James Skelton, Ph.D.

USGS Wetland and Aquatic Research Center (Contractor) 7920 NW 71st Street, Gainesville, Florida 32653 (540) 257-2788 <u>skelto3@gmail.com</u> <u>poetsworm.com</u>

Education and Professional Experience

2019- present	Research Scientist. Contractor for USGS Wetland and Aquatic Research
	Center. eDNA for endangered and invasive species management.
2015 - 2019	Postdoc, University of Florida. Mentor: Dr. Jiri Hulcr. Project: Diversity in
	the ambrosia beetle-fungus symbiosis; Emerging threats to forest health.
2015	Postdoc, Virginia Tech. Mentor: Dr. Jeffery Walters. Project: Avian
(summer)	community responses to endangered species management in southeastern
	forests.
2010 - 2015	Ph.D., Virginia Tech. Advisor: Bryan L. Brown. Dissertation: Towards an
	understanding of symbiont natural history through studies of crayfish and their
	annelid associates.
2008 - 2010	Adjunct Faculty, Northern Michigan University. Instructor; Genetics and
	Animal Physiology lab courses
2005 - 2009	M.S., Biology, Northern Michigan University. Advisor: Mac Strand. Thesis:
	Trophic ecology of freshwater Sponges and two sponge predators.
2001 - 2005	B.S., Zoology, Northern Michigan University, Cum Laude.
2004 - 2005	Invertebrate Museum Curator, Northern Michigan University.

Publications (Mentees; *undergraduate, **graduate student)

- Skelton, J., M. A. Jusino, P. S. Carlson*, K. Smith, M. T. Banik, D. L. Lindner, J. M. Palmer, & J. Hulcr. (2019) Relationships among wood-boring beetles, fungi, and the decomposition of forest biomass. *Molecular Ecology*. https://doi.org/10.1111/mec.15263.
- Skelton, J., Loyd, A., Smith, J. A., Blanchette, R. A., Held, B. W., & Hulcr, J. (2019). Experimental evidence that fungal symbionts of beetles suppress wood decay by competing with decay fungi. *Fungal Ecology – revisions.*
- Hulcr, J., Skelton, J., Johnson, A. J., Li, Y., & Jusino, M. A. (2018). Invasion of an inconspicuous ambrosia beetle and fungus may alter wood decay in Southeastern North America. PeerJ Preprints, *No. e27334v1*.
- 27. Veselská, T., **J. Skelton**, J. Hulcr, M. Chudíčková, T. Vojtová, M. Kostovck, T. Cajthaml, and P. Baldrian. (2019). Adaptive traits of bark and ambrosia beetle-associated fungi. *Fungal Ecology*.
- 26. **Skelton, J.**, A. J. Johnson, M. A. Jusino, C. C. Bateman**, Y. Li** and J. Hulcr. A selective symbiont transport organ maintains phylogenetic partner fidelity in a globally distributed fungus-farming mutualism. (2019). *Proceedings of the Royal Soc. B*, 286(1894).
- Landler, L., J. Skelton, M. S. Painter, P. W. Youmans, R. Muheim, R. P. Creed, B. L. Brown, and J. B. Phillips. Ectosymbionts alter spontaneous responses to the Earth's magnetic field in crustaceans. (2019). *Scientific Reports*, 9(1), 3105.
- 24. Huang**, Y. T., **J. Skelton**, A. J. Johnson**, M. Kolarík, and J. Hulcr. *Geosmithia* species in Southeastern USA and their affinity with beetle vectors and tree hosts. (2019). *Fungal Ecology*, 39, 168183.

