with shrimp most abundantly, but strange, deep-water fish and sharks were observed. But among the most abundant visitors were nautilus, and in Papua New Guinea, the much rarer and more elusive allonautilus as well.

My most recent trips, separate voyages through COVID restrictions, flying the newly-narrowed seats of current air travel, to Fiji and New Ireland, and Papua New Guinea, both in 2022, lent optimism for the state of health of chambered cephalopod populations. But seeing them emerging out of the dark into the hard light of the video systems brought back images from my other job: paleontologist. It does not take much imagination to envision the time immediately after the Permian Extinction, the Triassic mass extinction, and the Cretaceous mass extinction, among the first and most abundant fossils were shelled cephalopods, including now extinct nautilus. We may, at these depths, be witnessing yet again the ascendance of shelled cephalopods in the immediate aftermath of mass extinction.

**Peter Ward, Professor of Biology  
University of Washington**

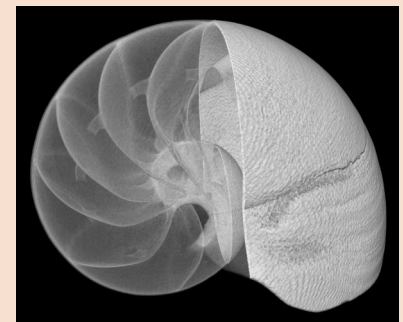
Ward is also analyzing the composition of nautilus shells to track climbing temperatures in the deep sea, and looking to nautilus behavior to predict how these changes might affect the animals.

Ward believes nautilus may already be seeking refuge in cooler, deeper waters to cope. Below 800 meters, the pressure is enough to make their shells implode. So far, though, around Manus, the nautilus seem to be adapting.

Back in the lab in Seattle, Washington, Ward analyzed his collection of *Ndroya* nautilus shells—some from 1984, the shell fragments from 2015, and a whole fuzzy nautilus shell he bought in a curio shop in Adelaide, Australia.

With a whole shell, you can take a chunk of each septum—the thin partition between the internal chambers—and the oxygen isotopes trapped within provide a record of the average sea temperature over the month or so the chamber took to form. “So a shell is a 20- or 25-year record of temperature,” Ward says—almost like tree rings. Meanwhile, the tiny samples taken from the shells of 13 living animals in 2015, each provide a single data point—a snapshot of the sea temperature when their last chamber grew.

The results showed the 1975 animals inhabited waters averaging between 12-14°C, while those from 1984 and 2015 lived in temperatures of around 16°C. Ward was surprised the shells offered no evidence of warming water over those three decades, but says it is possible the nautilus simply moved deeper to stay cool. Since the transmitters the team attached to the animals in 2015 record water temperature and depth, in future versions of the experiment the living nautilus may reveal with more certainty how their home might be changing.



CT scan of a nautilus shell. Photo credit: Peter Ward

Abstracted from *Hakai Magazine*, July 5, 2022

# ***Oregon State University Research Discovers Probiotic Combination Drastically Improves Larval Oyster Survival***

***By: Molly Rosbach, Oregon State University***

The survival rates of oyster larvae were significantly boosted by treating them with specific combinations of probiotics, Oregon State University researchers found in a recent study. With only a one-time application, the probiotics also boosted larval growth, metamorphosis and settlement, meaning that in addition to more oysters surviving past the larvae stage, they also fared better at transitioning to juveniles and anchoring to shells and other surfaces. The findings could be a major boon to oyster farms where pathogens can kill off a whole season's worth of larvae, costing hundreds of thousands of dollars at a time.

"The results definitely exceeded our expectations," said Carla Schubiger, project leader and co-author on the study and an Assistant Professor in the OSU Carlson College of Veterinary Medicine. "Just a 40-50% improvement in larval survival would be huge, but here we have over 80% increased survival at times. That's very, very significant for the industry. Antibiotics are not allowed in hatcheries, so this will be the first tool they can actually use to increase their production."

Shellfish are big business in Oregon, and oyster sales account for close to \$5 million annually, according to a 2010 report from the Pacific Coast Shellfish Growers Association. In oysters, as in humans, the organism's overall function depends on help from good bacteria living within the host's gastrointestinal tract. The goal of the study was to pinpoint which types of these beneficial bacteria were best at fighting off pathogenic bacteria that can kill oyster larvae.



*Photo credit: Oregon State University*

The pathogen, *Vibrio coralliilyticus*, is common in marine aquaculture, so oyster farms need a cost-effective way to defend against it. The OSU researchers grew several strains of naturally occurring bacteria and screened them for their ability to fend off *V. coralliilyticus* under laboratory conditions. They then selected the strains that performed best against the pathogenic bacteria.

