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EDUCATION AND EMPLOYMENT

2015- Neukom Postdoctoral Fellow, Dartmouth College [mentors: Hannah ter Hofstede (Biology) and Thalia Wheatley (Psychological and Brain Sciences)]
2016- Smithsonian Fellow
2014-2015 Post-doctoral Research Associate in Biology at University of Wisconsin, Milwaukee [advisor: Gerlinde Hobel]
2014 Short-term Fellow at Smithsonian Tropical Research Institute [advisor: Rachel Page]
2013 PhD in Biological Science, Dartmouth College [advisor: Mark McPeck]
2007 Denison University, B. S. Biological Sciences
2006 Organization for Tropical Studies—Costa Rica (Duke University affiliated)

RESEARCH INTERESTS

- Community ecology and species interactions
- Sensory ecology and communication
- Evolution of decision making and recognition
- Speciation, sexual selection, and mate recognition
- Artificial neural networks and neurobiology

PUBLICATIONS

* Indicates undergraduate or high school student co-author; + Indicates citizen scientist co-author.

In review or revision:

Fitzpatrick CL, Mendelson TC, Rodríguez RL, Safran RJ, Scordato E, Servedio MR, Stern CA, **Symes LB**, Kopp M. Theory meets empiry: a citation network analysis. *In revision for BioScience*.

Symes LB. Male signals and female mate recognition in the tree cricket *Oecanthus forbesi*. *In review at Behavioral Ecology and Sociobiology (resubmission invited)*.

Published and in press:

Kopp M[^], Servedio MS[^], Mendelson TC, Safran RJ, Rodriguez RL, Scordato EC, **Symes LB**, Balakrishnan CN, Hauber ME, Zonana DM, van Doorn GS. Mechanisms of assortative mating in speciation: connecting theory and empirical research. *In press at The American Naturalist*.
[^]Equal authorship.

Symes LB, Rodriguez RL, and Höbel G. 2017. Beyond temperature-coupling: Effects of temperature on ectotherm signaling and mate choice and the implications for communication in multi-species assemblages. *Ecology and Evolution*. 00:1–11. <https://doi.org/10.1002/ece3.3059>

Reichert M, **Symes LB**. and Höbel G. 2016. Female acoustic signal timing preferences are robust to cross-modal visual stimulation. *Animal Behaviour* 119:151-159.

Symes LB, Page RA, and ter Hofstede HM. 2016. Effects of acoustic environment on male calling activity and timing in Neotropical forest katydids. *Behavioral Ecology and Sociobiology* 70: 1485-1495.

