

D. RABERN SIMMONS, PH.D.
Department of Ecology and Evolutionary Biology
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RESEARCH INTERESTS

My primary research interest is the molecular systematics of the Kingdom Fungi, specifically the early diverging lineages (Chytridiomycota, Blastocladiomycota, Rozellomycota), but also including various insect-associated (Ascomycota, Basidiomycota) and entomopathogenic (Ascomycota) fungi. I isolate fungi into pure cultures, from which I amplify molecular sequence data and observe developmental morphology by light microscopy, along with comparisons of ultrastructural features by transmission electron microscopy for selected taxa. I have used molecular phylogenies augmented with morphological characters to revise the taxonomy of fungal organisms to reflect a more natural phylogenetic history than classical systems, which relied on morphology of thalli on natural substrates as detected by light microscopy. I have increased knowledge of the diversity of fungi by describing new taxa and have characterized a culture collection of the Chytridiomycota and Blastocladiomycota using an Oxford Nanopore Technologies device and protocols.

EDUCATION

Ph.D. in Biological Sciences earned May 2012, GPA 3.89
University of Maine, Orono, ME, USA

M.S. in Botany and Plant Pathology earned May 2007, GPA 3.85
University of Maine, Orono, ME, USA

B.S. in Biological Sciences earned May 2004, GPA 3.63
University of Virginia's College at Wise, Wise, VA, USA

PROFESSIONAL EXPERIENCE

Postdoctoral Fellow, Jan 2017 – Present
Ecology and Evolutionary Biology, College of Literature, Science, and the Arts,
University of Michigan, Ann Arbor, MI, USA
Supervisor: Dr. Timothy Y. James
Systematics of the Chytridiomycota, Blastocladiomycota, and Rozellomycota, and curation, cryopreservation, utilization, and molecular characterization of the Collection of Zoosporic Eufungi at the University of Michigan (CZEUM)

Postdoctoral Research Associate, Aug 2016 – Nov 2016
School of Biology & Ecology, University of Maine, Orono, ME, USA
Supervisors: Drs. Frank Drummond, Eleanor Groden, Joyce E. Longcore
Assessment of microsatellite markers in *Beauveria bassiana* and *Vaccinium angustifolium*, and molecular systematics of the Cladochytriales (Chytridiomycetes)

Postdoctoral Research Associate, Oct 2014 – Aug 2016

School of Forest Resources and Conservation, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL, USA

Supervisor: Dr. Jiri Hulcr

Novel interaction of a basidiomycetous mycosymbiont with wood boring ambrosia beetles, description of a new species in Polyporales, and systematics of Ophiostomatales fungi associated with wood boring beetles

Postdoctoral Fellow & Program Director, Sep 2013 – Oct 2014

School of Biology & Ecology, University of Maine, Orono, ME, USA

Co-mentors: Dr. Eleanor Groden (University of Maine)

Dr. Richard A. Humber (USDA-ARS Collection of Entomopathogenic Fungal Cultures)

Systematics of *Hirsutella*, a fungal genus of potential insect biocontrol agents, and teaching a systematic approach to identify plant pests

Postdoctoral Research Associate, May 2012 – Aug 2013

School of Biology & Ecology, University of Maine, Orono, ME, USA

Supervisor: Dr. Eleanor Groden

Description of a novel *Ophiocordyceps* species (Ophiocordycipitaceae; Hypocreales) infecting invasive *Myrmica rubra* in Maine

Ph.D. Student, May 2007 – May 2012

School of Biology & Ecology, University of Maine, Orono, ME, USA

Advisor: Dr. Joyce E. Longcore

Systematics of the Powellomycetaceae fam. nov. and the detection of spizellomycetalean chytrids from manure and soil substrates

M.S. Student, Jan 2005 – May 2007

School of Biology & Ecology, University of Maine, Orono, ME, USA

Advisor: Dr. Joyce E. Longcore

Systematics of the Lobulomycetales, a new order within the Chytridiomycota

Research Assistant, May 2004 – Dec 2004

Department of Natural Sciences, University of Virginia's College at Wise, Wise, VA, USA

Advisor: Dr. Kevin G. Jones, Ret.

