

BIOGRAPHICAL SKETCH

QUINN S. McFREDERICK

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University of California, Riverside
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PROFESSIONAL PREPARATION

UC, Berkeley	Integrative Biology	B.A., 1993
CSU, San Francisco	Conservation Biology	M.A., 2004
Univ. of Virginia	Biology	Ph.D., 2010
Univ. of Rochester	Symbiosis	postdoc, 2010
UT, Austin	Microbial Ecology, Bioinformatics	postdoc, 2011-2013

APPOINTMENTS

2020-present	Associate Professor of Entomology, University of California, Riverside
2014-2020	Assistant Professor of Entomology, University of California, Riverside
2013-2014	Assistant Professor of Biology, California State University, Fresno
2011-2013	NSF Minority Postdoctoral Research Fellow, UT Austin
2010	Postdoctoral Researcher, University of Rochester

AWARDS AND RECOGNITIONS

2017 Hellman Fellow
2016 Outstanding Faculty Award from the Entomology Graduate Student Association
2011 NSF Minority Postdoctoral Research Fellowship in Biology (award number 1003133, \$189,000)
2010 Award for Excellence in Scholarship in the Sciences from the Vice-President for Research, University of Virginia. The award recognizes “excellence in original scholarship by Ph.D. students at the University” (\$5,000)
2010 Graduate Teaching Assistant Award from the Department of Biology, University of Virginia (\$250)

PUBLICATIONS and PROFESSIONAL ACTIVITIES

50 Peer-reviewed journal articles, beginning 2006
Grants Received (Since 2014 > \$1,000,000 from a variety of competitive sources)
Symposia, Seminars and Invited Presentations (12 since 2014)

TEACHING:

University of California, Riverside

Fall 2019	Evolution of Conflict and Coopertion (upper division lecture)
Fall 2014-2020	Cellular Basis of Life (Non-majors lower-division lecture)
Winter 2016, 17, 18, 19	Morphology - Entomology Graduate Student Core Course,
Spring 2019, 20	Graduate seminar in pollination and pollinator conservation (co-taught)
Winter 2016	Pollination Graduate seminar (co-taught with Erin Wilson Rankin).
Spring 2016	Symbiosis Graduate seminar (co-taught with Richard Stouthamer and Joel Sachs).

California State University, Fresno

Spring 2014	General Entomology (upper division lecture and lab)
	Bioinformatics (upper division lecture and lab)
Fall 2013	Systematic Biology (upper division lecture and lab)
	Ecological and evolutionary genetics (graduate student seminar)

SYNERGISTIC ACTIVITIES

1. TRAINING and MENTORSHIP:

Since 2014, McFrederick has trained 2 postdoctoral scholars, 5 graduate students and 16 undergraduates (17 female, 4 male; 7 Asian, 7 Hispanic, 1 African-American) in field biology, molecular biology, experimentation, and microbiology. Four graduate students received fellowships (1 UC-Mexus, 2 USDA predoctoral fellowships, 1 NASA-Fields fellowship, and 1 NSF GRFP fellowship).

2. PUBLIC OUTREACH:

UC Riverside Entomology Outreach: McFrederick served as chair of the outreach committee from 2015-2020. Our outreach program includes graduate student presentations to local schools (> 30 schools per year), plant sales, science fairs, and other public events.

Microbes and bee health: Since 2013, McFrederick has presented his bee/microbe research at the Central Valley Café Scientifique, Central Valley Beekeeper's Association, Orange County Beekeeper's Association, Orange County group of the Sierra Club, California Association of Pest Control Advisers (three times), California Almond Board (three times), the Orchard Bee Association, and the Bee Symposium at the UC Davis Honey and Pollination center.

Elementary School presentations: McFrederick has presented to 12 elementary school classes on bee biology and science as a career choice. Classes comprised groups underrepresented in the sciences. McFrederick will continue to conduct elementary school outreach.

UC Riverside Insect Fair: McFrederick and his lab members participate in the annual Insect Fair, which is organized by UC Riverside graduate students and the Riverside Metropolitan Museum and attracts a larger crowd every year. In 2019 the crowd was estimated at 16,000 visitors.