- Symes LB**, Ayres MP, Cowdery C* and Costello RA*. 2015. Signal diversification in *Oecanthus* tree crickets is defined by energetic, morphometric, and acoustic trade-offs. *Evolution* 69-6: 1518-1527. *Featured in NPR series "Close Listening."* [Journal cover photo by Janel diBiccari*]
- Symes LB**, Serrell N, and Ayres MP. 2015. A practical guide for mentoring scientific inquiry. *Bulletin of the Ecological Society of America* 96(2): 352-367. *Featured in Nature article 'Research protocols: A forest of hypotheses' by Julia Rosen (2016).*
- Rodríguez RL, Araya–Salas M, Gray DA, Reichert M, **Symes LB**, Wilkins MR, Safran RJ and Höbel G. 2015. How acoustic signals scale with individual body size: common trends in static allometry across diverse taxa. *Behavioral Ecology* 26(1): 168-177.
- Symes LB** and Price TD. 2015 Sexual stimulation and sexual selection. *The American Naturalist* 185(4) iv. *Invited perspective piece.*
- Symes LB**. 2014. Species composition affects the shape of mate response functions. *Evolution* 68: 205-213.
- Costello RA* and **Symes LB**. 2014. Effects of anthropogenic noise on male signaling behaviour and female phonotaxis in *Oecanthus* tree crickets. *Animal Behaviour* 95: 15-22. (**Undergraduate senior thesis and best student poster in Animal Behavior at SICB 2015*).
- Scordato ESC, **Symes LB**, Mendelson TC and Safran RJ. 2014. The role of sexual selection in speciation: how often is ecology measured? *The Journal of Heredity* 105(Special issue): 782-794.
- Safran RJ, Scordato ESC[^], **Symes LB**[^], Rodriguez RL and Mendelsen TC. 2013. Contributions of natural and sexual selection to the evolution of premating reproductive isolation: a research agenda. *Trends in Ecology and Evolution* 28:643-650. [^]*Equal authorship*
- Rodríguez RL, Boughman JW, Gray DA, Hebets EA, Hobel G and **Symes LB**. 2013. Diversification under sexual selection: the relative roles of mate preference strength and the degree of divergence in mate preferences. *Ecology Letters* 16: 964-974.
- Symes LB** and Collins NC⁺. 2013. A new species of tree cricket from the southwestern United States. *Journal of Orthoptera Research* 22: 87-91.
- Safran RS, Flaxman S, Kopp M, Irwin D, Evans MR, Funk WC, Gray DA, Hebets EA, Seddon N, Scordato ESC, **Symes LB**, Tobias JA, Toews D and Uy A. 2012. A robust new metric of phenotypic distance to estimate and compare multiple trait differences among populations. *Current Zoology* 58: 426-439.
- Collins N⁺ and **Symes LB**. 2012. *Oecanthus walkeri*: A new species of tree cricket from Texas. *Journal of Orthopteran Research*. *Journal of Orthoptera Research* 21: 51-56.
- McPeck MA, **Symes LB**, Zong DM* and McPeck CL*. 2011. Species recognition and patterns of population variation in the reproductive structures of a damselfly genus. *Evolution* 65: 419-428.
- Schultz TD, Anderson CN and **Symes LB**. 2008. The conspicuousness of colour cues in male pond damselflies depends on ambient light and visual system? *Animal Behaviour*. 76: 1357-1364.
- Paul P and **Symes LB**. 2008. Ballistocardiography in the physics classroom. *The Physics Teacher* 46:300-302.
- In preparation:**
Symes LB, Mendelson TC, Safran RA, Scordato ESC, Rodríguez RL, Hebets EA, Servedio MR and Höbel G. Sexual selection as a process opposing divergence and incipient speciation.

Symes LB, Martison SJ, ter Hofstede HM. The sound of silence: Laboratory and field measurement of katydids responses to bat echolocation calls.

NON-PEER REVIEWED CONTRIBUTIONS

Symes LB and Price TD. 2015. Review of 'Animal Communication in Noise, Ed. H. Brumm.' *Animal Behaviour* 108: 43-45.

DATA AND SPECIMEN ARCHIVES

Symes LB, Robillard T, Martison SM, ter Hofstede HM. Tettigoniidae collection archived at the French Museum of Natural History, Paris [approx. 1800 specimens].

Symes LB. 2016. *Oecanthus* collection archived at California Academy of Sciences [approx. 2200 specimens]. NSF program Advancing Digital Biological Collections.

Symes LB, Ayres MP, Cowdery CP, and Costello RA. 2015. Data from *Signal diversification in Oecanthus tree crickets is shaped by energetic, morphometric, and acoustic trade-offs*. Dryad data depository. <http://dx.doi.org/10.5061/dryad.fb48n>

Symes LB. 2014. Data from *Species composition affects the shape of mate response functions*. Dryad data depository. DOI:10.5061/dryad.87tk7

Symes LB 2013. Recordings and metadata for more than 600 individual *Oecanthus* crickets. Macaulay Library of Natural Sound, Cornell University.

CONFERENCE ORGANIZATION

Co-chair of the 2017 Gordon Research Seminar in Speciation. Tuscany, Italy.

WORKING GROUPS, AND SHORT COURSES

Toward a unified evolutionary theory of decision-making in animals. National Evolutionary Synthesis Center working group. 2013-2014 (4 meetings).

An integrative evolutionary approach to examine sexual selection as a mechanism of speciation, National Evolutionary Synthesis Center Working Group. 2009-2011 (5 meetings).

Sound Analysis Workshop. Bioacoustics Research Program, Lab of Ornithology, Cornell University. June 2010 (9 day workshop).

Sound Recording Workshop. Macaulay Library of Natural Sounds, Lab of Ornithology, Cornell University. June 2009 (5 day workshop).

TEACHING EXPERIENCE

Courses as Primary Instructor

Comparative Neurobiology of Social Interactions [Bio 33/Psychological and Brain Sciences 53, writing-intensive upper-level course]. *Enrollment: 34 students (2017), 20 students (2016)*. Dartmouth College.

