Clint Penick PHD

Auburn University
Department of Entomology & Plant Pathology
Auburn, AL 36849
clintpenick@gmail.com
www.penicklab.com

EDUCATION

2012 **Ph.D. Biology** (20 December 2012)
Arizona State University
School of Life Sciences, Tempe, AZ
Advisor: Jürgen Liebig

2005 **B.S. Biology** (21 December 2005)
Florida State University
Department of Biology, Tallahassee, FL
Thesis advisor: Walter Tschinkel

PROFESSIONAL APPOINTMENTS

2023 **Assistant Professor** (2023-*present*)
Auburn University
Department of Entomology & Plant Pathology
Auburn, AL

2019 **Assistant Professor** (2019-2023)
Kennesaw State University
Department of Ecology, Evolution & Organismal Biology
Kennesaw, GA

2017 **Assistant Research Professor** (2017-2019)
Arizona State University
Biomimicry Center, Tempe, AZ

Affiliate Global Futures Scholar (2017-present)
Julie Ann Wrigley Global Futures Laboratory, ASU

2013 **Postdoctoral fellow** (2013-2017)
NC State University & NC Museum of Natural Sciences
Department of Applied Ecology, Raleigh, NC
PI: Robert R. Dunn

PUBLICATIONS

2025 **Penick CA**, Peagler Z, Buttram L, Dunn RR, Frank SD, Youngsteadt E. Urban heat and latitude: Contrasting effects on ant diversity across cities. *Urban Ecosystems* 28:139

2025 Lehner J, Ozturk C, **Penick CA**, Chawla N, Bhate D. Beyond the hexagon: Meso-structures in the bee's honeycomb for bio-Inspired design. *Integrative and Comparative Biology* 6:icaf071

2025 Travasso RDM, **Penick CA**, Dunn RR, Corvera Poiré E. Predicting cardiac frequencies in mammals. *Scientific Reports* 15:7017

2024 Kennett SM, Seifert B, Dunn RR, Pierson TW, **Penick CA**. The ManhattAnt: Identification, distribution, and colony structure of a new pest in New York City, *Lasius emarginatus*. *Biological Invasions* 26:2759-2772

2024 Morankar S, Luktuke A, Nieto-Valeiras E, Mistry Y, Bhate D, **Penick CA**, Chawla N. Cholla cactus wood (*Cylindropuntia imbricata*): Hierarchical structure and micromechanical properties. *Acta Biomaterialia* 174:269-80

2024 Rahman K, Ehme D, **Penick CA**, Kim DH. Motion compensator for an untethered walking insect using adaptive model predictive control. *ASME Letters in Dynamic Systems and Control* 4:011004

2023 Mistry Y, Weeger O, Morankar S, Shinde M, Liu S, Chawla N, Chen X, **Penick CA**, Bhate D. Bio-inspired selective nodal decoupling for ultra-compliant interwoven lattices*. Communications Materials* 4:35

2023 Hellenbrand JP, **Penick CA**. Ant cuticle microsculpturing: diversity, classification, and evolution. *Myrmecological News* 33:123-138

2023 Morankar SK, Mistry Y, Bhate D, **Penick CA**, Chawla N. *In situ* investigations of failure mechanisms of silica fibers from the Venus flower basket (*Euplectella Aspergillum*)*. Acta Biomaterialia* 162:304-311

2022 Gardner N, Hellenbrand JP, Phan A, Zhu H, Long Z, Wang M, **Penick CA**, Hung CC. Investigation of ant cuticle dataset using image texture analysis methods. *Applied Computing and Intelligence* 2:133-151

2022 Benyus J, Dwyer J, El-Sayed S, Hayes S, Baumeister D, **Penick CA**. Ecological performance standards for regenerative urban design. *Sustainability Science* 17:2631-2641

2022 **Penick CA**, Cope G, Morankar S, Mistry Y, Grishin Y, Chawla N, Bhate D. The comparative approach to bio-inspired design: integrating biodiversity and biologists into the design process*. Integrative and Comparative Biology* 62:1153-1163 [cover article]