3. DEVELOPMENT OF STANDARDIZED METHODS:

Standard Methods for Research on *Apis mellifera* Gut Symbionts: Along with co-authors Philipp Engel, Rosalind James, Ryuichi Koga, Waldan K. Kwong, and Nancy A. Moran, McFrederick developed standardized methods for studying the gut microbiota of bees, which was published in the Journal of Apicultural Research and The COLOSS BEEBOOK (<http://www.coloss.org/beebook>).

BeeBiome synthesis meeting NESCent, October 2014. McFrederick was one of about 30 participants that met to discuss and design standard protocols, databases, and research directions for research on the bee microbiome.

4. WORKSHOPS:

Chemical ecology class for University of Panama students: McFrederick taught a class (for Panamanian students in Spanish) as part of a workshop in chemical ecology at the Smithsonian Tropical Research Institute (2011).

August Teaching Workshop, University of Virginia: McFrederick led a workshop on grading student writing for incoming graduate students and faculty at the University of Virginia (2009).

RECENT PUBLICATIONS (Past 5 years, bold names are McFrederick lab members):

- 2019 EC Palmer-Young, L Ngor, R Burciaga, JA Rothman, TR Raffel, QS McFrederick.** Temperature dependence of parasitic infection and gut bacterial communities in bumble bees. *Environmental Microbiology*. doi.org/10.1111/1462-2920.14805.
- 2019 JA Rothman, L Leger, J Kirkwood, QS McFrederick.** Cadmium and selenate exposure affects the honey bee microbiome and metabolome, and bee-associated bacteria show potential for bioaccumulation. *Applied and Environmental Microbiology*. doi:10.1128/AEM.01411-19
- 2019 A Voulgari-Kokota, QS McFrederick, I Steffan-Dewenter, A Keller, Drivers, diversity, and functions of the solitary-bee microbiota. *Trends in Microbiology*, 10.1016/j.tim.2019.07.011**
- 2019 HQ Vuong, QS McFrederick,** Comparative genomics of wild bee and flower isolated *Lactobacillus* reveals potential adaptation to the bee host, *Genome Biology and Evolution*, <https://doi.org/10.1093/gbe/evz136>
- 2019 JA Rothman, L Leger, P Graystock, KA Russell, QS McFrederick.** The bumble bee microbiome increases survival of bees exposed to selenate toxicity. *Environmental Microbiology* <https://doi.org/10.1111/1462-2920.14641>
- 2019 A Rubanov, KA Russell, JA Rothman, JC Nieh, QS McFrederick.** Intensity of *Nosema ceranae* infection is associated with specific honey bee gut bacteria and weakly associated with gut microbiome structure. *Scientific Reports* 9 (1) 38920.
- 2019 McFrederick, Q. S. and Rehan, S.** Wild bee foraging patterns and microbial communities co-vary across landscapes. *Microbial Ecology* 77 (2), 513-522, <https://doi.org/10.1007/s00248-018-1232-y>.
- 2019 JA Rothman, C Andrikopoulos, D Cox-Foster, QS McFrederick.** Floral and foliar source affect the bee nest microbial community. *Microbial Ecology* <https://doi.org/10.1007/s00248-018-1300-3>
- 2018 Carroll, MJ, Meikle, WG, McFrederick, QS, Rothman, JA Brown, N, Weiss, M.** Pre-almond supplemental forage improves colony survival and alters queen pheromone signaling in overwintering honey bee colonies. *Apidologie* 49 (6), 827-837
- 2018 Palmer-Young, EC, Raffel, TR, McFrederick, QS.** Temperature-mediated inhibition of a bumblebee parasite by an intestinal symbiont *Proceedings of the Royal Society B*, 10.1098/rspb.2018.2041
- 2018 Palmer-Young, EC, Raffel, TR & McFrederick, QS.** pH-mediated inhibition of a bumble bee parasite by an intestinal symbiont. *Parasitology*. 10.1017/S003118201800015.
- 2018 Meikle, WG, Holst, N, Colin, T, Weiss, M, Carroll, MJ, McFrederick, QS, & Barron, AB.** Using within-day hive weight changes to measure environmental effects on honey bee colonies. *PLoS ONE*, 13(5), e0197589.
- 2018 McFrederick, QS, Vuong, HQ, & Rothman, JA.** *Lactobacillus micheneri* sp. nov., *Lactobacillus timberlakei* sp. nov. and *Lactobacillus quenuiae* sp. nov., lactic acid bacteria isolated from wild bees and flowers. *International Journal of Systematic and Evolutionary Microbiology*, 68 (6), 1879-1884.
- 2018 Pennington, MJ, Rothman, JA, Jones, MB, McFrederick, QS, Gan, J, & Trumble, JT.** Effects of contaminants of emerging concern on *Myzus persicae* (Sulzer, Hemiptera: Aphididae) biology and on their host plant, *Capsicum annuum*. *Environmental Monitoring and Assessment*, 190 (3), 3347.
- 2018 Rothman, JA, Carroll, MJ, Meikle, WG, Anderson, KE, & McFrederick, QS.** Longitudinal effects of supplemental forage on the honey bee (*Apis mellifera*) microbiota and inter- and intra-colony variability. *Microbial Ecology*, 274 (80), 1–11.