General Ecology [Bio 310, lecture course with TA-led labs]. *Enrollment: 65 students (2015)*. University of Wisconsin – Milwaukee.

Graduate Teaching Assistant (Dartmouth College)

Biology Foreign Studies Program (Costa Rica and Cayman Islands Winter 2010)

Biostatistics (Winter 2009)

Ecology (Spring 2008)

Marine Biology (Fall 2007)

Other Teaching Experience

GK-12 Teaching Fellowship. Taught five classes per week in a 7th grade science classroom. Helped teachers design inquiry-based activities to incorporate into their curriculum. Fall 2012 through Spring 2013.

STUDENT PROJECT MENTORING

Project mentor. Caitlyn Lee. An evolutionary model of energy expenditure in humans. 2016-

Project mentor. Kirstyn Coxen. Multi-component signals and the effect of pupil diameter on age perception. 2016-

Senior Research Mentor. Robin Costello. Effects of anthropogenic noise on insect behavior and community composition. 2012-2013. *Published in Animal Behaviour (Costello and Symes 2014), received best animal behavior poster award at Society for Integrative and Comparative Biology 2015. Co-author on Evolution paper (Symes et al. 2015).*

Summer Research Mentor. Lisa Carson. Latitudinal variation in the life-history of *Oecanthus* tree crickets. Summer 2012. *Publishable data, manuscript in early draft.*

WISP (Women in Science Project) Mentor. Lisa Carson. Eight to ten hours per week. Winter and Spring 2012. *Published in Transactions of the Entomological Society of America (Collins et al 2014)*

Summer Research Mentor. Janel DiBiccari. Field photography and audio archive. Summer 2011. *[Photographs included cover image for Symes et al 2015, Evolution]*

HHMI Mentor. Colleen Cowdery. Fall 2011 and Winter 2012.

WISP (Women in Science Project) Mentor. Colleen Cowdery. Eight to ten hours per week. Winter and Spring 2011. *Published in Evolution (Symes et al. 2015)*

Leave Term Project. Effects of anthropogenic noise on insect community structure. Jen Fownes. Ten week leave-term independent research project. Forty hours per week. Fall 2010.

MENTORED MANUSCRIPTS

Provided feedback on ideas and design, technical assistance, and statistical advice.

* Indicates undergraduate student, + Indicates citizen scientist

Brown N*, Fownes J*, Grear* M and O'Donnell D*. 2010. Blindfolded birdwatching: The effect of harmonics on the localization of bird calls. *Dartmouth Undergraduate Journal of Science*. 2010(Summer).

Collins N⁺, Berghe EVD and Carson LM*. 2014. Two new species of *Neoxabea*, three new species of *Oecanthus*, and documentation of two other species in Nicaragua (Orthoptera: Gryllidae: Oecanthinae). *Transactions of the American Entomological Society*. 140: 163-184.

GRANTS, AWARDS, HONORS

Neukom Fellowship, Dartmouth College (Total Award ~\$190,000, 2015)

Smithsonian Tropical Research Institute Short-term Fellowship (2014)

Hannah Croasdale Research and Teaching Graduation Award (2013)

National Science Foundation Fellow (Stipend support) (2012-2013)

Orthopterists Society Research Fund (\$800, 2012)

Huyck Preserve Grant (\$2600 and three weeks lodging for three people, 2012)

Huyck Preserve Grant (\$2600 and three weeks lodging for two people, 2011)

Department nominee for Filene Teaching Award (2010)

Gilman Grant (\$1500, 2010)

Orthopterists' Society Research Fund (\$1000, 2010)

Graduate Studies Grant (\$1000, 2010)

Graduate Research Fellowship (GRFP) Honorable Mention (2009)

Graduate Research Fellowship (GRFP) Honorable Mention (2008)

Graduate Assistance in Areas of National Need Grant, Dartmouth College (stipend and research expenses, 2007-2008)

President's Medal, Denison University (2007)

Graduate Research Fellowship (GRFP) Honorable Mention (2007)

Anderson Scholarship in the Sciences (full tuition scholarship, summer stipend and research expenses, 2005-2007)

Battelle Memorial Institute Grant (travel expenses for research in Costa Rica: \$1148, 2006)

Arend/McBride Summer Field Biology Scholar (summer stipend and research expenses, 2005)

Denison Summer Scholar Award (summer stipend and research expenses, 2004)