2022 Morankar S, Singaravelu A, Niverty S, **Penick CA**, Bhate D, Chawla N. Tensile and fracture behavior of silica fibers from the Venus flower basket *(Euplectella aspergillum). International Journal of Solids and Structures* 253:111622

2022 Rajeev A, Grishin A, Agrawal V, Santhanam B, Goss D, Niverty S, Cope G, **Penick CA**, Chawla N, Bhate D. Parametric optimization of corner radius in hexagonal honeycombs under in-plane compression*. Journal of Manufacturing Processes* 79:35-46

2021 Vecchi M, Kossi Adakpo L, Dunn RR, Nichols LM, **Penick CA**, Sanders NJ, Rebecchi L, Guidetti R. The toughest animals of the Earth vs global warming: effects of long-term experimental warming on tardigrade community structure of a temperate deciduous forest. *Ecology and Evolution* 11:9856-9863

2021 **Penick CA**, Ghaninia M, Haight KL, Opachaloemphan C, Yan H, Reinberg D, Liebig J. Reversible plasticity in brain size, behavior, and physiology characterizes caste transitions in a socially flexible ant (*Harpegnathos saltator*). *Proceedings of the Royal Society B* 288:20210141 [cover article]

2021 Fitzgerald JL, Stuble KL, Nichols LM, Diamond SE, Wentworth TR, Pelini SL, Ellison AM, Gotelli J, Sanders NJ, Dunn RR, **Penick CA**. Abundance of spring- and winter-active arthropods declines with warming. *Ecosphere* 12:e03473

2020 Goss D, Mistry Y, Niverty S, Noe C, Santhanam B, Ozturk C, Penick CA. Lee C, Chawla N, Grishin A, Shyam V, Bhate D. Bioinspired honeycomb core design: An experimental study of the role of corner radius, coping and interface. *Biomimetics* 5:59

2019 Lucas J, Madden AA, **Penick CA**, Epps MJ, Marting PR, Stevens JL, Fergus DJ, Dunn RR, Meineke EK. *Azteca* ants maintain unique microbiomes across functionally distinct nest chambers. *Proceedings of the Royal Society B* 286:20191026 [cover article]

2019 Bhate D, **Penick CA**, Ferry LA, Lee C. Classification and selection of cellular materials in mechanical design: engineering and biomimetic approaches. *Designs* 3:19

2019 Lau MK, Ellison AM, Nguyen AD, **Penick CA**, DeMarco BB, Gotelli NJ, Sanders NJ, Dunn RR, Cahan SH. Expanded view of the ecological genomics of ant responses to climate change. *PeerJ* 7:e6447

2018 Ellison AM, LeRoy CJ, Landesbergen KJ, Bosanquet E, Borden DB, CaraDonna P, Cheney K, Crystal-Ornelas R, DeFreece A, Goralnik L, Irons E, Merkle BG, O'Connell KEB, **Penick CA**, Rustad L, Schulze M, Waser NM, Wysong L. Art/Science collaborations: New explorations of ecological systems, values, and their feedbacks. *Bulletin of the Ecological Society of America* 99:180-191

2018 Beasley DE, **Penick CA**, Boateng NS, Menninger HL, Dunn RR. Urbanization disrupts latitude-size rule in 17-year cicadas. *Ecology and Evolution* 8:2534-254

2018 **Penick CA**, Halawani O, Pearson B, Mathews S, López-Uribe MM, Dunn RR, Smith AA. External immunity in ant societies: Sociality and colony size do not predict investment in antimicrobials. *Royal Society Open Science* 5:171332 [cover article]

2018 Epps MJ, **Penick CA**. Facultative mushroom feeding by common woodland ants (Formicidae, *Aphaenogaster* spp.). *Food Webs* 14:9-13

2017 Gospocic J, Shields E, Glastad KM, Lin Y, **Penick CA**, Yan H, Mikheyev A, Linksvayer T, Garcia BA, Berger S, Liebig J, Reinberg D, Bonasio R. The neuropeptide corazonin controls social behavior and caste identity in ants. *Cell* 170: 748-759

