

# Brian Richard Lovett, PhD

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## Education

2012-2019	PhD Entomology	University of Maryland, College Park, MD
2008-2012	B.S. Microbiology	Michigan State University, East Lansing, MI

## Professional Research Experience

**Feb 2020-Present**      **40 hours/week**      **Postdoctoral Researcher, WVU, Morgantown, WV**

Advised by Dr. Matt Kasson – Responsibilities involve development of chestnut blight biotechnology and investigation of the pathology and evolution of entomophthoralean (‘insect destroying’) fungi. This role involves benchwork (e.g., culturing fungi, microscopy and molecular techniques), fieldwork (e.g., experimental inoculations, monitoring of tree disease symptoms and sample collection), writing up independent research for publication and seeking independent funding.

## Graduate Research

**Jun 2012-Jan 2020**      **40+ hours/week**      **Graduate Student, UMD, College Park, MD**

Advised by Dr. Raymond St. Leger – Projects included semi-field application of transgenic entomopathogenic fungi to control malaria vector mosquitoes, transcriptomic analysis of *Anopheles* mosquitoes infected with *Metarhizium* and *Plasmodium*, comparative genomics study of recently diverged *Metarhizium* spp. fungi, and functional gene microarray analysis of winter wheat and turf microfauna. Responsibilities involved independent research on the projects above, management of grant funds, management of laboratory personnel and safety, mentoring of undergraduate and graduate students and writing and publishing manuscripts.

## Publications

\* signifies co-first authorship

- **Lovett, B.**, Angie, M. M., Stajich, J. E., Cooley, J., Eilenberg, J., de Fine Licht, H. H., Kasson, M. T., 2020. Behavioral Betrayal: how select fungal parasites enlist living insects to do their bidding. *PLoS Pathogens*, accepted.
- **Lovett, B.**, St. Leger, R. J., de Fine Licht, H. H., 2020. Going gentle into that pathogen-induced goodnight, *Journal of Invertebrate Pathology*, accepted.
- St. Leger, R.J., Diabate, A. and **Lovett, B.**, 2019. Regulate GM fungi to protect ecosystems—Response. *Science*, 365(6452), pp.455-455.
- **Lovett, B.**, Bilgo, E.\*, Millogo, S. A., Ouattarra, A. K., Sare, I., Gnambani, E. J., Dabire, R. K., Diabate, A., St. Leger, R., 2019. Transgenic *Metarhizium* rapidly kills mosquitoes in a malaria-endemic region of Burkina Faso, *Science*, 6443(364), pp.894–897.
- **Lovett, B.**, Bilgo, E., Diabate, A. and St. Leger, R. J., 2019. A review of progress toward field application of transgenic mosquitocidal entomopathogenic fungi. *Pest management science*.
- Wang, J., **Lovett, B.** and St. Leger, R.J., 2019. The secretome and chemistry of *Metarhizium*; a genus of entomopathogenic fungi. *Fungal Ecology*, 38, pp.7-11.
- Bilgo, E., **Lovett, B.**, Bayili, K., Millogo, A.S., Saré, I., Dabiré, R.K., Sanon, A., St. Leger, R.J. and Diabate, A., 2018. Transgenic *Metarhizium* pingshaense synergistically ameliorates pyrethroid-resistance in wild-caught, malaria-vector mosquitoes. *PloS one*, 13(9), p.e0203529.
- Bilgo, E., **Lovett, B.**, St. Leger, R. J., Sanon, A., Dabiré, R. K., and Diabaté, A. 2018. Native entomopathogenic *Metarhizium* spp. from Burkina Faso and their virulence against the malaria vector *Anopheles coluzzii* and non-target insects. *Parasites & vectors*, 11(1), 209.
- **Lovett, B.** and St. Leger, R.J., 2018. Genetically engineering better fungal biopesticides. *Pest management science*, 74(4), pp.781-789.

