

LUKE E. HEARON

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EDUCATION

The Ohio State University 2024–present

Doctor of Philosophy, Entomology

Advisor: Dr. Reed Johnson

The University of Illinois, 2020–2023

Urbana–Champaign

Master's of Science, Entomology

Advisor: Dr. Carla E. Cáceres

Thesis available at ideals.illinois.edu/items/127368

University of Pennsylvania 2019–2020

Post-baccalaureate coursework

Temple University 2020

Post-baccalaureate coursework

The Ohio State University 2015–2019

Bachelor of Science in Entomology; cum laude with research distinction

Minor in Evolution and Ecology

WORK

The Ohio State University, Honey Bee Lab

2023–2024

Research Technician

- PI: Dr. Reed Johnson
- Created buzzdetect, a machine learning tool for automated detection of honey bee flight buzzes in audio. buzzdetect is still under production, but latest versions can be found on the Bee Lab GitHub at github.com/OSU-Bee-Lab/buzzdetect
- Designed, executed, and analyzed laboratory component of project studying effects of mustard pollen on *Vairimorpha* infection in adult honey bees; assisted in design, execution, and analysis of field component.
- Networked and collaborated researchers from other universities

University of Pennsylvania, Morris Arboretum

2019–2020

Plant Protection Intern

- Operated the Arboretum Plant Clinic; diagnosed plant, pest, and disease submissions, communicated relevant information regarding identification, treatment, plant care, etc. in a manner appropriate to the expertise of the client
- Scouted arboretum grounds and greenhouse for pest, pathogen, or cultural problems; summarized the problem, its cause, and treatment recommendations to the relevant superior
- Designed and conducted research project quantifying bycatch of sticky bands used to trap spotted lanternfly; presented these results before Arboretum staff and communicated them to local homeowners and governmental authorities, as well as to academic experts
- Spearheaded Arboretum informational material regarding spotted lanternfly, drafting documents such as official responses to common questions and teaching classes aimed many levels of expertise from children to experienced gardeners

The Ohio State University, Honey Bee Lab 2016–2019

Student researcher

- PI: Dr. Reed Johnson 2018–2019
- Project: Pollen analysis to determine floral source of Ohio summer honey
- Sought to determine the contribution of soybean flowers to Ohio honeys
- Adapted existing palynological methodologies to suit research project
- Developed novel geographic information system (GIS) landscape analysis method to quantify presence of soybean around honey bee hives
- Presented progress and results at academic and professional conferences

Student research assistant 2016–2018

- Assisted postdoctoral researcher Chia-Hua Lin, doctorate student Rodney Richardson, and master's student Natalia Riusech
- Independently performed routine hive evaluations for the Sentinel Apiary Program
- Conducted in vivo bioassay for potential miticide to be used in bee hives
- Conducted GIS landscape analysis
- Reared worker and queen brood for use in toxicological studies
- Conducted regular colony maintenance and inspections

The Ohio State University 2018–2019

Student Grader

- Course instructors: Dr. Reed Johnson, Dr. Celeste Welty
- Graded weekly coursework for both Pesticide Science (ENTMLGY 5800) and Beekeeping (ENTMLGY 2200) courses
- Assisted in conducting Beekeeping labs

FELLOWSHIPS

Illinois Distinguished Fellowship

3-year fellowship with full coverage of tuition and \$25,000 annual stipend Awarded in fall semester of 2020

RESEARCH FUNDING – \$4,000 net

\$1,000 Francis M. and Harlie M. Clark Research Support Grant (UIUC internal) (2021)

Hearon, L.E. “Impacts of Parasitized Prey upon Predator Fitness in the Predator-Spreader System”

\$3,000 Ohio State Beekeepers Association (2018)

Johnson, R.M., **Hearon, L.E.** “Soybean or Clover: Pollen Analysis to Determine Floral Source of Ohio Summer Honey”

PUBLICATIONS, PEER-REVIEWED

Journal of Insect Science (in press)

Hearon, L. E., Johnson, L. H. P., Underwood, J., Lin, C. H., Johnson, R. M. buzzdetect: an open-source deep learning tool for automated bioacoustic pollinator monitoring.

- Preprint available at [biorxiv.org/content/10.1101/2025.06.13.659554v1](https://doi.org/10.1101/2025.06.13.659554v1)

Molecular Ecology

Richardson, R. T., Curtis, H. R., Matcham, E. G., Lin, C. H., Suresh, S., Sponsler, D. B., **Hearon, L. E.**, Johnson, R. M. 2018. Quantitative multi-locus metabarcoding and waggle dance interpretation reveal honey bee spring foraging patterns in Midwest agroecosystems. *Molecular Ecology*.