Myxomyceticolous fungi in the Appalachian Mountains of southwest Virginia

AWARDS AND GRANTS

- 2013 USDA Agriculture and Food Research Initiative: National Institute of Food and Agriculture Postdoctoral Fellowship Grant No. 2013-67012-21115 (**\$128,321**)
- 2012 University of Maine Fay Hyland-Hilborn Prize in Plant Biology for Ph.D. dissertation (**\$500**)
- 2011 University of Maine School of Biology & Ecology Graduate Student Travel Award (**\$250**)
- 2008 Mycological Society of America Mentor Student Travel Award (**\$500**)
- 2007 University of Maine Fay Hyland-Hilborn Prize in Plant Biology for M.S. thesis (**\$500**)
- 2004 University of Virginia's College at Wise Fellowship in the Natural Sciences Research Grant (**\$2000**)

PEER REVIEWED PUBLICATIONS (CITATIONS: 770)

- 30) Amses KR, **Simmons DR**, Longcore JE, Mondo SJ, Seto K, Alves GHJ, Bonds AE, Quandt CA, Davis WJ, Chang Y, Letcher PM, Powell MJ, Kuo A, LaButti K, Pangilinan J, Andreopoulos W, Tritt A, Riley R, Hundley H, Johnson Lipzen JA, Barry K, Berbee ML, Buchler NE, Grigoriev IV, Spatafora JW, Stajich JE, James TY. Phylogenomic analysis of zoosporic true fungi suggests most early diverging lineages have diploid-dominant life cycles. Preparing for *Proceedings of the National Academy of Sciences of the United States of America*.
- 29) Voigt K, James TY, Kirk PM, Santiago A, Waldman B, Griffith GW, Fu M, Radek R, Alves GJ, **Simmons DR**, Seto K, Gentekaki E, Hurdeal VG, Nguyen TTT, Lee HB. 2021. Basal fungi: taxonomy, species concepts, ecology, distribution, impacts, and the new phylum Nephridiophagomycota phyl. nov. Preparing for *Fungal Diversity*.
- 28) Quandt CA, Marino JA, **Simmons DR**, Lazarus KL, Davis WJ, Hassett BT, Picard KT, James TY. 2021. Evaluating the diversity of the enigmatic fungal phylum Cryptomycota across habitats using 18S rRNA metabarcoding. Preparing for *Fungal Ecology*.
- 27) **Simmons DR**, Longcore JE, James TY. 2021. *Polyrhizophydium stewartii*, the first known rhizomycelial genus and species in the Rhizophydiales, is closely related to *Batrachochytrium*. *Mycologia* 113: 684–690. <https://doi.org/10.1080/00275514.2021.1885206>
- 26) **Simmons DR**, Bonds AE, Castillo BT, Clemons RA, Glasco AD, Myers JM, Thapa N, Letcher PM, Longcore JE, Powell MJ, James TY. 2020. The Collection of Zoosporic Eufungi at the University of Michigan (CZEUM): introducing a new repository of barcoded Chytridiomycota and Blastocladiomycota cultures. *IMA Fungus* 11: 20. <https://doi.org/10.1186/s43008-020-00041-z>
- 25) Myers JM, Bonds AE, Clemons RA, Thapa NA, **Simmons DR**, Longcore JE, Bonito G, Stajich JE, Spatafora JW, Chang Y, Corrochano L, Gryganskyi A, Grigoriev I, James TY. 2020. Survey of early-diverging lineages of fungi reveals abundant and diverse mycoviruses. *mBio*: 11: e02027-20. <https://doi.org/10.1128/mBio.02027-20>
- 24) Longcore JE, Qin S, **Simmons DR**, James TY. 2020. *Quaeritorhiza haematococci* gen. et sp. nov., a parasitic chytrid of the commercially grown alga, *Haematococcus pluvialis*. *Mycologia* 112: 606–615. <https://doi.org/10.1080/00275514.2020.1730136>
- 23) Davis WJ, Jerônimo GH, **Simmons DR**, Quandt CA, James TY. 2019. Revisiting the aquatic phycomycete biota of the Douglas Lake region since the time of Dogma and Sparrow. *Philippine Journal of Systematic Biology* 13 (2): 1–14. <https://doi.org/10.26757/pjsb2019b13001>
- 22) Jerônimo GH, **Simmons DR**, James TY, Pires-Zottarelli CLA. 2019. *Boothiomyces angulosum* and *Boothiomyces elyense*: two new combinations to Terramycetaceae (Rhizophydiales, Chytridiomycota). *Nova Hedwigia* 109: 399–412. https://doi.org/10.1127/nova_hedwigia/2019/0536
- 21) James TY, Michelotti LA, Glasco AD, Clemons RA, Powers RA, James ES, **Simmons DR**, Bai F, Ge S. 2019. Adaptation by loss of heterozygosity in *Saccharomyces cerevisiae* clones under divergent selection. *Genetics* 213: 665–683. <https://doi.org/10.1534/genetics.119.302411>
- 20) Jerônimo GH, Jesus AL, **Simmons DR**, James TY, Pires-Zottarelli CLA. 2019. Novel taxa in Cladochytridiales (Chytridiomycota): *Karlingiella* (gen. nov.) and *Nowakowskiella crenulata* (sp. nov.). *Mycologia* 111: 506–516. <https://doi.org/10.1080/00275514.2019.1588583>
- 19) Letcher PM, Longcore JE, James TY, Leite DS, **Simmons DR**, Powell MJ. 2018. Morphology, ultrastructure, and molecular phylogeny of *Rozella multimorpha*, a new species in Cryptomycota. *Journal of Eukaryotic Microbiology* 65: 180–190. <http://dx.doi.org/10.1111/jeu.12452>