- Fujimoto, M., **Lovett, B.**, Angoshtari, R., Nirenberg, P., Loch, T.P., Scribner, K.T. and Marsh, T.L., 2017. Antagonistic Interactions and Biofilm Forming Capabilities Among Bacterial Strains Isolated from the Egg Surfaces of Lake Sturgeon (*Acipenser fulvescens*). *Microbial Ecology*, pp.1-16.
- Liao, X., **Lovett, B.**, Fang, W. and St. Leger, R.J., 2017. *Metarhizium robertsii* produces indole-3-acetic acid, which promotes root growth in *Arabidopsis* and enhances virulence to insects. *Microbiology (Reading, England)*, 163(7), p.980.
- Gott, R.C., Kunkel, G.R., Zobel, E.S., **Lovett, B.R.** and Hawthorne, D.J., 2017. Implicating ABC Transporters in Insecticide Resistance: Research Strategies and a Decision Framework. *Journal of Economic Entomology*, 110(2), pp.667-677.
- Bilgo, E., **Lovett, B.\***, Fang, W., Bende, N., King, G.F., Diabate, A. and St. Leger, R.J., 2017. Improved efficacy of an arthropod toxin expressing fungus against insecticide-resistant malaria-vector mosquitoes. *Scientific Reports*, 7.
- **Lovett, B.** and St. Leger, R.J., 2017. The Insect Pathogens. *Microbiology Spectrum*, 5(2).
- Zhao, H., **Lovett, B.** and Fang, W., 2016. Genetically Engineering Entomopathogenic Fungi. *Advances in Genetics*, 94, pp 137-163.
- **Lovett, B.** and St. Leger, R.J., 2014. Stress is the rule rather than the exception for *Metarhizium*. *Current genetics*, 61(3), pp 253-261.
- **Lovett, B.** and St. Leger R.J., 2016. Genetics and Molecular Biology of Entomopathogenic Fungi. *Advances in Genetics*, 94. (Editor)

### **Fellowships, Honors and Funding**

- Entomological Society of America Innovation Task Force Participant (2020)
- AAAS Newcomb Cleveland Prize Recipient (2020)
- Entomological Society of America Innovation Day Participant (June 2019)
- Board of Visitors Outstanding Graduate Student Award (2019)
- American Institute of Biological Sciences Emerging Public Policy Leadership Award (2019)
- Student Presentation Award at European Congress of Entomology (2018)
- Cosmos Scholars Grant “Floral delivery of transgenic malaria mosquito killing fungi” (2018; \$1,000 USD)
- Bioscience Day Bioengineering Section Poster Award Winner (2017)
- Society for Invertebrate Pathology Best Student Oral Presentation – First Prize (2017)
- Society for Invertebrate Pathology Inaugural Video Contest – First Prize (2017)
- AAAS Annual Meeting Joshua E. Neimark Memorial Travel Award (2017)
- Entomology Society of America Science Policy Fellows Program (2016 Finalist)
- Fungal Biology and Biotechnology Poster Award at European Conference on Fungal Genetics (2016)
- First Place Student Speaking Competition Entomological Society of America Annual Meeting (2015)
- Society for Invertebrate Pathology Division of Fungi Annual Meeting Travel Award (2015)
- Department of Entomology Merit Fellowship (2015)
- Gahan Fellowship (2012-2014)
- National Science Foundation Graduate Research Fellowship Honorable Mention (2014)
- Allen L. Steinhauer Award for Excellence In Teaching (2013)
- Society for Invertebrate Pathology Best Student Presentation Award – Second Prize (2013)

### **Professional Memberships**

- American Society of Microbiology (2019-Present)
- Mycological Society of America (2018-Present)
- Entomological Society of America (2011-Present)
- American Association for the Advancement of Science (2016-Present)
- American Society for Microbiology (2011-Present)
- American Society of Tropical Medicine & Hygiene (2017-2019)
- Society for Invertebrate Pathology (2012-2018)

### **Presentations**

#### **National**

- Oral presentation “When does jargon rear its ugly head?” at the Entomological Society of America annual meeting in St. Louis, MO on 17 November 2019
- Poster Presentation “Stopping malaria with transgenic insect-killing fungi” at the Cellular and Molecular Fungal Biology Gordon Research Conference in Holderness, NH on 18 June 2018
- Oral Presentation “Stopping malaria with transgenic insect-killing fungi” at the Cellular and Molecular Fungal Biology Gordon Research Seminar in Holderness, NH on 16 June 2018
- Oral Presentation “Preventing malaria parasite transmission with transgenic entomopathogenic fungi” at the American Society of Tropical Medicine & Hygiene Annual Meeting in Baltimore, MD on 9 November 2017
- Oral Presentation “Exploiting mosquito biology with transgenic *Metarhizium pingshaense*” at the Society for Invertebrate Pathology Conference in San Diego, CA on 16 August 2017
- Invited Departmental Seminar “Genetically engineered insect pathogenic fungi” at the Johns Hopkins Malaria Research Institute in Baltimore, MD on 7 April 2017
- Poster Presentation “Applying Transgenic Fungi In a MosquitoSphere” at the 2017 AAAS Annual Meeting in Boston, MA on 18 February 2017
- Oral Presentation "Lethal and pre-lethal effects of transgenic *Metarhizium* in the semi-field" at The Future of Malaria Research in Rockville, MD on 4 November 2016
- Poster Presentation “Consistent Risk Assessment of a Genetically Modified Microorganisms in the Field” at Annual 2016 BRAG Project Meeting in Riverdale, MD on 31 August 2016
- Poster Presentation “Applying Transgenic Fungi In a MosquitoSphere” at Global Malaria: The International Centers of Excellence at Johns Hopkins Bloomberg School of Public Health in Baltimore, MD on 25 April 2016
- Oral presentation “Transgenic Entomopathogenic Fungi In the Semi-Field” at the Entomological Society of America Annual Meeting in Minneapolis, MN on 16 November 2015
- Poster presentation “Impact of a Genetically Modified Biocontrol Agent On Rhizospheric Processes” at the Annual 2014 BRAG Project Meeting In Riverdale, MD on 5 June 2014
- Invited oral presentation “Enhancing and Capitalizing on the Genetic Toolkit of Entomopathogenic Fungi” at the North Central Branch Entomological Society of America Conference in Des Moines, IA on 9 March 2014
- Oral presentation “Transcriptomic Analysis of Tripartite Interactions of *Metarhizium*, *Plasmodium falciparum*, and *Anopheles gambiae*” at the Society for Invertebrate Pathology Conference in Pittsburg, PA on 14 August 2013
- Poster presentation “Functional Gene Microarray Analysis of the Effect of *Metarhizium* on Winter Wheat and Turf Rhizospheres” at the Annual 2013 BRAG Project Meeting in Riverdale, MD on 14 June 2013