- Conducted GIS analysis to create and correct ground cover data for use in analysis of spatial foraging patterns of honey bees

PUBLICATIONS, UNDER REVIEW

Hearon, L. E., Cáceres, C.E. Testing feeding rate and resource trade-off as mechanisms driving the increased disease of *Daphnia* exposed to *Chaoborus* cues.

- Submitted to Journal of Plankton Research
- Draft available on request

SCIENTIFIC PRESENTATIONS – ORAL

American Bee Research Conference

Hearon, L.E., Lin, C.H., Johnson R.M. 2025. Impacts of weather on daily foraging patterns in soybeans. Reno, NV.

Entomological Society of America

Hearon, L.E., Johnson, R.M. 2024. “When bees are actively foraging” - Using bioacoustics to monitor pollinators. Phoenix, AZ.

EcoSpatial Summit

Hearon, L.E., Johnson R.M. 2024. Looking for spatial patterns with acoustic detection. Flash talk. College Station, PA.

American Bee Research Conference

Hearon, L.E., Johnson R.M. 2024. buzzdetect: a machine learning tool for automated acoustic detection of honey bee activity. New Orleans, LA.

Ohio State Beekeepers Association Conference

Hearon, L.E., Lin, C.H., Johnson R.M. 2023. Golden Forage: Can mustard cover crops provide both food and medicine for bees? Wooster, OH.

UIUC Graduates in Ecology Workshop Series

Hearon, L.E. 2023. Principled Programming and Mouth Pipetting. Graduates in Ecology and Evolutionary Biology Weekly “EcoLunch” brown bag lecture series, Champaign, IL.

- This three part workshop series sought to teach graduate student attendees best practices and open, reproducible workflows for data manipulation, analysis, and graphing at the scale of entire research projects.

UIUC Graduates in Ecology Colloquium

Hearon, L.E. 2023. Effects of predator cues and pathogen exposure on *Daphnia dentifera*. Research presentation. Graduates in Ecology and Evolutionary Biology Annual Research Colloquium, Champaign, IL.

The Morris Arboretum

Hearon, L.E. 2020. What's the Catch? Collateral mortality of spotted lanternfly sticky banding. Morris Arboretum internship project presentation.

American Bee Research Conference

Hearon, L.E., Johnson R.M. 2019. Establishing a correlation between soybean presence and soybean foraging by *A. mellifera*. Research presentation. American Bee Research Conference, Tempe, AZ.

Ohio State Beekeepers Association Conference

Johnson, R.M., **Hearon, L.E.** 2018. Soybean vs. Clover: Summertime honey production in Ohio. Research presentation. OSBA Annual Fall Conference, Plains City, OH.

SCIENTIFIC PRESENTATIONS – POSTERS

Entomological Society of America ([2nd in class](#))

Hearon, L.E., Cáceres C.E. 2022. Non-consumptive effects of an insect predator on the dynamics of its prey's disease. Annual meeting, student poster competition. Vancouver, BC, Canada.

Ohio State University, Undergraduate Research Forum ([2nd in class](#))

Hearon, L.E., Johnson R.M. 2019. Soybean cropland as foraging source for the European honey bee and predictor of honey content. CFAES Undergraduate Research Forum, Columbus, OH.

The Richard J. and Martha D. Denman Undergraduate Research Forum

Hearon, L.E., Johnson R.M. 2019. Establishing a correlation between soybean presence and soybean foraging by *A. mellifera*. The Richard J. and Martha D. Denman Undergraduate Research Forum, Columbus, OH.

Ohio State University College of Food, Agricultural, and Environmental Sciences Undergraduate Research Forum

Hearon, L.E., Johnson R.M. 2018. Establishing a correlation between soybean presence and soybean foraging by *A. mellifera*. CFAES Undergraduate Research Forum, Columbus, OH.

MENTORING

Greta Keilman

Mentored undergraduate student Greta Keilman from the summer of 2021 to spring, 2023. Assisted Greta in the creation, execution, and analysis of two independent research projects. Greta presented these results at multiple undergraduate research forums.

Hayden Goldspink

Mentored undergraduate student Hayden Goldspink in the summers of 2021 and 2022. Assisted Hayden in the creation and execution of an independent research project. Hayden presented these results at the iBio undergraduate research symposium in 2022.