- 18) Li Y, Bateman CC, Skelton J, Jusino MA, Nolen ZJ, **Simmons DR**, Hulcr J. 2017. Wood decay fungus *Flavodon ambrosius* (Basidiomycota: Polyporales) is widely farmed by two genera of ambrosia beetles. *Fungal Biology* 121: 984–989. <http://dx.doi.org/10.1016/j.funbio.2017.08.004>
- 17) Bateman C, Huang Y-T, **Simmons DR**, Kasson MT, Stanley EL, Hulcr J. 2017. Ambrosia beetle *Premnobius cavipennis* (Scolytinae: Ipini) carries highly divergent ascomycotan ambrosia fungus, *Afroraffaelea ambrosiae* gen. et sp. nov. (Ophiostomatales: Ophiostomataceae). *Fungal Ecology* 25: 41–49. <http://dx.doi.org/10.1016/j.funeco.2016.10.008>
- 16) **Simmons DR**, De Beer ZW, Huang Y-T, Bateman C, Campbell AS, Dreaden TJ, Li Y, Ploetz RC, Black AW, Li H-F, Chen C-Y, Wingfield MJ, Hulcr J. 2016. New *Raffaelea* species (Ophiostomatales) from the USA and Taiwan associated with ambrosia beetles and plant hosts. *IMA Fungus* 7: 265–273. <http://dx.doi.org/10.5598/imafungus.2016.07.02.06>
- 15) **Simmons DR**, Li Y, Bateman CC, Hulcr J. 2016. *Flavodon ambrosius* sp. nov., a basidiomycetous mycosymbiont of *Ambrosiodmus* ambrosia beetles. *Mycotaxon* 131: 277–285. <http://dx.doi.org/10.5248/131.277> (**Selected for issue cover figure**)
- 14) Kasson MT, Wickert KL, Stauder CM, Macias AM, Berger MC, **Simmons DR**, Short DPG, DeVallance DB, Hulcr J. 2016. Mutualism with aggressive wood-degrading *Flavodon ambrosius* (Polyporales) facilitates niche expansion and communal social structure in *Ambrosiophilus* ambrosia beetles. *Fungal Ecology* 23: 86–96. <http://dx.doi.org/10.1016/j.funeco.2016.07.002>
- 13) Longcore JE, **Simmons DR**, Letcher PM. 2016. *Synchytrium microbalum* sp. nov. is a saprobic species in a lineage of parasites. *Fungal Biology* 120: 1156–1164. <http://dx.doi.org/10.1016/j.funbio.2016.06.010>
- 12) **Simmons DR**, Kepler RM, Rehner SA, Groden E. 2015. Phylogeny of *Hirsutella* species (Ophiocordycipitaceae) from the United States: remedying the paucity of *Hirsutella* sequence data. *IMA Fungus* 6: 345–356. <http://dx.doi.org/10.5598/imafungus.2015.06.02.06>
- 11) Li Y, **Simmons DR**, Bateman CC, Short DPG, Kasson MT, Rabaglia R, Hulcr J. 2015. New fungus-insect symbiosis: culturing, molecular, and histological methods determine saprophytic Polyporales mutualists of *Ambrosiodmus* ambrosia beetles. *PLoS ONE* 10: e0137689. <http://dx.doi.org/10.1371/journal.pone.0137689>
- 10) **Simmons DR**, Lund J, Levitsky T, Groden E. 2015. *Ophiocordyceps myrmicarum*, a new species infecting invasive *Myrmica rubra* in Maine. *Journal of Invertebrate Pathology* 125: 23–30. <http://dx.doi.org/10.1016/j.jip.2014.12.010>
- 9) Hajek AE, Longcore JE, **Simmons DR**, Peters K, Humber RA. 2013. Chytrid mycoparasitism of entomophthoralean azygospores. *Journal of Invertebrate Pathology* 114: 333–336. <http://dx.doi.org/10.1016/j.jip.2013.10.002>
- 8) **Simmons DR**, Longcore JE. 2012. *Thoreauomyces* gen. nov., *Fimicolochytrium* gen. nov. and additional species in *Geranomyces*. *Mycologia* 104: 1229–1243. <http://dx.doi.org/10.3852/12-015>
- 7) Longcore JE, **Simmons DR**. 2012. The Polychytriales ord. nov. contains chitinophilic members of the rhizophlyctoid alliance. *Mycologia* 104: 276–294. <http://dx.doi.org/10.3852/11-193>
- 6) **Simmons DR**, Letcher PM, Powell MJ, Longcore JE. 2012. *Alogomyces tanneri* gen. et sp. nov., a chytrid in Lobulomycetales from horse manure. *Mycologia* 104: 157–163. <http://dx.doi.org/10.3852/11-043>
- 5) Steiger RA, **Simmons DR**, Longcore JE. 2011. *Cylindrochytridium johnstonii* is a member of the Cladochytriales. *Mycotaxon* 118: 293–302. <http://dx.doi.org/10.5248/118.293>

