Department of Integrative Biology

Ecology, Evolutionary Biology, and Behavior Program

Michigan State University

288 Farm Lane, East Lansing, MI 48824

[younga46@msu.edu](mailto:younga46@msu.edu)

**Education**

Michigan State University, East Lansing, MI *Anticipated May 2021*

Dual Ph.D. in Integrative Biology and Ecology, Evolutionary Biology, and Behavior

Dissertation Title: *Investigations into the exploitation-exploration tradeoff in four honey bee species: Effects of environment and life history*

Advisor: Dr. Fred Dyer

Graduate GPA: 4.0/4.0

University of Kentucky, Lexington, KY  *May 2015*

Bachelor of Science in Agricultural Biotechnology, Biology Minor

Undergraduate GPA: 4.0/4.0

University of Dar es Salaam, Dar es Salaam, Tanzania *Jan 2013-June 2013*

Study Abroad in Zoology and Wildlife Conservation

GPA: 4.0/4.0

**Nationally Competitive Fellowships**

NSF Graduate Research Internship Program - $5,000 *2020*

NSF Graduate Research Opportunities Worldwide - $8,000 *2018-2019*

Fulbright-Nehru U.S. Student Research Grant - $13,000 *2018-2019*

NSF Graduate Research Fellowship (GRFP) - $138,000 *2017-present*

**Institutional and Other Grants and Fellowships**

EEBB Travel Fellowship - $500 *2020*

Animal Behavior Society Student Research Grant - $1,300 *2020*

MSU BEACON Travel Grant - $400 *2019*

Integrative Biology Travel Award - $250 *2019*

EEBB Summer Research Fellowship - $2,000 *2019*

2018 Integrative Biology Shaver Fellowship - $1,050 *2018*

MSU Claffey Meyer International Fellowship - $2,000 *2018*

EEBB Summer Travel Grant - $700  *2018*

College of Natural Sciences Summer Continuation Fellowship - $5,000 *2017*

EEBB Summer Research Fellowship - $1,900 *2017*

Animal Behavior Society Graduate Student Travel Grant - $500 *2016*

Phi Kappa Phi Love of Learning Fellowship - $400 *2016*

Organization for Tropical Studies Grant - $900 *2016*

MSU Graduate School Research Enhancement Fellowship - $1,000 2*016*

EEBB Summer Travel Grant - $700 *2016*

MSU College of Natural Science Recruiting Fellowship - $27,000 *2015*

MSU College of Natural Science Early Start Fellowship - $8,000 *2015*

University of Kentucky Conference Travel Fellowship *2015*

University of Kentucky Summer Research Travel Fellowship *2014*

University of Kentucky Honors Program Student Skills Award Grant *2012*

University of Kentucky Singletary Scholarship *2011-2015*

**Honors and Awards**

EEBB Distinguished Student Speaker  *2020*

MSU Certification in Community Engagement (in progress) *Aug 2019-present*

University of Kentucky Honors: Summa Cum Laude *2015*

University of Kentucky Honors Program Graduate *2015*

University of Kentucky Dean’s List *Fall 2011-Spring 2015*

R.M. Cable Award for Best Undergraduate Presentation- Annual Midwestern *2014*

Conference of Parasitology

University of Kentucky General Chemistry I Excellence Award *2011*

**Publications**

***Published***

**Young AM**, Brockmann A, and Dyer FC. In press. Adaptive tuning of the exploitation-exploration tradeoff in four honey bees. *Behavioral Ecology and Sociobiology.*

**Young AM**, Kohl PL, Rutschmann B, Steffan-Dewenter I, Brockmann A, and Dyer FC. In press. Temporal and spatial foraging patterns of three Asian honey bee species in Bangalore, India.

**Young, AM**, Gómez-Ruiz, P, Peña, JA, Uno, H, and Jaffe, R (2018). Wind speed affects pollination success in blackberries. *Sociobiology* 65(2): 225-231.