Denison Faculty Scholarship for Achievement (full tuition, 2003-2007)

OUTREACH ACTIVITIES

- “Sex and Death in the Rainforest.” National Public Radio. All Things Considered. April 2016. Discussed research and presented compilations of sounds from insects and bats.
- “Close Listening: Decoding Nature Through Sound.” National Public Radio series on research and acoustics. Morning Edition, 2015. Discussed research and acoustics. In follow-up piece, identified insect recordings submitted by listeners. *Series received the National Academies of Sciences, Engineering, and Mathematics Communication Award in 2016.*
<http://www.npr.org/series/432299810/listening-series>
- “Slo-mo cricket chirps reveal secret serenades.” National Public Radio segment. Morning Edition, 2009.
- Howard Hughes Medical Institute Mentoring Program: Six-week program teaching hands-on science in sixth and eighth grade class rooms (2008 and 2009, respectively)
- Montshire Museum of Science Camp-In Program: Program for grade school and middle school students. Four hour program that includes leading night walks, discussions about social insects, chemistry experiments, and star gazing. 2007-2010.

PRESENTATIONS AT MEETINGS

- Symes LB** and HM ter Hofstede. Effects of predator cues on prey signaling behavior: Bat echolocation and katydid calls in the Neotropical forest canopy. Invertebrate Sound and Vibration, Rauschholzhausen, Germany. 2017.
- Symes LB**, HM ter Hofstede, SJ Martinson, S Stone, JA Ralston, and MP Ayres. Acoustic Communication by Animals, Omaha, NE. 2017.
- Symes LB** and HM ter Hofstede. Predator, competitor, mate: Signal detection and discrimination by Neotropical forest katydids. Animal Behavior, Columbia, MO. 2016.
- Symes LB**, MP Ayres, and HM ter Hofstede. Automated acoustic recording and detection at Hubbard Brook. Hubbard Brook Collaborators Meeting, Hubbard Brook Forest, NH. 2016
- Symes LB** and HM ter Hofstede. The music of nature: Animal communication and soundscapes. New music festival, Dartmouth College, NH. 2016
- Symes LB**. Signal diversification in *Oecanthus* tree crickets is shaped by energetic, morphological, and acoustic trade-offs. Invertebrate Sound and Vibration. Ottawa, Canada. 2015.
- Symes LB**, ESC Scordato, RJ Safran, and TC Mendelson. The interaction of ecology in sexual selection and speciation. Evolution meeting, Durham, NC. *Featured symposium*. 2014
- Symes LB**. Species composition affects the shape of female response functions. Evolution Meeting, Snowbird, UT. 2013.
- Symes LB**. Sexual selection and species recognition in *Oecanthus* tree crickets. Acoustic Communication in Animals Meeting, Ithaca, NY. 2011.
- Symes LB** and MA McPeck. Interpopulation variation in structures used in mate recognition by *Enallagma* damselflies. Evolution Meeting, Minneapolis, MN. 2008.
- Symes LB** and TD Schultz. Polychromatism in the damselfly *Enallagma civile* and assessment of the male mimicry hypothesis. Annual Meeting of the Ecological Society of America. Memphis, TN. 2006.

INVITED SEMINARS

- University of Nebraska (Fall 2017)
- Elon University (Fall 2017)
- Reed College (Fall 2017)
- University of Illinois (Winter 2017)
- New Jersey Institute of Technology (Winter 2017)
- Castleton College (Fall 2016)
- University of New Hampshire (Fall 2016)

REFEREE

- Acta Ethologica, American Naturalist, Animal Behaviour, Behavioral Ecology and Sociobiology, Behavioural Processes, Biological Journal of the Linnean Society, Biology Letters, Ecological Applications, Evolution, PLOS ONE, Proceedings of the Royal Society B, United States National Science Foundation

REFERENCES

- Dr. Mark A. McPeck. Biology Department. Dartmouth College.
Dr. Hannah ter Hofstede. Biology Department. Dartmouth College.
Dr. Thalia Wheatley. Psychological and Brain Sciences. Dartmouth College.
Dr. Nathaniel Dominy. Anthropology Department. Dartmouth College.
Dr. Gerlinde Höbel. Biology Department. University of Wisconsin - Milwaukee.
Dr. Rebecca Safran. Department of Ecology and Evolutionary Biology. University of Colorado at Boulder.