#### **International**

- Invited Oral Presentation “More fungus, less malaria” at the 2018 ESA, ESC, and ESBC Joint Annual Meeting in Vancouver, British Columbia, Canada on 14 November 2018
- Invited Oral Presentation “*Metarhizium* and plants: the symbiosis is mutual” at the International Mycological Congress in San Juan, Puerto Rico on 21 July 2018
- Oral Presentation “Transgenic fungi prevent mosquitoes from transmitting malaria parasites” at the European Congress of Entomology in Naples, Italy on 4 July 2018
- Invited Departmental Seminar “Using transgenic fungi to kill malaria mosquitoes” at Brock University in St. Catharines, Ontario, Canada on 27 October 2017
- Oral Presentation “Transgenic entomopathogenic fungi: vector control before vector death” at the Pan-African Mosquito Control Association Conference in Ouagadougou, Burkina Faso on 17 October 2017
- Oral Presentation “Big Data and Little *Metarhizium*: Evolution and interactions of an endophytic insect pathogenic fungus” at the Society for Invertebrate Pathology Conference in Tours, France on 27 July 2016
- Poster Presentation “Applying Transgenic Fungi In a MalariaSphere” at the Clavicipitaceae Workshop of the European Conference on Fungal Genetics in Paris, France on 5 April 2016
- Oral Presentation “The Dual Lifestyles of *Metarhizium*” at the Clavicipitaceae Workshop of the European Conference on Fungal Genetics in Paris, France on 3 April 2016
- Oral presentation “Using GM Fungi to Prevent Malaria Transmission” at the Institut de Recherche en Sciences de la Sante in Bobo-Dioulasso, Burkina Faso on 29 February 2016

- Oral presentation “GeoChip Analysis of the Soil Microbial Community In Turf and Winter Wheat Treated with Genetically Modified *Metarhizium*” at the Society for Invertebrate Pathology Conference in Vancouver, British Columbia, Canada on 12 August 2015
- Oral presentation “Semi-field Trials and Tribulations” at the Society for Invertebrate Pathology Conference in Vancouver, British Columbia, Canada on 12 August 2015
- Oral presentation “*Metarhizium* as a Multifactoral Growth Promoter” at the Society for Invertebrate Pathology Conference in Vancouver, British Columbia, Canada on 12 August 2015
- Poster presentation “Comparative Genomics of Cold Adapted *Metarhizium frigidum*” at the Society for Invertebrate Pathology Conference in Vancouver, British Columbia, Canada on 12 August 2015
- Oral presentation “*Metarhizium*: An Outdoor Survival Guide” at the International Symposium on Fungal Stress in São José dos Campos, Brazil on 29 October 2014

## Service and Outreach

### Institutional Service

- UMD Maryland Day Public Booth for Genetically Modified Organisms in Pest Control on 30 April 2016
- UMD Graduate Student Success Symposium: Panel on Poster Presentations on 22 January 2018