***In Preparation***

**Young AM**, Brockmann A, and Dyer FC. Investigations into the nocturnal foraging behavior of the giant honey bee *A. dorsata* across seasons, temperature, and light intensity. (In preparation)

**Young AM** and Dyer FC. Adaptive tuning of short-term exploratory behavior in response to spatial and temporal uncertainty in honey bees. (In preparation)

Dyer FC, **Young AM**, and Miner KM. Adaptive significance of negative incentive contrast effects in foraging bees: evidence from the influence of colony state. (In preparation)

**Presentations**

**Young AM** and Dyer FC. Do honey bees weigh evidence of absence differently based on prior experience with spatial uncertainty?. Virtual Animal Behavior Society conference, July 2020. Oral Presentation.

**Young AM,** Brockmann A, and Dyer FC. Comparative studies on the exploitation-exploration tradeoff in honey bees. Meeting of Pollinator Researchers in Asia, Kolkata, West Bengal, India, March 2020. Poster Presentation.

**Young AM,** Kolavi S, Brockmann A, and Dyer FC. Nocturnal foraging behavior of the giant honey bee across lunar cycles. Entomology 2019 conference, St. Louis, Missouri, November 2019. Oral Presentation.

**Young AM**, Brockmann A, and Dyer FC. Comparative studies on the evolution of the exploitation-exploration tradeoff in honey bees. Behaviour 2019 conference, Chicago, Illinois, July 2019. Oral Presentation.

**Young AM**, Kolavi S, Brockmann A, and Dyer FC. Nocturnal foraging behavior in *Apis dorsata*. 2nd Annual Bangalore Meeting on Asian Bees conference, Bangalore, India, March 2019. Oral Presentation.

**Young AM**, Kolavi S, Brockmann A, and Dyer FC. Studies on the nocturnal foraging behavior of the giant honey bee. South and South-east Asia Fulbright Conference, Kochi, India, February 2019. Oral Presentation.

**Young AM**, Brockmann A, and Dyer FC. Nocturnal foraging behavior in the giant honey bee *Apis dorsata*. Animal Behavior Society, Milwaukee, Wisconsin, August 2018. Oral Presentation.

**Young AM** and Dyer FC. Influence of individual foraging costs on the tradeoff between exploration and exploitation in honey bees. Animal Behavior Society conference, Toronto, Canada, June 2017. Poster Presentation.

**Young AM**. Foraging costs and the tradeoff between exploration and exploitation in honey bees. Ecology, Evolutionary Biology, and Behavior Colloquium, East Lansing, Michigan, October 2016. Oral Presentation.

**Young AM** and Dyer FC. To exploit or to explore: Adaptive modulation of search in foraging bees. Animal Behavior Society, Columbia, Missouri, July 2016. Poster Presentation

**Young AM** and Howe D. Identification of surface antigens in the llama and alpaca parasite *Sarcocystis aucheniae*. National Conference for Undergraduate Research, Spokane, Washington, April 2015. Oral Presentation.

**Young AM** and Howe D. Identification of surface antigens and development of diagnostic test for the

llama and alpaca parasite *Sarcocystis aucheniae*. Agricultural Biotechnology Student Research Presentations Showcase. Lexington, Kentucky, December 2014. Oral Presentation.

**Young AM** and Howe D. Identification of surface antigens in the llama and alpaca parasite *Sarcocystis aucheniae*. Annual Midwestern Conference of Parasitology, Lexington, Kentucky, June 2014. Poster Presentation.