2017 Yan H, Opachaloemphan C, Mancini G, Yang H, Gallitto M, Mlejnek J, Haight K, Ghaninia M, Huo L, Perry M, Leibholz L, Slone J, Zhou X, Traficante M, **Penick CA**, Dolezal K, Gokhale K, Stevens K, Fetter-Pruneda I, Bonasio R, Zwiebel LJ, Berger S, Liebig J, Reinberg D, Desplan C. An engineered *orco* mutation produces aberrant social behavior and defective neural development in ants. *Cell* 170:736-747

2017 MacClean HJ, **Penick CA**, Dunn RR, Diamond SE. Experimental winter warming increases thermal performance and primes species for spring activity. *Journal of Insect Physiology*.100:77-81

2017 **Penick CA**, Liebig J. A larval 'princess pheromone' identifies future ant queens based on their juvenile hormone content. *Animal Behaviour* 128:33-40

2017 Diamond SE, Chick L, **Penick CA**, Nichols LM, Cahan SH, Dunn RR, Ellison AM, Sanders NJ, Gotelli NJ. Heat tolerance predicts the importance of species interaction effects as the climate changes. *Integrative and Comparative Biology* 57:112-120

2017 **Penick CA**, Diamond SE, Sanders NJ, Dunn RR. Beyond thermal limits: Comprehensive metrics of performance identify key axes of thermal adaptation in ants. *Functional Ecology* 31: 1091-1100

2017 Cahan SH, Nguyen AD, Stanton-Geddes J, **Penick CA**, Hernáiz-Hernández Y, DeMarco BB, Gotelli NJ. Modulation of the heat shock response is associated with acclimation to novel temperatures but not adaptation to climatic variation in the ants *Aphaenogaster picea* and *A. rudis*. *Comparative Biochemistry & Physiology A* 204:113-120

2016 Diamond SE, Nichols LM, Pelini SL, **Penick CA**, Barber GW, Cahan SH, Dunn RR, Ellison AM, Sanders NJ, Gotelli NJ. Climatic warming destabilizes forest ant communities. *Science Advances* 2:e1600842

2016 Karlik J, Epps MJ, Dunn RR, **Penick CA**. Life inside an acorn: How microclimate and microbes influence nest organization in *Temnothorax* ants. *Ethology* 122:790-797

2016 Brent CS, **Penick CA**, Trobaugh B, Moore D, Liebig J. Induction of a reproductive-specific cuticular hydrocarbon pattern by juvenile hormone in the termite *Zootermopsis nevadensis*. *Chemoecology* 26:195-203

2016 **Penick CA**, Crofton CA, Appler RH, Frank SD, Dunn RR, Tarpy DR. The contribution of human foods to honey bee diets in a mid-sized metropolis. *Journal of Urban Ecology* 2:juw001

2016 Sasaki T, **Penick CA** [co-first authors], Shaffer Z, Haight KL, Pratt SC, Liebig J. A simple behavioral model predicts the emergence of complex animal hierarchies. *The American Naturalist* 187:765-775

2015 **Penick CA**, Smith AA. The true odor of the odorous house ant. *American Entomologist* 61:85-87

2015 **Penick CA**, Savage AM, Dunn RR. Stable isotopes reveal links between human food inputs and urban ant diets. *Proceedings of the Royal Society B* 282:20142608

2014 **Penick CA**, Brent CS, Dolezal K, Liebig J. Neurohormonal changes associated with ritualized combat and the formation of a reproductive hierarchy in the ant *Harpegnathos saltator. Journal of Experimental Biology* 217:1496-1503 [cover article]

2014 **Penick CA**, Ebie J, Moore D. A non-destructive method for identifying the sex of ant larvae. *Insectes Sociaux* 61:51-55

2013 Diamond SE, **Penick CA**, Pelini SL, Ellison AM, Gotelli NJ, Sanders NJ, Dunn RR. Using physiology to predict the responses of ants to climatic warming. *Integrative and Comparative Biology* 53:965-974 [Faculty of 1000 Prime recommended]

2013 **Penick CA**, Trobaugh B, Brent CS, Liebig J. Head-butting as an early indicator of reproductive disinhibition in the termite *Zootermopsis nevadensis*. *Journal of Insect Behavior* 26:23-34