The team grew larvae in water conditions comparable to those used by oyster farms. When the larvae were 24 hours old, they were treated with the different strains of cultivated probiotics, first individually, and then in combinations of the most promising strains. At 48 hours old, the larvae were exposed to *V. coralliilyticus*.

The results were striking. Compared with the untreated control group, four of the individual probiotic strains resulted in an average increased survival rate of 68% or better, including one strain that increased survival by 99.7%. Researchers then treated

larvae with combinations of the most promising individual strains. Different two- and three-strain combinations increased larval survival rates by up to 86%.

Fourteen to 16 days later, the probiotics appeared to still have an effect, with treated larvae displaying significantly higher rates of natural settlement and metamorphosis into adolescent oyster spat, along with significantly larger shells than the untreated larvae produced.

The exact mechanism that aided the oysters is unknown, but the improved growth and settlement rates were an unexpected perk on top of the improved survival rates, Schubiger said. "It's possible that we influenced something very early in their development, like the immune response, to make them do better later in life," she said.

The research team envisions applying the probiotic treatment as freeze-dried material that can be sprinkled into the larval spawning bucket. Treating the larvae so early in their life cycle means they only need a very small amount of material, making the probiotic treatment more cost-effective.

The next steps will be to test a combination with a fourth probiotic and to work on growing the probiotic bacteria alongside the microalgae that serve as the initial food source for the larvae, so the treatment could be integrated into their spawning process from the very beginning, Schubiger said.

The research team included lead author David Madison, formerly of the OSU College of Agricultural Sciences, along with co-authors Spencer Lunda (Carlson College of Veterinary Medicine), Ryan Mueller (College of Science), and Chris Langdon (College of Agriculture Sciences). The study was funded by a National Oceanic and Atmospheric Administration National Sea Grant award and a NOAA Saltonstall-Kennedy grant.

## New Online Oyster Aquaculture Business Planning Tool from UMD Extension

The oyster aquaculture industry has grown steadily in recent years. States, like Maryland, that revised their leasing program to encourage investment have seen significant expansion. Advances in hatchery technology, breeding programs, field production, and marketing helped that occur. A critical part of starting a new business, or expanding an existing one, is to understand economic forces that can make or break the enterprise. More businesses fail because of poor business practices than any other cause. Critically analyzing these forces at the outset can help make it a success.

We are proud to announce the rollout of the new University of Maryland Extension Online Economic Spreadsheet Tool (OEST), thanks to funding from the National Sea Grant Office and Maryland Sea Grant. This tool allows users to build a complete and robust business plan forecast by entering production cost and revenue assumptions in an online program that runs a Monte Carlo simulation to predict a range of outcomes. Monte Carlo simulations randomly pick values from entered ranges for each iteration of the simulation and consider potential outcomes for good and bad production years. At the conclusion of the simulation, mean values are computed for program outputs to provide the user with minimum, maximum, and most likely outcomes. In this case, the tool will provide reports which can be used for business planning or applying for farm financing.

This tool will be useful for anyone planning a new oyster aquaculture business, considering expanding an existing one, or comparing different financial assumptions of a currently operating business for both on-bottom and water column applications. The tool contains the option to input financing terms for up to three separate loans allowing farmers to evaluate the impact of borrowing money for their operation. For those users in Maryland, the tool includes the option to include up to three loans from the [MARBIDCO Shellfish Aquaculture Loan Fund](#), a state program that has been highly useful to growing the industry.

Once the OEST input fields are filled and the simulation is run, several useful reports are generated. The financial summary report displays the net present value (NPV) of the operation along with an internal rate of return (IRR) for funds contributed to the project by the user. In addition, the OEST will predict annual cash flow and income statements for a 10-year time frame. The 10-year period allows time for multiple crops to reach harvest, providing a more accurate forecast of long-term financial feasibility. Reports can be downloaded in a variety of common file formats and include graphics to help interpret the results.

The privacy of the users is protected. The tool does not collect or share any information with the University of Maryland or any other entity. Users may choose to save the model information to their personal computer drive, to be shared by the user, or reloaded into the tool at a later time.

It is hopeful this tool is valuable for oyster farmers and we want to know how it is helping the industry! Thus, before the tool page loads, users will be asked to participate in an optional follow-up survey for the University of Maryland Extension Program to evaluate the effectiveness of the tool and gather user feedback for future improvements. Please consider participating in the survey, as stakeholder feedback is critical for Extension faculty to improve programming and further develop new tools.