- 4) **Simmons DR.** 2011. Phylogeny of Powellomycetaceae fam. nov. and description of *Geranomyces variabilis* gen. et comb. nov. *Mycologia* 103: 1411–1420. <http://dx.doi.org/10.3852/11-039>
- 3) Freeman KR, Martin AP, Karki D, Lynch RC, Mitter MS, Meyer AF, Longcore JE, **Simmons DR**, Schmidt SK. 2009. Evidence that chytrids dominate fungal communities in high-elevation soils. *Proceedings of the National Academy of Sciences of the United States of America* 106: 18315–18320. <http://dx.doi.org/10.1073/pnas.0907303106>
- 2) Mozley-Standridge SE, Letcher PM, Longcore JE, Porter D, **Simmons DR.** 2009. Cladochytriales — a new order in Chytridiomycota. *Mycological Research* 113: 498–507. <http://dx.doi.org/10.1016/j.mycres.2008.12.004>
- 1) **Simmons DR**, James TY, Meyer AF, Longcore JE. 2009. Lobulomycetales, a new order in the Chytridiomycota. *Mycological Research* 113: 450–460. <http://dx.doi.org/10.1016/j.mycres.2008.11.019>

INVITED BOOK CHAPTERS

- 3) Longcore JE, **Simmons DR.** 2020. Chytridiomycota (9 pp.) In: *Encyclopedia of Life Sciences*. John Wiley & Sons, Ltd: Chichester. [www.els.net](http://dx.doi.org/10.1002/9780470015902.a0000349.pub4) <http://dx.doi.org/10.1002/9780470015902.a0000349.pub4>
- 2) Longcore JE, **Simmons DR.** 2012. Blastocladiomycota (8 pp.). In: *Encyclopedia of Life Sciences*. John Wiley & Sons, Ltd: Chichester. [www.els.net](http://dx.doi.org/10.1002/9780470015902.a0023623) <http://dx.doi.org/10.1002/9780470015902.a0023623>
- 1) Longcore JE, **Simmons DR.** 2012. Chytridiomycota (11 pp.). In: *Encyclopedia of Life Sciences*. John Wiley & Sons, Ltd: Chichester. [www.els.net](http://dx.doi.org/10.1002/9780470015902.a0000349.pub3) <http://dx.doi.org/10.1002/9780470015902.a0000349.pub3>

INVITED TALKS

- 2015 Journey through the Kingdom: chytrids, insect pathogens, and a novel beetle symbiont. **Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, Pretoria, Gauteng, South Africa.** Sep 2015
- 2015 Chytrids, amphibian chytridiomycosis, & a novel ant pathogen in *Ophiocordyceps*. **National Chung Hsing University, Dept. of Plant Pathology, Taichung City, Taiwan.** Mar 2015
- 2009 Chytridiomycota: thallus development. *In symposium: Teaching with basal fungal lineages.* **2009 Mycological Society of America Annual Meeting**, Snowbird, Utah, USA.

PUBLIC OUTREACH

- 2020 **Simmons DR**, James TY. The Collection of Zoosporic Eufungi at the University of Michigan (CZEUM): a new resource unifying historically significant research collections. *Inoculum*: Oct. <https://bit.ly/34HRQ7X>
- 2019 An Oral History for Mycology Interview Series, “Rabern Simmons, University of Michigan”. Aug 14, 2019. <https://youtu.be/9XYRcrvQqNY>