- Li**, Y., Y. Huang**, M. T. Kasson, A. M. Macias, J. Skelton, P. S. Carlson*, M. Yin, and J. Hulcr. (2018). Specific and promiscuous ophiostomatalean fungi associated with Platypodinae ambrosia beetles in the southeastern United States. *Fungal Ecology* 35, 42-50.
- 22. Huang**, Y., **J. Skelton**, and J. Hulcr. Multiple evolutionary origins lead to diversity in the metabolic profiles of ambrosia fungi. (2019). *Fungal Ecology*, 38, 80-88.
- 21. Li**, Y., R. Yongying, S. Edward, **J. Skelton**, and J. Hulcr. Plasticity of mycangia in *Xylosandrus* ambrosia beetles. (2019). *Insect Science*, 26(4), 732-742.
- Skelton, J., M. A. Jusino, Y. Li, C. Bateman^{**}, P. H. Thai, D. L. Lindner, J. Hulcr. (2018). Detecting symbioses in complex communities: the specialist and generalist fungal symbionts of beetles within dead Asian pines. *Microbial Ecology*, 76(3), 839-850.
- Smith, J. A., K. Brust, J. Skelton, and J. R. Walters. How effective is the Safe Harbor program for the conservation of Red-cockaded Woodpeckers? (2018). Condor 120(1), 223-233.
- Gomez^{**}, D. F., J. Skelton, M. S. Steininger, R. Stouthamer, P. Rugman-Jones, W. Sittichaya, R. J. Rabaglia, J. Hulcr. Species delineation within the *Euwallacea fornicatus* complex revealed by morphometric and phylogenetic analyses. (2018). *Insect Systematics and Diversity*, 2(6), Nov. 1, 2018.
- Li**, Y., C. C. Bateman**, J. Skelton, M. A. Jusino, Z. J. Nolen*, D. R. Simmons, and J. Hulcr. Wood decay fungus *Flavodon ambrosius* (Basidiomycota: Polyporales) is widely farmed by two genera of ambrosia beetles. (2017). *Fungal Biology* 121(11), 984-989.
- Skelton, J., K. M. Geyer, J. T. Lennon, R. P. Creed, and B. L. Brown. Multi-scale ecological filters shape the crayfish microbiome. (2017). [Cover article] Symbiosis 72(3), 159-170.
- Brown, B. L., E. R. Sokol, J. Skelton, and B. Tornwall. Making sense of metacommunities: Dispelling the mythology of a metacommunity typology. (2017). *Oecologia* 183(3), 643-652.
- Skelton, J., R. P. Creed, L. Landler, K. M. Geyer, and B. L. Brown. Geographic patterns of crayfish symbiont diversity persist over half a century despite seasonal fluctuations. (2017). *Freshwater Crayfish* 22(1), 9-18.
- Brown, B. L., M. Turnbull, J. Skelton, and R. P. Creed. Ectosymbiotic cleaning mutualists induce down regulation of crayfish immune response genes. (2017). Freshwater Crayfish 22 (1), 43-51.
- 12. **Skelton, J.**, S. Doak*, M. Leonard*, R. P. Creed, and B. L. Brown. The rules for symbiont community assembly change along a mutualism–parasitism continuum. (2016). *Journal of Animal Ecology* 86, 843-853.
- 11. Luther, D., J. Skelton, C. Fernandez, and J. R. Walters. Conservation action implementation, funding, and population trends of birds listed on the Endangered Species Act. (2016). *Biological Conservation* 197, 229-234.
- Thomas, M. J., R. P. Creed, J. Skelton, and B. L. Brown. Ontogenetic shifts in a freshwater cleaning symbiosis: Consequences for hosts and their symbionts. (2016). *Ecology* 97(6), 1507-1517.
- Johnson**, A. J., P. E. Kendra, J. Skelton, and J. Hulcr. Species diversity, phenology, and temporal flight patterns of *Hypothenemus* pygmy borers (Coleoptera: Curculionidae: Scolytinae) in South Florida. (2016). *Environmental Entomology* 45(3), 627-632.
- 8. Bateman^{**}, C., M. Sigut, **J. Skelton**, K. Smith, and J. Hulcr. Fungal symbionts of the black twig borer, *Xylosandrus compactus* (Coleoptera: Curculionidae, Scolytinae) are

spatially segregated on the insect body. (2016). *Environmental Entomology* 45(4), 883-890.