SCIENTIFIC COMMUNICATION – WRITTEN

Grid Magazine

Hearon, L.E. 2019. A Host of Issues. Grid Magazine.

gridphilly.com/grid-magazine/2019/9/16/a-host-of-issues

Volunteer Newsletter (Morris Arboretum)

Hearon, L.E. 2019. What You Need to Know About the Spotted Lanternfly. Volunteer, August 2019.

morrisarboretum.org/pdf/Volunteer-August-2019.pdf

Ohio State Beekeepers Association Newsletter

Johnson, R.M., **Hearon, L.E.** 2019. Honey Pollen Results from 2017 OSBA Fall Conference. Ohio State Beekeepers Association Newsletter 8(2):7-8.

ohiostatebeekeepers.org/wp-content/uploads/2019/04/OSBA-2019-2nd-Quarter.pdf

Ohio State Beekeepers Association Newsletter

Hearon, L.E. 2018. Initial Results of Pollen Analysis from Honey. Ohio State Beekeepers Association Newsletter 7(4):11, 19.

ohiostatebeekeepers.org/wp-content/uploads/2018/10/OSBA-4th-QTR-2018.pdf

SCIENTIFIC COMMUNICATION – ORAL

Cáceres Lab Outreach

Organized and participated in multiple outreach events in collaboration with X-Time, a local summer camp. Used hands-on activities to teach children about food webs and ecosystem dynamics.

UIUC “Insect Petting Zoo”

Assisted in the presentation of UIUC “Insect Petting Zoo” as an outreach event to students of various grades at the following locations: Mahomet-Seymour Junior High School (Fall 2021), Little Hearts and Hands Academy (Spring 2022), X-Time summer camp (Summer 2022), Peggy Notebaert Nature Museum “Bugapalooza” (Summer 2022).

The Morris Arboretum

Hearon, L.E. 2020. “Spotted Lanternfly—What You Need to Know.” A teaching for homeowners on treatment and prevention of SLF infestation as well as the latest scientific developments and predictions. Approved for Pesticide Recertification Training Credit by the Pennsylvania Department of Agriculture.

The Office of Senator Daylin Leach

Hearon, L.E. 2019. “A Spotted Lanternfly Presentation For Kids.” Hosted by Belmont Hills Library. A presentation oriented to children of middle school age and below (as well as to their attending parents) serving as an opportunity to teach about invasive insects and conservation.

Hearon, L.E. 2019. “A Spotted Lanternfly Presentation For Kids.” Hosted by Radnor Memorial Library. As described above.

SCIENTIFIC COMMUNICATION – OTHER

Letters to a Pre-Scientist

2021–2022; participated in a pen-pal program that pairs scientists with students in underprivileged schools, encouraging pen-pal to engage with science and consider a career in STEM.

UIUC, Insect Fear Film Festival

2021, 2022, 2023; assisted in planning and preparation of films, served as webmaster and projectionist (2021, 2022), edited and controlled presentation of all media used in event (2022) and coordinated with event staff.

EXTRACURRICULAR

UIUC, Graduates in Ecology and Evolutionary Biology

Treasurer *Academic year 2022–2023*

UIUC, Entomology Graduate Student Association

Webmaster *Academic year 2021–2022*

Social co-chair *Academic year 2021–2022*

Faculty Liaison *Academic year 2022–2023*

SKILLS

- R; extremely comfortable with data processing, analysis, highly organized data management, and version control for source files. Practice and promote a project-centric, fully programmatic workflow for collaborative, open, reproducible science. Some experience creating custom packages; see my package “synthesizer” at github.com/lukehearon/synthesizer
- Statistical analysis; regularly conduct regression analyses with a wide range of modeling techniques such as generalized linear modeling, mixed effect and hierarchical modeling, time-to-event modeling, and have some exposure to Bayesian models, partial differential equation models, and spatial models. Place a great emphasis on principled causal analysis and rich interpretation of models beyond simple decisions of “significant or not”

- Excel/Google Sheets; capable of creating interactive, responsive sheets and visualizations utilizing multiple nested functions. Though I do all analysis in R, I have leveraged spreadsheets to facilitate complex, conditional data collection pipelines for large experiments with multiple researchers concurrently entering data
- Python; comfortable constructing functional programs, comfortable with TensorFlow.
- Geographic information system analysis; experience with ArcGIS, creating batch processing scripts and the model builder for automation of analyses; some exposure to GIS work in QGIS and R
- Tinkering; moderate experience with designing functional 3d printed devices, building and wiring electronic devices, drafting schematics and wiring diagrams for projects, woodworking and other fabrication
- Linux command line; experience solving the countless problems I create for myself in Ubuntu
- Sundry software tools for media processing, analysis, and creation including ImageJ, GIMP, Photoshop, Audacity, Reaper, DaVinci Resolve, and Fusion360