PRESENTATIONS

- 2019 The Collection of Zoosporic Eufungi at the University of Michigan (CZEUM): a new culture collection resource unifying 100 years of research. **2019 Mycological Society of America Annual Meeting**, Minneapolis, Minnesota, USA. Simmons DR, Bond A, Castillo B, James TY; poster presentation.

- 2016 Increasing diversity of ambrosia beetle mycosymbionts emphasizes dynamic field of plant-animal-fungus symbioses. **2016 Mycological Society of America Annual Meeting**, Berkeley, California, USA. Simmons DR, De Beer ZW, Huang Y-T, Bateman C, Storer CG, Dreaden TJ, Li Y, Ploetz RC, Kasson MT, Hulcr J; contributed talk.
- 2016 New *Raffaelea* species (Ophiostomatales) from the United States and Taiwan associated with ambrosia beetles and plant hosts. **2016 Mycological Society of America Annual Meeting**, Berkeley, California, USA. Simmons DR, De Beer ZW, Huang Y-T, Bateman C, Campbell AS, Dreaden TJ, Li Y, Ploetz RC, Wingfield MJ, Hulcr J; poster presentation.
- 2015 New fungus-insect symbiosis: molecular and histological methods determine hyphal Polyporales symbionts of *Ambrosiodmus* ambrosia beetles. **2015 Mycological Society of America Annual Meeting**, Edmonton, Alberta, Canada. Simmons DR, Li Y, Bateman CC, Short DPG, Kasson MT, Hulcr J; contributed talk.
- 2014 *Hirsutella* species are polyphyletic in Ophiocordycipitaceae. **2014 Mycological Society of America Annual Meeting**, East Lansing, Michigan, USA. Simmons DR, Groden E; poster presentation.
- 2012 *Hirsutella myrmicarum* nom. prov. (Ophiocordycipitaceae; Hypocreales), a new species infecting invasive *Myrmica rubra* in Maine. **2012 MassMyco Meeting**, Worcester, Massachusetts, USA. Simmons DR, Lund J, Levitsky T, Groden E; poster presentation.
- 2011 Phylogeny of Powellomycetaceae fam. nov. in Spizellomycetales. **2011 Mycological Society of America Annual Meeting**, Fairbanks, Alaska, USA. Simmons DR, Longcore JE; contributed talk.
- 2010 Molecular and ultrastructural evidence from additional isolates support elevation of the *Polychytrium* clade (Chytridiomycetes) to ordinal status. **2010 Mycological Society of America Annual Meeting**, Lexington, Kentucky, USA. Simmons DR, James TY, Longcore JE; poster presentation.
- 2008 Diversity within the genus *Powellomyces* (Spizellomycetales, Chytridiomycota). **2008 Mycological Society of America Annual Meeting**, State College, Pennsylvania, USA. Simmons DR, Chambers JG, Churchill PF, Wakefield WS; poster presentation.
- 2006 Genetic and zoospore ultrastructural data support a new chytrid genus. **2006 Mycological Society of America Annual Meeting**, Quebec City, Quebec, Canada. Simmons DR, Longcore JE, James TY; poster presentation.