To access the tool and basic instructions, visit: <https://go.umd.edu/aquaculturebusiness>. Select 'model' to open the OEST tool.

**Matt Parker, University of Maryland Extension**  
[mparke11@umd.edu](mailto:mparke11@umd.edu)

The screenshot shows the 'Model Configuration' page for the OEST tool. It features a navigation bar at the top with 'UNIVERSITY OF MARYLAND' and links for 'ADMISSIONS', 'COLLEGES & SCHOOLS', 'NEWS', 'EVENTS', and 'MAKE A GIFT'. Below the navigation bar are links for 'Home', 'Model', 'Simulation', 'Reports', and 'Advanced Configuration'. The main content area is titled 'Model Configuration' and includes a dropdown menu for 'Water Column'. A section titled 'Operating cost Assumptions' contains a grid of input fields for various financial parameters. At the bottom right, there are 'Update model' and 'Clear data section' buttons.

Parameter	Value	Unit/Label
Market-Size Oysters Per Bushel	275	oyster per bushel
Retail Containers for Half-Shell Market	100	count box
Cost Of Retail Containers for Half-Shell Market	\$ 1	\$ per box
General Labor Rate	\$ 12	per hour
Percent of General Labor in Year 1	50%	
Percent of General Labor in Year 2	100%	
Supervisory/Owner Labor Rate	\$ 24	per hour
Supervisory/Owner Operator Labor Hours per Week	40	hours per week
Supervisory/Owner Operator Weeks per Year	50	
Unemployment Insurance Tax	2.6%	% of payroll
Federal Insurance Contributions Act (FICA)	6.2%	% of payroll
Workman's Comp	5%	% of payroll
General Liability Insurance	\$ 1,000	per \$150,000 in rev per year
Boat Insurance	\$ 600	\$ per boat per year
Auto Insurance	\$ 683	\$ per auto per year
Repairs And Maintenance	1%	% of variable
Overhead	3%	% of variable costs
Cash on hand to contribute to business	\$ 200,000	
Yearly Fees	\$ 95	
Interest Rate for opportunity costs	2.88%	

Figure 2: Example of financial term inputs used in the OEST model. Credit: Matt Parker

## NSA Pacific Coast Section News

Hello from the West coast, where October felt a lot like August this year. We held the 76<sup>th</sup> Annual Shellfish Conference of the National Shellfisheries Association Pacific Coast Section (NSA-PCS), September 20-22, 2022, in conjunction with the Pacific Coast Shellfish Growers Association (PCSGA). The conference was in eastern Washington at the Wenatchee Convention Center in the heart of apple country. This conference was in-person and had about 275 people registered. It was so nice to see everyone and the conference was a success.

The conference included 48 oral presentations across 13 sessions, and five workshops: Shellfish Producer BMPs and IPM: A coordinated Update; Finding Yourself in Furthering Justice, Equity, Diversity, and Inclusion (JEDI); How Has Climate Change Impacted Your Business; 2021 Atmospheric Heatwave Impacts on Intertidal Shellfish and Implications for the Future; and Biosecurity: Planning for the Worst – Potential West Coast OsHV-1 outbreak. There were 18 vendors present at the tradeshow with the latest technologies in aquaculture.

This year's conference keynote speaker was Dr. Yoshitaka Ota from the University of Washington School of Marine and Environmental Affairs, who gave a talk titled, "Ocean Equity – to protect oceans, we need to protect those who live within nature". The lunchtime speaker was author David B. Williams who talked about his book, *Homewaters: A Human and Natural History of Puget Sound*. Both speakers were very enjoyable. This year's *John Lentz Profiles in Innovation Speaker Series* was a social hour in memory of the past PCSGA president and friend, John Lentz of Chelsea Farms.

The NSA-PCS provided funding to support the participation of students at the conference. Student participation was low this year compared to conferences in the past. The 2022 NSA-PCS Best Student Presentation award was a tie between Miranda Roethler (University of Washington) and her talk entitled "Effects of Climate Change on Bull Kelp Photophysiology" and Henry Fleener (Oregon State University) and his talk entitled "Optimizing a Flow-through System for Rearing Bivalve Larvae". Congratulations to Miranda and Henry. All the students did a wonderful job presenting their research and we look forward to hearing more about it next year. Additional support for students to attend the meeting was also generously provided by Arcadia Point Seafoods, Brenner Oyster, Chelsea Farms, Chuckanut Shellfish, Pacific Shellfish Institute, Rock Point Oyster Company, LLC, SEAPA, oceanfarmr, Jorstad Creek Oyster Co., Seattle Shellfish, Inc., Whiskey Creek Shellfish Hatchery, and National Fish and Oyster. A big shoutout to all the sponsors and the students. I encourage students to think about presenting their research next year and reach out if you have any questions.