- Skelton, J., R. P. Creed, and B. L. Brown. A symbiont's dispersal strategy: Conditiondependent dispersal underlies predictable variation in direct transmission among hosts. (2015). *Proceedings of the Royal Society B* 282(189).
- 6. Tornwall, B., E. Sokol, J. Skelton, and B. L. Brown. Trends in stream biodiversity research since the River Continuum Concept. (2015). *Diversity* 7, 16-35.
- Landler, L., M. A. Jusino, J. Skelton, and J. R. Walters. Global trends in woodpecker cavity entrance orientation: Latitudinal and continental effects suggest regional climate influence. (2015). Acta Ornithologica 49(2), 257-266.
- Skelton, J., R. P. Creed, and B. L. Brown. Ontogenetic shift in host tolerance controls initiation of a cleaning symbiosis. (2014). *Oikos* 123(6), 677-686.
- Skelton, J., K. J. Farrell, R. P. Creed, B. W. Williams, B. Helms, J. Stoekel, and B. L. Brown. Servants, scoundrels, and hitchhikers: Current understanding of the complex interactions between crayfish and their ectosymbiotic worms (Branchiobdellida). (2013). *Freshwater Science* 32(4), 1345-1357.
- Brown, B. L., R. P. Creed, J. Skelton, M. A. Rollins, and K. J. Farrell. The fine line between mutualism and parasitism: Complex effects in a cleaning symbiosis demonstrated by multiple field experiments. (2012). *Oecologia* 170(1), 199-207.
- 1. **Skelton, J.**, and M. Strand. Trophic ecology of a freshwater sponge (*Spongilla lacustris*) revealed by stable isotope analysis. (2012). *Hydrobiologia* 709(1), 227-235.

Publication submitted or in advanced stages of preparation

in	Luther, D, S. Butchart, J. Cooper, C. Hilton-Taylor, C. Hermes, M. A. Jusino, H.
review	Wheatley, J. Lamoreux, R. Malin, J. Skelton, and T. Brooks. The relationship
	between IUCN Red List categories and criteria for species and the conservation
	actions needed. Conservation Biology – in review.
in	Huang**, Y. T., J. Skelton, & J. Hulcr. Lipids and small metabolites provisioned by
review	ambrosia fungi to symbiotic beetles are phylogeny-dependent, not convergent. ISME – in review.
In review	Jusino, M. A., J. Skelton, C. C. Chen, J. Hulcr, & M. Smith. Sexual reproduction and saprotrophic dominance by the ambrosial fungus <i>Flavodon subulatus</i> (= <i>Flavodon ambrosius</i>). Fungal Ecology – in review.
In	Bateman ^{**} , C., Li ^{**} , Y., Skelton, J. , <i>et al.</i> , (22 other authors). Pre-invasion assessment
review	of overseas beetle-borne pathogens of trees - pdf available by request.
In	Hulcr, J. & J. Skelton. Chapter 18: Ambrosia Beetles. In Forest Entomology and
press	Pathology. Springer.
In	Skelton, J., L. Landler, M. A. Jusino, A. Van Lanen, and J. R. Walters. Effects of cavity
review	orientation on nesting success inferred from long-term monitoring of the endangered Red-Cockaded Woodpecker. In prep - pdf available by request.
In review	Creed, R. P., B. L. Brown, K. Farrell, J. Skelton, and A. Meeks. Ectosymbiotic mutualists alter the effect of a dominant species on community structure. <i>In review - pdf</i> <i>available by request.</i>

\$668,980

Grants

2016 **National Science Foundation**: *Ambrosia beetles and fungi – a comprehensive global survey of an increasingly important symbiosis. Lead PIs: Matthew E. Smith and Jiri Hulcr.* Senior personnel – J. Skelton authored data analysis and hypothesis testing sections.