TEACHING EXPERIENCE

Guest Instructor – Biology of the Fungi, Fall 2017
University of Michigan, Ann Arbor, MI, USA
Instructor: Dr. Timothy Y. James

Guest Instructor – Fungal Biology, Fall 2014, 2015
University of Florida, Gainesville, FL, USA
Instructor: Dr. Matthew E. Smith

Guest Instructor – Biology of the Fungi, Fall 2009, 2011, 2013
University of Maine, Orono, ME, USA
Instructor: Dr. Seanna L. Annis

Course Coordinator and Laboratory Instructor – Basic Biology Summer Course and Laboratory, Summer 2013
University of Maine, Orono, ME, USA

Co-Instructor – Evolution, Spring 2013
University of Maine, Orono, ME, USA

Teaching Assistant – Basic Biology Laboratory, Fall 2011, Spring & Fall 2012
University of Maine, Orono, ME, USA
Supervisor: Kevin Tracewski

Teaching Assistant – Physiology of Plants and Animals Laboratory, Spring 2007
University of Maine, Orono, ME, USA
Supervisor: Kevin Tracewski

STUDENT MENTORING

2014 **Mattie Viola Paradise (University of Maine, BS with Honors)** – effects of flooding on the microbial communities of sparrow eggs in a temperate Maine salt marsh.

WORKSHOPS AND TRAINING SESSIONS ATTENDED

- 2015 Phylogeny and biology of Ophiostomatales fungi (Ascomycota; Sordariomycetes)
Forestry and Agricultural Biotechnological Institute (FABI), University of Pretoria, Pretoria, Gauteng, South Africa. Sep 18 – Oct 22
Instructor: Dr. Z. Wilhelm de Beer
- 2008 Advanced mycology: freshwater and marine ascomycetes
Humboldt Field Research Institute, Eagle Hill, Steuben, ME, USA. Sep 28 – Oct 4
Instructors visiting from **University of Illinois at Urbana-Champaign**:
Drs. Carol Shearer and Huzefa Raja
- 2005 Polymerase chain reaction and molecular analyses instruction for chytrid fungi
Duke University, Raleigh, NC, USA. June – July
Instructor: Dr. Timothy Y. James
-

PROFESSIONAL AFFILIATION

Mycological Society of America

ACADEMIC SERVICE

Ad hoc reviewer – National Science Foundation

External examiner

Forestry and Agricultural Biotechnological Institute (FABI), University of Pretoria, Pretoria, Gauteng, South Africa.

Reviewer for 10 journals (Total reviews: 20)

BMC Evolutionary Biology (2), *Diseases of Aquatic Organisms* (1), *Florida Entomologist* (1), *Fungal Biology* (1), *Fungal Ecology* (1), *Insectes Sociaux* (1), *Journal of Eukaryotic Microbiology* (2), *Mycologia* (7), *Nova Hedwigia* (3), *Phytologia* (1)