2012 **Penick CA**, Prager SS, Liebig J. Juvenile hormone induces queen development in late-stage larvae of the ant *Harpegnathos saltator*. *Journal of Insect Physiology* 58:1643-1649

2012 **Penick CA**, Copple RN, Mendez RA, Smith AA. The role of anchor-tipped larval hairs in the organization of ant colonies. *PLOS One* 7: e41595

2012 **Penick CA**, Liebig J. Regulation of queen development through worker aggression in a predatory ant. *Behavioral Ecology* 23:992-998

2011 **Penick CA**, Liebig J, Brent CS. Reproduction, dominance, and caste: endocrine profiles of queens and workers of the ant *Harpegnathos saltator*. *Journal of Comparative Physiology A* 197:1063-1071

2010 Holbrook CT, Clark RM, Moore D, Overson RP, **Penick CA,** Smith AA. Social insects inspire human design. *Biology Letters* 6:431-433 [Top 10 most downloaded article of 2010]

2008 **Penick CA**, Tschinkel WR. Thermoregulatory brood transport in the fire ant*, Solenopsis invicta*. *Insectes Sociaux* 55:176-182

Book chapters, etc.

2023 **Penick CA**, Boradkar P. Design inspired by nature: The bat brolley, in *Design and Science.* Atzmon L (ed.), Bloomsbury Publishing: London, 113-128

2022 Goss D, **Penick CA**, Grishin A, Bhate D. Bio-Inspired design and additive manufacturing of cellular materials for aerospace applications, in *Biomimicry for Aerospace*. Help AF, Eggermont M, Shyam V (eds.), Elsevier: Amsterdam, 141-185

2021 **Penick CA**. Book review: *Tales from the Ant World* by E.O. Wilson. *American Entomologist* 67:62-63

2021 **Penick CA.** Urban social insects, in *Encyclopedia of Social Insects.* Starr CK (ed.), Springer: New York, 983-988

2019 Fehler M, **Penick CA.** Hidden treasures: Discovering the design potential of natural history collections. *The Design Journal* 22(sup1):2189-2195

Patents

2024 Y. Mistry, S. Liu, M. Shinde, X. Chen, D. Bhate, S. Morankar, N. Chawla, **C. Penick**, Method for Designing Ultra-Compliant Interwoven Meta-Materials, U.S. Patent Application No. 18/468,185

**Underlined authors are undergraduate or graduate students I mentored*

GRANTS & AWARDS

Grants

2024 AAES-ARES, *How does antimicrobial investment affect entomopathogenic control of invasive ants?*, PI: Penick CA - **$50,000**

2020 USDA AFRI, *Where is pollination in peril? Evaluating climate risks to wild and managed bees and pollination services across the US*, PI's: McCluney K, Youngsteadt E, Penick CA - **$429,291** (KSU portion, $128,209)

2020 NASA STTR Phase II, *Aperiodic lattice design optimization for multi-functional lightweight aerospace structures*, PI's: Bhate D, Grishin A, Sutton M, Penick CA, Chawla N - **$755,000** (KSU portion, $90,358)

2018 NASA STTR Phase I, *Bio-inspired cellular material optimization for the design of additively manufactured multi-functional lightweight structures,* PI's: Bhate D, Grishin A, Penick CA - **$127,000** (ASU portion, $68,733)

2017 Google Inc., *Biomimicry for sensory communication,* PI's: Boradkar P, Penick CA - **$288,367**

2016 Triangle Center for Evolutionary Medicine (TriCEM), *Finding the next antibiotics: Putting evolutionary theory into practice,* PI's: Smith AA, Penick CA, Mathews S, Lopez-Uribe M - **$20,000**

2012 Graduate and Professional Students Association, ASU, *Seasonal cues and timing of ant queen production,* PI: Penick CA - **$500**

2009 NSF conference organization grant, (PI: Jennifer Fewell; I was a graduate student and could not officially be listed as a Co-PI), award #0964277, **$16,838**

2009 Conference organization grant, Frontiers in Life Sciences workshop, *Social Biomimicry: Design insights from insect* societies, PI's: Clark RM, Holbrook CT, Moore D, Overson RP, Penick CA, Smith AA - **$30,000**