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2014	National Science Foundation Doctoral Dissertation Improvement Grant. The ax and wedge of competition shapes symbiont diversity. J. Skelton and B. L. Brown.	\$20,668
2014	VBI & Fralin Life Science Institute Small Grants Program , Virginia Tech, <i>The effects of cleaning symbionts on the crayfish microbiome; an experimental test and metagenomics approach. J. Skelton, K. M. Gever, B. L. Brown, J. E. Barret, and J. T. Lennon.</i>	\$14,156
2013	Organismal Biology and Ecology Interdisciplinary Summer Research Program, Virginia Tech, Summer 2013. <i>Multipartite</i> <i>mutualisms: Disentangling context and diversity. J. Skelton and K. M</i> <i>Geyer.</i>	\$3,995
2012	Organismal Biology and Ecology Interdisciplinary Summer Research Program, Virginia Tech. Magnetoreception of two ecologically different crayfish species (Cambarus bartonii and Cambarus sciotensis). J. Skelton and L. Landler.	\$1,756
2012	Organismal Biology and Ecology Interdisciplinary Summer Research Program, Virginia Tech, Exploring interactions between branchiobdellidans and the crayfish microbiome. J. Skelton and K. M Gever.	\$2,827
2008	Charles C. Spooner Student Research Program, Northern Michigan University. Using stable isotopes to investigate freshwater sponge and spongivorous insect trophic ecology. J. Skelton.	\$500
2006 & 2007	Excellence in Education Program, Northern Michigan University. The role of symbiotic algae in the diet of spongivorous insects. J. Skelton.	\$2,700

Awards and Scholarships

Virginia Tech Doctoral Assistantship Fellowship, Virginia Tech Graduate School, 2014, Awarded \$12,000 for tuition for excellence in teaching and graduate research.

- John G. Palmer Memorial Scholarship, Virginia Tech, 2014-2015, awarded \$1,220 for excellence in graduate research.
- Schaeffer Scholar Award, Virginia Tech, 2013. Awarded \$1,050 to cover publication costs of graduate research in stream ecology.
- Society for Freshwater Science Boesel-Sanderson Award, summer 2013, awarded \$600 to describe branchiobdellidan life histories.
- First Place EEB Poster at Virginia Tech Biological Sciences Research Day, Virginia Tech, February 25, 2012, awarded \$300.

Teaching Experience

- spring 2019 *Instructor*. University of Florida. Environmental Metabarcoding: an introduction to high-throughput community sequencing and bioinformatics (PLP 6905)
- 2011 2015 Teaching assistant. Virginia Tech. Lab courses in General Biology, Honors Biology, Invertebrate Zoology (2 semesters), and Stream Ecology. Guest lecturer in Invertebrate Zoology and Stream Ecology.
 *Designed and instructed Invertebrate Zoology Laboratory (spring semesters 2013-2014), and Honors Biology (spring 2015) at Virginia Tech.
- 2010 2011 *Teaching assistant.* Clemson University. Field measurement techniques.
- 2008 2010 Adjunct faculty. Northern Michigan University. Introductory Genetics Lab (3 semesters) and Animal Physiology Lab (2 semesters).

CIRRICULUM VITAE

2005 – 2008 *Teaching assistant.* Northern Michigan University. General Biology Lab, Animal Physiology Lab, Entomology, Aquatic Insects, Invertebrate Zoology.

Specialized Skills and Interests

Analytical	R programming, multivariate statistics and ordination, permutations-based null
	model hypothesis testing, generalized linear models and mixed effects models, multi-model selection, phylogenetic analysis, molecular species identification.
Field	Extensive experience in sampling insect-vectored fungi, aquatic and terrestrial
	macroinvertebrates, stream morphometrics, quantitative sampling methods, in
	situ field experiments, avian identification.
Laboratory	Fungal isolation and culture. Molecular techniques for microbial community
	assessment including Ion Torrent and Illumina based next generation
	sequencing and metagenomics and library prep. Invertebrate taxonomy with
	special expertise in several groups (Branchiobdellidans, aquatic insects,
	ambrosia beetles).