The NSA-PCS auction fundraising was done as a hybrid this year, there was an online bidding format and with the auction items present at the conference. A big 'thank you' to NSA-PCS board members Katie Houle (Pacific Shellfish Institute) and Annie Raymond (Jamestown S'Klallam Tribe) for organizing both the online auction and items showcased at the conference. The auction was successful and lots of fun. Proceeds from the auction, individual donations, the student fundraiser, and registration fees totaled more than \$10,000 this year. This will help the NSA-PCS sponsor more students to attend future meetings. Thank you to all who donated, participated, and ran those bids up.

The annual business meeting was held during the 2022 conference. There were 20 NSA-PCS members attending the annual board meeting. Elections were held and a new Treasurer and Member-at-Large were voted in: welcome Laura Spencer and Derek Epps. The current board is made up of the following: Chair: Sandy Zeiner (Northwest Indian Fisheries Commission); Vice Chair: Jodie Toft (Puget Sound Restoration Fund); Secretary: Annie Raymond (Jamestown S'Klallam Tribe); Treasurer: Laura Spencer (Washington University); and Members-at-Large: (1) Margaret Homerding (Nisqually Indian Tribe) (2) Derek Epps (Seattle Shellfish Inc.), and (3) Matt Nelson (Swinomish Indian Tribal Community).

The NSA-PCS Executive Committee held a Zoom meeting on February 14, 2022 to discuss the budget, student volunteers, and the 2022 conference logistics. A post conference wrap-up session with the PCSGA was held on October 10, 2022, by Zoom. The 2023 Conference Planning Committee will start meeting in January to plan the 77<sup>th</sup> Annual Shellfish Conference (NSA-PCS/PCSGA joint meeting) to be held September 18-21, 2023, in Seaside Oregon at the Seaside Convention Center. The call for presentations will open April 1, 2023 with titles due May 1, 2023, and full abstracts by June 30, 2023. You can find more information at: <https://pcsga.org/annual-conference> or follow us on Facebook.

**Sandy Zeiner**  
**Pacific Coast Section Chair**





## Recruits Corner

Fellow Recruits,

We hope you've had an enjoyable fall and are beginning to look forward to heading to Baltimore for the NSA 115th Annual Meeting!



The meeting will be held at the Baltimore Marriott Inner Harbor at Camden Yards in Baltimore, Maryland, from March 26 - 30, 2023. In case you haven't submitted yours yet, the abstract deadline is December 15th. Students presenting at the conference are also strongly encouraged to apply for Student Endowment Fund Travel Awards. Travel awards are given in the form of either shared lodging or registration waivers and are awarded based on a lottery system. The deadline to apply is December 15th. Students who receive a Travel Award will be expected to volunteer their time during the conference to help with registration, leading talks, or staffing the NSA sales booth. For more information on how to apply check out the NSA website: <https://www.shellfish.org/sef-student-presentation-and-travel-awards>

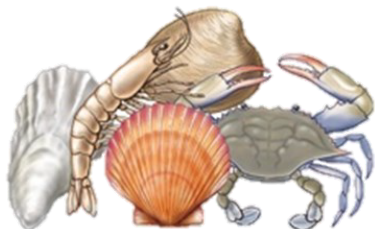
Early-bird registration for the Annual Meeting ends January 18th, so make sure to register by then to take advantage of the discounted registration price. On that note, discounts are also available for members of NSA, so make sure to renew your NSA student membership! Memberships run the calendar year and will expire on December 31st.



As always, there will be fun events and activities at the meeting that are just for students. The schedule is still being ironed out but we anticipate bringing back crowd favorite events such as the Mentor-Mentee Breakfast and a student field trip, so watch your inbox and the Student Recruits Facebook page (<https://www.facebook.com/groups/2216454881732029>) for more details to come!

Please feel free to contact your Recruit Co-chairs with ideas, questions, or concerns!

**Hannah and Fiona**  
hannah.i.collins@uconn.edu  
fcboard@uw.edu



## Preparing Your Poster

Presenting a poster may seem less prestigious than giving an oral presentation, but it is a great opportunity for one-on-one interaction with colleagues to discuss your research.