2009 Graduate and Professional Students Association, ASU, *Neurochemistry of aggression in a social insect,* PI: Penick CA - **$2,000**

2009 Graduate and Professional Students Association, ASU, *Evolution of nest architecture in desert ants,* PI's: Penick CA, Smith AA - **$750**

Undergraduate support

2023 Birla Carbon Scholars Program award (mentor to Darmon Kahvazadeh), KSU, **$8,000**

2023 Summer Undergraduate Research Program award (mentor to Sofia Cuenca Rojas), KSU, **$8,000**

2020 Mentor–Protégé award (mentor to Zach Peagler & Layne Buttram), *Does the treatment fit the disease? Testing whether seasonal allocation of insect-produced antimicrobials peaks with pathogen load*, KSU, **$3,000**

2016 NCSU undergraduate research grant (mentor to Omar Halawani), NCSU, *Microbiology of ant cuticle and the role in disease defense,* **$1,000**

2016 NCSU undergraduate research team grant (mentor to Omar Halawani and Bria Pearson), NCSU, *Investigating the role of public health in social insect societies,* **$2,000**

2015 NCSU undergraduate research grant (mentor to Jacquelyn Fitzgerald) - NCSU, *Are spring species more vulnerable to climate warming? -* **$3,000**

2014 NCSU undergraduate research grant (mentor to Joseph Karlik), NCSU, *Microbiome of an acorn: How acorn-nesting ants thrive in a tight environment -* **$1,000**

2014 NCSU undergraduate research grant (mentor to Jacquelyn Fitzgerald), NCSU, *Can large-scale climate manipulations help predict changes in arthropod communities with global warming? -* **$1,000**

Awards

2019 GaphPad Prism Data Visualization award, **$100**

2014 Award, YouTube *Your Entomology* award for best science outreach video (*Termite Hunter*, with Adrian Smith & Martin Hoogeboom) from the Entomological Society of America, **$200**

2014 W.M. Keck Center for Behavioral Biology competitive travel award, **$430**

2013 George C. Eickwort Student Research Award – recognizes outstanding dissertation research in the field of social insect biology, awarded by North American Section of the IUSSI, **$1,000**

2013 Best talk, W.M. Keck Center for Behavioral Biology Student/Postdoc Symposium.

2013 Biomimicry 3.8: Education Summit and Global Conference travel award, **$400**

2012 Best poster, session II, North American Section of the IUSSI Breakout Meeting.

2012 North American Section of the IUSSI competitive travel award, **$100**

2011 Nominated, Design Excellence Award, Herberger Institute for Design and the Arts, ASU

2011 Graduate and Professional Students Association competitive travel award, ASU, **$717**

2010 Award, Best in show for *Nest cast of the desert harvester ant,* Pogonomyrmex rugosus*.* Arizona State Fair, outreach section.

2009 Training award for California Academy of Sciences' *Ant Course*, Graduate Initiative Fellowships for Training, ASU, **$1,000**

2008 North American Section of the IUSSI travel award, **$250**

INVITED TALKS

2025 Keynote speaker, National Pest Management Association, Eastern Conference, Pocono Manor, PA

2024 Department seminar, Department of Biology, University of Florida, Gainesville, FL

2024 Symposium speaker, "More than the Sum of Their Parts: Sociobiology and Health of Eusocial Insects," Entomological Society of America, SE Branch Meeting, Augusta, GA

2023 Keynote speaker, "Envisioning Urban Futures," North Carolina State University, Raleigh, NC

2023 Featured speaker, "Climate Stress Across the Biosphere," A UN/NYC Climate Week Event, CUNY Advanced Science Research Center, New York, NY