Service

Reviewer:	NSF DEB ad hoc panel reviewer, Ecology, Oikos, Oecologia, Functional
	Ecology, Fungal Ecology, Freshwater Science - Journal of the North
	American Benthological Society (7), PeerJ (2), Parasites and Vectors,
	Environmental Biology of Fishes, Aquatic Invasions, Biological Invasions,
	Ecological Research, Zoological Science, Plos one (2), Symbiosis,
	Environmental Microbiology, Canadian Journal of Zoology.
Memberships:	Mycological Society of America, Ecological Society of America,
	Entomological Society of America, Society for Freshwater Science
Outreach:	Instructor/organizer for 2018 Bark and Ambrosia Beetle Academy, a week-
	long workshop that provides expert taxonomy and organismal biology
	training to researchers from around the world. See here:
	http://ambrosiasymbiosis.org/academy/2018/
	Public presentations given at SEEDs program (http://www.seedskids.org/) at
	Price House Nature Center, Blacksburg Va.
	Moderator of "Frass and Noodles" facebook page, a public forum for
	discussing and disseminating research on bark and ambrosia beetles
	Produced short film highlighting forest soil arthropod diversity for the Global
	Soil Biodiversity Initiative, which is an international effort to promote the
	translation of expert knowledge on soil biodiversity into environmental
	policy and sustainable land management: www.globalsoilbiodiversity.org
Service:	Member of the Virginia Tech Biology Student Recognition Committee,
	Volunteer for Biology Department Research Day

Presentations

Invited talks and seminars

- **2019** The engineers of decay: fidelity and function in a beetle-fungus meta-symbiosis. University of Florida Dept. of Biology Seminar Series.
- **2018** Globally distributed beetles drive fungal colonization of dead wood and slow wood decomposition. Presented in the fungal communities and the functioning of forest

ecosystems symposium of the 11th International Mycological Congress, San Juan, Puerto Rico.

- **2017** Embracing complexity to accelerate discovery in the fungal symbioses of bark and ambrosia beetles. Bark and ambrosia beetle symposium at the Entomological Society of America Meeting, Denver CO.
- **2017** The hunt for nefarious symbioses in a complex world: Experimental, molecular, and statistical perspectives of bark beetles and fungi. Insect/fungus symbiosis symposium at Mycology Society of America Annual summer meeting, Athens GA.
- **2016** Every host an island; integrating ideas across community ecology and parasitology to understand real-world complexity in multi-species symbioses. University of Florida Dept. of Biology Seminar Series.
- **2016** The fascinating fungal symbioses of two (wood) boring animals. J. Skelton and M. A. Jusino. Northern Michigan University Dept. of Biology Seminar Series
- **2016** Top-down controls and ambrosia beetle symbiont fidelity. Wood Borer-Fungus Alliances and Conflicts Symposium: The Frontier of Forest Entomology, 25th International Congress of Entomology, Orlando, FL.
- **2015** Homage to Hutchinson, or why are there so many kinds of animals... living on animals? J. Skelton. University of Florida School of Resources and Conservation.
- 2015 Science on the side: How collaborative side projects can enrich the graduate school experience. J. Skelton. Virginia Tech Biological Sciences Research Seminar Series
- 2010 Trophic ecology of freshwater sponges revealed by stable isotope analyses; Skelton, J. and M. Strand. Presented at Tri-Beta Biological Research Seminar Series, Northern Michigan University
- **2010** Symbiont abundance and variable outcomes in an aquatic cleaning symbiosis; Skelton, J., Brown, B. L., and R. P. Creed. Natural Resources Student Research Symposium, Clemson University.