**Research Experience**

Dissertation research on behavioral ecology of European and Asian honey bees *2015-present*

* Established original collaboration with Dr. Axel Brockmann at the National Centre for Biological Sciences in Bangalore, India
* Designed and conducted experimental study on species differences in the exploitation-exploration tradeoff in four honey bee species in naturalistic field settings in U.S. and India
  + Tested the effects of life history, change in resource quality, and season on behavior
* Designed and conducted observational investigation into the nocturnal foraging behavior of the giant honey bee Apis dorsata in India
  + Examined effects of season, illumination, and moon phase on activity
  + Investigated honey bee waggle dance orientation at night
  + Mentored one masters student in data collection and experimental design
* Designed and conducted observational study on the lifespan, activity, and foraging age of three honey bee species in U.S. and India
  + Investigated relationship on individual and colony level
* Designed and conducted manipulative experiments to investigate effects of environmental factors on honey bee foraging behavior and decision making
  + Investigated effects of colony nutritional state, individual energy expenditure, spatial uncertainty of resources in the environment, and temporal predictability of resources in the environment on honey bee feeding and exploratory behavior
* Designed and began field and laboratory experiment to investigate molecular causes of variation in exploratory behavior in Asian honey bees
  + Designed field assays to identify highly exploratory and non-exploratory bees
  + Began preparation for molecular genomics assays that collaborators will complete using RT-qPCR
* Statistical training and expertise in ANOVA, generalized linear mixed models, principal component analysis, R programming, and basic Python coding
* Experience in writing successful grant and fellowship applications, data analysis, manuscript preparation, academic presentations, non-academic scientific communication

Tropical Biology: An Ecological Approach field course, Costa Rica *June-July 2016*

* Extensive training in tropical biology field research including field methods, RCR training, data analysis, manuscript preparation
* Collaboratively designed and conducted 5 research projects with diverse group of fellow scientists on topics such as:
  + Feeding ecology of bats, effect of altitudinal gradient on plant morphology, effect of tree species on soil chemistry\*, effect of leaf chemistry on ants, landscape effects on pollination success of blackberries\*\*
* Individually designed and conducted independent research project on relationship between stingless bee nest morphology and aggression

\*\* indicates manuscript published or \* in revision

Independent undergraduate research, University of Kentucky *June 2013-Dec 2014*

Principal Investigator: Dr. Daniel Howe, Department of Veterinary Science

Project focus: Identifying surface proteins of *Sarcocystis aucheniae* parasite

* Identified unknown surface proteins of *Sarcocystis aucheniae* using bioinformatics
* Cloned four identified proteins and produced recombinant protein from each
* Developed and refined diagnostic test for parasite infection using Enzyme-linked Immunosorbent Assay (ELISA)
* Collaborated with Cayetano Heredia University in Lima, Peru to ground-truth diagnostic test, including travel to Peru to work in collaborator’s laboratory

**Teaching Experience**

Graduate Teaching Assistant

* \*Organismal and Population Biology Lab (online) *Summer 2020*
* Organismal and Population Biology Lab *Aug-Dec 2016*
* Organismal and Population Biology Lecture *Aug 2016-May 2017*

Guest Lectures

* “Genetic Drift and Hardy-Weinberg Equilibrium” - Organismal and Population Biology
* “Pedigree Analysis and Epigenetics” - Organismal and Population Biology

\* Denotes assisted with course design and curriculum development

**Community Outreach**

K-12 Partnership Workshop hosted by Kellogg Biological Station, MSU *June 2018, Oct 2019*

* Developed lesson plans based on NGSS standards, presented to K-12 teachers
* “Buzzy, buzzy bees and the process of pollination” – elementary
* “Hot and hangry: Exploring Arctic food web interactions under climate change” – middle school

Making a Difference at Spooky Science Saturday, Kingman Museum, Battle Creek, MI *Oct 19th, 2019*

* Presented “Elephant bird egg mystery” interactive activity – visitors matched bird eggs and pictures, teaches how to interpret and use graphs to solve a bird egg mystery

Reach the World Traveler *Sept 2018-Dec 2018*

* Participated in Reach the World program, which connects international travelers to K-12 classrooms in one-on-one virtual exchanges as learning resource
* Blogged about life in India, honey bees, research to class of 3rd grade students in Brooklyn, NY
* Skyped two times with students answering questions about research, bees, and Indian culture