Bright colors and flashy font styles can be distracting to viewers. Focus on the information that is essential to understanding your methods, results, and conclusions.

Use large, clear figures, and brief bullet-pointed text.

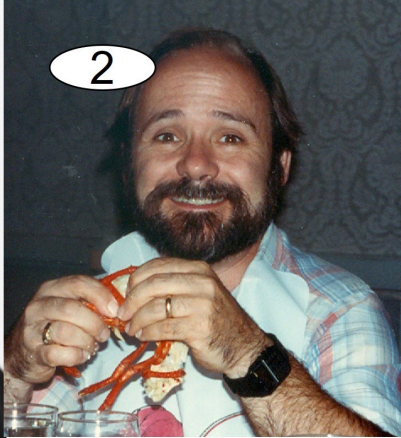
Practice your poster presentation in front of colleagues and friends just as you would an oral presentation.

Read the entire *Science* article:  
<https://www.science.org/doi/10.1126/science.366.6466.766>



**23<sup>RD</sup> INTERNATIONAL  
PECTINID WORKSHOP**  
APRIL 19 - 25 2023  
DOUGLAS, ISLE OF MAN

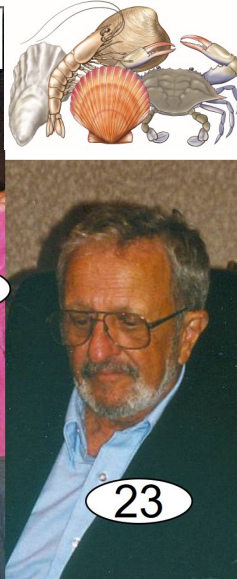
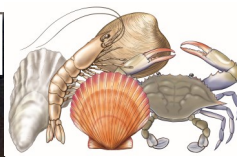
<http://www.internationalpectinidworkshop.org>



First and most correct identifications by Dec 31<sup>st</sup> receives free drink tickets in Baltimore. Send responses to [sandra.shumway@uconn.edu](mailto:sandra.shumway@uconn.edu)



Bonus: what is the common denominator?



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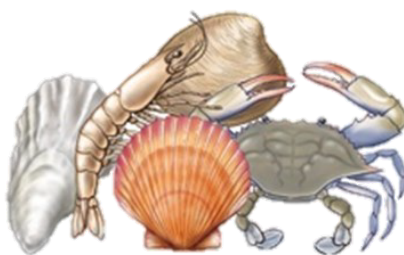
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*Forwarding Service Requested*

## RENEW YOUR DUES

Be sure to review your membership profile. Contact [secretariat@shellfish.org](mailto:secretariat@shellfish.org) with questions.

[www.shellfish.org](http://www.shellfish.org)

### Upcoming Events

**42<sup>nd</sup> Milford Aquaculture Seminar:** Jan. 9-11, 2023. Shelton, Connecticut. For more information: <https://www.fisheries.noaa.gov/new-england-mid-atlantic/aquaculture/milford-aquaculture-seminar>

**Aquaculture America 2023:** Feb. 23-26, 2023. New Orleans, Louisiana. For more information: [www.was.org](http://www.was.org)

**11<sup>th</sup> International Abalone Symposium:** Feb. 27-Mar. 2, 2023. Auckland, New Zealand. For more information: <https://www.internationalabalonesociety.net>

**Conference for Shellfish Growers:** Mar. 6-7, 2023. Washington State. For more information: <https://wsg.washington.edu/>

**115<sup>th</sup> NSA Annual Meeting:** Mar. 26-30, 2023. Baltimore, Maryland. For more information: [www.shellfish.org](http://www.shellfish.org)

**23<sup>rd</sup> International Pectinid Workshop:** Apr. 19-25, 2023. Douglas, Isle of Man. For more information: <https://internationalpectinidworkshop.org/>

**77<sup>th</sup> Annual Shellfish Conference (NSA-PCS/PCSGA):** Sept. 18-21, 2023. Seaside, Oregon. For more information: <https://pcsga.org/annual-conference>

**116<sup>th</sup> NSA Annual Meeting:** Mar. 17-21, 2024. Charlotte, North Carolina. For more information: [www.shellfish.org](http://www.shellfish.org)

**Aquaculture 2025 (Triennial):** Mar. 5-9, 2025. New Orleans, Louisiana. For more information: [www.was.org](http://www.was.org)

If you would like to announce a meeting, conference, workshop, or publication of interest to NSA members, please contact the *QNL* Editor, Steven Allen ([sallen@bowdoin.edu](mailto:sallen@bowdoin.edu)).