Oral presentations

- **2016** Broken Covenant: Experimental symbiont switching in an ambrosia beetle symbiosis. J. Skelton. Annual Meeting of the Mycological Society of America, Berkeley, CA.
- **2015** Why are there so many kinds of animals... living on animals? J. Skelton; Dissertation defense seminar given at Virginia Tech, Blacksburg VA.
- **2014** Size matters and location is everything: Competition and prudent dispersal explain transmission in a freshwater cleaning symbiosis; Skelton, J., S. Doak, R. P. Creed, and B. L. Brown; presented at the Joint Aquatic Sciences Meeting, Portland, OR.
- 2014 Is your compass aligned? Ectosymbionts alter crayfish response to Earth's magnetic fields. Landler, L., Skelton, J., Painter, M. S., Youmans, P. W., Muheim, R., Brown, B. L., and J. B. Phillips; presented at the Joint Aquatic Sciences Meeting, Portland, OR.
- **2013** Slipping past the doorman: Host control shapes succession-like patterns in ectosymbiont assemblages; Skelton, J., Creed, R. P., and Brown, B. L.; Talk presented at the 2013 Annual Meeting of the Ecological Society of America, Minneapolis, MN.
- **2012** Partner Control and Ontogenetic Shifts in a Cleaning Symbiosis Involving Crayfish; Skelton, J., Brown, B. L., and R. P. Creed; Presented at the 2012 Summer Meeting of the Society for Freshwater Science, Louisville KY.

CIRRICULUM VITAE

- **2012** Ectosymbionts of Crayfish Influence Benthic Community Structure and Ecosystem Properties; Brown, B. L., Creed, R. P., and Skelton, J. Presented at the 2012 Summer Meeting of the Society for Freshwater Science, Louisville KY.
- **2011** Variable Outcomes in the Cleaning Symbiosis between Crayfish and Branchiobdellid Annelids; Skelton, J., Brown, B. L., and R. P. Creed; Presented at the 2011 Summer Meeting of the North American Benthological Society, Providence RI.
- **2010** Symbiont Abundance and Variable Outcomes in an Aquatic Cleaning Symbiosis; Skelton, J., Brown, B. L., and R. P. Creed; Presented at 2011 Southeast Ecology and Evolution Conference, Auburn University.
- 2009 Trophic ecology of Freshwater Sponges Revealed by Stable Isotope Analyses; Skelton, J. and M. Strand; Presented at NMU Biology Seminar Series, Northern Michigan University.
- 2005 Insects Associated with the Freshwater Sponges in Marquette Co., MI; J. Skelton; Presented at The 10th Annual Celebration of Student Research and Creative Works, Northern Michigan University.

Poster Presentations

- 2017 Methods matter: a better way to characterize the diets of insectivorous birds using fecal DNA. M. A. Jusino, J. Skelton, M. T. Banik, J. M. Palmer, L. Blanc, S. Goodman, J. R. Walters, and D. L. Lindner. Presented at the American Ornithologist Union, East Lansing, MI.
- 2014 Circular reasoning: cavity alignment preferences in red-cockaded woodpeckers. Landler, L., M.A. Jusino, J. Skelton, and J.R. Walters. Presented at the 7th International Woodpecker Conference, Vitoria-Gastiez, Spain. Awarded 3rd Place Best Poster Award.
- 2013 Ontogeny of a cleaning symbiosis: Age-specific controls examined from both sides; Skelton, J., Creed, R. P., and Brown, B. L.; Poster presented at the 2013 Society for Freshwater Science Annual Meeting; Jacksonville, FL
- 2012 Partner Control and Ontogenetic Shifts in a Cleaning Symbiosis Involving Crayfish; Skelton, J., Brown, B. L., and R. P. Creed; Presented at 2012 Virginia Tech Department of Biological Sciences Research Day, Blacksburg, VA. Awarder 1st place Ecology and Evolutionary Biology Poster Award.
- 2010 Evaluation of the Trophic Ecology of a Freshwater Sponge and Two Spongepredators via Stable Isotope Analysis; Skelton, J. and M. Strand; Presented at 2010 Summer Joint Meeting of the North American Benthological Society and American Society of Limnology and Oceanography, Santa Fe, NM.