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2017 Pennington, MJ, **Rothman, JA**, Dudley, SL, Jones, MB, **McFrederick, QS**, Gan, J, & Trumble, JT. Contaminants of emerging concern affect *Trichoplusia ni* growth and development on artificial diets and a key host plant. *Proceedings of the National Academy of Sciences*, 114 (46), E9923–E9931.

2017 Pennington, MJ, **Rothman, JA**, Jones, MB, **McFrederick, QS**, Gan, J, & Trumble, JT. Effects of contaminants of emerging concern on *Megaselia scalaris* (Lowe, Diptera: Phoridae) and its microbial community. *Scientific Reports*, 7 (1).

2017 **Graystock, P**, Rehan SM, **McFrederick QS**. Hunting for healthy microbiomes: Determining the core microbiome of *Ceratina*, *Apis*, and *Megalopta* bees and how they associate with microbes in bee collected pollen. *Conservation Genetics* 18, 701-711.

2017 Hudson, LN and 149 others, including **McFrederick, QS**. The database of the PREDICTS (Predicting Responses of Ecological Diversity In Changing Terrestrial Systems) project. *Ecology and Evolution*, 7, 145-188.

2017 **McFrederick, QS**, Thomas, JM, Neff, JL, **Vuong, HQ**, **Russell, KA**, Hale, AR, & Mueller, UG. Flowers and wild megachilid bees share microbes. *Microbial Ecology*, 73, 188-200.

2016 Gordon, ERL, **McFrederick, QS**, Weirauch, C. Phylogenetic evidence for ancient and persistent environmental symbiont reacquisition in Largidae (Hemiptera: Heteroptera). *Appl Environ Microbiol* 82:7123-7133.

2016 De Palma, A., and 75 others, including McFrederick QS. Predicting bee community responses to land-use changes: Effects of geographic and taxonomic biases. *Scientific Reports*, 6, 31153.

2016 Meirelles LA, **McFrederick, QS**, Rodrigues A, Mantovani JD, de Melo Rodovalho C, Ferreira H, Bacci M, Mueller UG. Bacterial microbiomes from vertically-transmitted fungal inocula of the leaf-cutting ant *Atta texana*. *Environmental Microbiology Reports*. 8, 630-640.

2016 Engel P, Kwong WK, **McFrederick QS**, Anderson KE, Barribeau SM, Chandler JA, et al. The bee microbiome: Impact on bee health and model for evolution and ecology of host-microbe interactions. *mBio*, 7(2), e02164–15.

2016 **McFrederick QS**, and Rehan S. Characterization of pollen and bacterial community composition in brood provisions of a small carpenter bee. *Molecular Ecology*. 25, 2302-2311.

2016 **Graystock P**, Blaine EJ, **McFrederick QS**, Goulson D, and Hughes WH. Do managed bees drive parasite spread in wild bees? *International Journal for Parasitology: Parasites and Wildlife*. 5, 64-75.