### Professional Service

- Panelist for Advocate Entomology! Learn How with the Science Policy Committee on 12 November 2018 (20,000+ international readers)
- Co-Chair for “Mosquitoes: Operational Control” session at the American Society of Tropical Medicine & Hygiene Annual Meeting in Baltimore, MD on 9 November 2017
- Served on the Local Scientific Committee for the 2017 Pan-African Mosquito Control Association Conference
- Co-Chair for “Fungi as biocontrol agents for sustainable agriculture” session at the International Mycological Congress in San Juan, Puerto Rico on 21 July 2018
- Co-Chair/Panelist “Next Generation Sequencing Symposium” at the Society for Invertebrate Pathology Conference in Tours, France on 27 July 2016
- Entomological Society of America Science Policy Committee (2016-present)
  - Served as chair for a position statement on the importance of gene drive technologies
  - Served as chair for a position statement on the value of gene drives and two infographic fact sheets on how gene drives work and the safety of *Bacillus thuringiensis*
  - Served as member of writing committee for position statements and fact sheets on modern mosquito management and effective mosquito management
- President-Elect of Mycological Society of America Diversity and Inclusion Committee (2019-Present)
  - Creator of the original MSA Diversity Statement as part of this committee
- Served as reviewer for Journal of Invertebrate Pathology, FEMS Microbiology Letters, Bulletin of Entomological Research, Developmental and Comparative Immunology, Fungal Ecology, Scientific Reports, Heredity, PCI Entomology, Journal of Medical Entomology, Journal of Pest management, Fungal Genetics and Biology, Mycologia, Frontiers in Microbiology, G3, Science and PLOS Genetics

### Outreach

- The Conversation article: “Scientists are working to protect invaluable living collections during coronavirus lockdowns” with Matt Kasson and Rita Rio on 23 April 2020
- WIRED article: “The Magic of Teaching Science Labs Isn’t Lost Online” with Esther Ngumbi on 25 March 2020
- USA Today article: “Coronavirus closings: Are colleges helping their foreign, homeless and poor students?” contributing author with Esther Ngumbi on 17 March 2020
- Inter Press Service article: “Is Our Academic System Ready for a New Coronavirus Normal?” with Esther Ngumbi on 11 March 2020
- WIRED article: “Science Conferences Are Stuck in the Dark Ages” with Esther Ngumbi on 3 January 2020
- Contributing editor and author for the American Society for Microbiology online articles
  - “How microbes help us reclaim our wastewater” 10 April 2020
  - “The Frozen Potential of Microbial Collections” 16 August 2019

- “The Stuff of Insect Nightmares: Genetically Engineered Entomopathogenic Fungi” 14 June 2019
- Science On Tap UMD public outreach talk “Engineering good fungi to kill bad mosquitoes quickly” on 29 July 2019
- The Conversation article: “Is an ‘insect apocalypse’ happening? How would we know?” on 29 April 2019
- UMD Bioscience Day Poster entitled “Engineering Fungi to Prevent Malaria Transmission” on 16 November 2017

## Media

I have been interviewed on my work, biotechnology and vector biology in a variety of print, radio and television outlets including BBC World Service, BBC News, NPR, CBS News, EuroNews, The Associated Press, The Telegraph, The Independent, CNN and The Washington Post.

- Podcast: Five Minute Fight Malaria blog - Transgenic Malaria Control Kills 99% of Mosquitoes in African Trial on 1 June 2019
- Podcast: Naked Scientists - GM fungi to kill malaria mosquitoes on 31 May 2019
- Constant Wonder radio interview on the “insect apocalypse” on 1 May 2019
- Podcast: Bacteriofiles 320: Fortified Fungi Fight Fevers on 11 December 2017
- CBS News Interview on the EPA approval of MosquitoMate *Wolbachia* male mosquito release 16 November 2017
- Podcast: AAAS Science Update – Mosquito Killing Fungi on 10 July 2017

## Teaching Experience

**HONR278Q-** Biodiversity Matters (FS2019, 20 students)

Guest lecturer covering mosquito biology, insect-killing fungi and transgenic semi-field trials

**BSCI222-** Principles of Genetics (SS 2019, 240 students)

Class instructor for two lectures on gene regulation and behavioral genetics

**ENTM609-** Integrated Pest Management (SS 2019, 20 students)

Guest lecturer covering gene drive technologies

**ENTM715/756-** Insect Diseases and Pathology Online Entomology Master’s Course Instructor (FS 2016, FS 2018 and FS 2019)

**HLSC 322-** Genes and Genomics GTA (SS 2012; SS 2014; 70 students)

Class Instructor for Introductory Lecture of SS 2014

**BSCI 105-** Principles of Biology I GTA (FS 2013)

**BSCI 207-** Organismal Biology GTA (FS 2012)

**Coursera: Genes and the Human Condition-** From Behavior to Biotechnology GTA and Producer (SS 2012; FS 2013; Summer 2014, On-Demand Continual Release)

I produced 72 videos for this massive open online course with over 100,000 total learners

**Two-day Workshop entitled “Quality In, Quality Out: Statistics In R”** for the Centre Muraz and the Institut de Recherche en Sciences de la Sante in Bobo-Dioulasso, Burkina Faso on 1-2 March 2016