NCBS Public Science Day *Nov 16, 2018*

* Developed interactive activity and booth about giant honey bee *Apis dorsata*
* Interacted with +1000 K-12 students and families, taught about honey bee dancing and honeycomb

MSU Bee Palooza Native Bee Expert *June 24th, 2018*

* Taught visitors about native Michigan bees using ‘native bee hotel’, including life cycle, nesting habitat, and practical conservation tips

GWIS Science Outreach Lecture, Laingsburg Elementary *Nov 14th 2016*

* Taught four classes of 4th grade students about reptiles and amphibians
* Developed interactive activity on axolotl development

**Mentoring**

Payrn Norman (Michigan State University), undergraduate research assistant *Nov 2019-May 2020*

Riley Barry (Michigan State University), undergraduate research assistant *Nov 2019-May 2020*

Kaitlyn Ringe (Michigan State University), undergraduate research assistant *Nov 2019-May 2020*

\*Taylor Rhoades (Michigan State University), MSU Emerging Scholars Program *Aug 2019-May 2020*

Kayla Gilstorff (Michigan State University), undergraduate research assistant *June 2019-Sept 2019*

Madison White (Michigan State University), undergraduate research assistant *June 2019-Sept 2019*

Sam Hinkley (Michigan State University), undergraduate research assistant *June 2019-Sept 2019*

Sangamesh Kolavi (University of Agricultural Sciences, Bangalore), masters student *Oct 2018-May 2019*

Julia Fudala (Michigan State University), undergraduate research assistant *June 2018-present*

Emily Mall(Michigan State University), undergraduate research assistant *June 2018-Jan 2019*

\*Joi Wright (Spellman College), MSU Summer Research Opportunities Program *May-Aug 2017*

\*Solidad Nwakibu (Spellman College), MSU Summer Research Opportunities Program *May-Aug 2017*

\*Christha Edwards (Spellman College), MSU Summer Research Opportunities Program *May-Aug 2017*

\* Denotes first generation college student or member of community underrepresented in STEM

**Service**

EEBB Graduate Group Outreach Chair *Aug 2019-present*

* Develop and present outreach activities for EEBB program at local outreach events
* Teach outreach activities to EEBB graduate students

Graduate Women in Science Undergraduate Mentoring Committee *Aug 2017-present*

* Assist in planning educational events for undergraduate students, including informative panel discussions on applying for graduate school and writing workshops
* Pair and monitor graduate and undergraduate students in mentoring relationships

Student Co-organizer for 2nd Annual Bangalore Meeting on Asian Bees *Nov 2018-Feb 2019*

* Assisted in organizing conference at National Centre for Biological Sciences
* Contacted invited participants, organized responses and abstracts for program development

EEBB Research Symposium Planning Committee *Jan 2017-May 2017*

* Assisted in logistical planning for first ever EEBB Research Symposium, including recruiting presenters and day-of organization and setup

EEBB Seminar Aide *Aug 2016-Dec 2017*

* Assisted in hosting weekly speaker, including technology support and refreshment planning

Integrative Biology Seminar Exploratory Committee *Aug 2015-Dec 2015*

* Served as graduate student representative in committee to explore departmental interest and funding for seminar series

**Graduate Coursework**

Population and Community Ecology, Introduction to Computational Science for Evolutionary Biologists, Multidisciplinary Approaches to the Study of Evolution, Professional Development, Advanced Statistics for Biologists, Statistical Methods for Ecology and Evolution, Evolutionary Biology, Pathways to Scientific Teaching, CIRTL An Introduction to Evidence-Based Undergraduate STEM Teaching, CIRTL Advancing Learning through Evidence-Based STEM Teaching

**Professional Memberships**

International Society for Behavioral Ecology *2020-present*

Entomological Society of America *2019-present*

International Union for the Study of Social Insects *2019-present*

Animal Behavior Society *2016-present*

Graduate Women in Science Mu Sigma Chapter *2017-present*