2023 Department seminar, Department of Biology, The University of Akron, Ohio, Akron, OH

2023 Department seminar, Department of Entomology and Plant Pathology, Auburn University, Auburn, AL

2023 Department seminar, Environmental Studies Program, SUNY Binghamton, Binghamton, NY

2023 Symposium speaker, "Biomimicry Across Scales: From Macro to Molecular," NC State University, Raleigh, NC

2022 Department seminar, School of Biological Sciences, Georgia Tech University, Atlanta, GA

2022 Department seminar, Department of Entomology, University of Georgia, Athens, GA
2022 Symposium speaker, Society of Integrative and Comparative Biology (SICB), Phoenix, AZ
2021 Seminar speaker, Social Insect Research Group, Arizona State University, Tempe, AZ
2021 Featured speaker, Frontiers in Social Evolution (FINE), virtual
2020 Public lecture, Research with Relevance, Office of Research, Kennesaw State University, Kennesaw, GA
2020 Department seminar, Department of Biology, Georgia Southern University, Statesboro, GA
2020 Department seminar, Department of Biology, Geology and Environmental Science, University of Tennessee, Chattanooga, TN
2019 Featured speaker, Sustainable Brands Conference, Detroit, MI
2019 Department seminar, Department of Ecology, Evolution, and Organismal Biology, Kennesaw State University, Kennesaw, GA
2019 Department seminar, Department of Biochemistry, Molecular Biology, Entomology and Plant Pathology, Mississippi State University, Starkville, MS
2019 Department seminar, Department of Biological Sciences, Auburn University, Auburn, AL
2019 Department seminar, Department of Biology and Biochemistry, University of Houston, TX
2018 Department seminar, School of Integrative Biology, University of Illinois Urbana-Champaign, IL
2018 Department seminar, CUNY Baruch, New York, NY
2017 Symposium speaker, Ecological Society of America meeting, Portland, OR
2017 Featured speaker, RTP180 sponsored event, Research Triangle Park, NC
2017 Department seminar, The University of North Carolina, Pembroke, NC
2017 Humphrey's lecture, Mary Baldwin University, Staunton, VA
2017 Department seminar, University of Massachusetts, Dartmouth, MA
2017 Department seminar, Rutgers University, Camden, NJ
2016 Symposium speaker, International Conference of Entomology (ICE) XXV, Orlando, FL
2016 Department seminar, University of the Ryukyus, Okinawa, Japan
2016 Featured speaker, Science communication workshop, The Graduate School, NC State University, Raleigh, NC
2016 Keynote symposium speaker, Georgia Entomological Society meeting, Pine Mountain, GA
2016 Symposium speaker, SE Branch Meeting, Entomological Society of America, Raleigh, NC
2016 Department seminar, Entomology, NC State University, Raleigh, NC
2016 Department seminar, Research in Progress, Eastern Carolina University, Greenville, NC
2015 Featured speaker, Carolina Science Café series, UNC, Chapel Hill, NC
2015 Featured speaker, North Carolina Museum of Natural Sciences, Raleigh, NC
2015 Featured speaker, Wild West Naturalist Association, Raleigh, NC
2015 Symposium speaker, Experimental Biology meeting, Boston, MA
2015 Symposium speaker, Entomological Society of America Annual Meeting, Portland, OR
2013 Symposium speaker and panelist, Biomimicry 3.8: Education Summit and Global Conference, Boston, MA
2011 Featured speaker, Arizona Audubon Society, Phoenix, AZ
2011 Symposium speaker, Managing the Hive: Organization of Work in Business and Eusocial Colonies, Tempe, AZ

TEACHING

Instructor

2024 General Entomology, AU
2024 Insect Ecology, AU
2023 General Entomology, AU
2023 Invertebrate Zoology & Lab, KSU
2023 Gene Editing & the Future of the Human Race, Honors Discovery course, KSU
2022 Culture of Science and Math, KSU
2022 Biological Principles II & Lab, KSU
2021 Culture of Science and Math, KSU
2021 Biological Principles II & Lab, KSU
2020 Culture of Science and Math, KSU
2020 Ecology, Evolution, Behavior, & Organismal Biology Senior Seminar, KSU
2020 Biological Principles II, Spring, KSU
2019 Innovation Space, Spring (co-instructor), The Design School, ASU
2018 Innovation Space, Fall (co-instructor), The Design School, ASU
2018 Innovation Space, Spring (co-instructor), The Design School, ASU
2017 Innovation Space, Fall (co-instructor), The Design School, ASU
2017 Bio-inspired Design (co-instructor), Biological Sciences and College of Design, NCSU
2016 Traveling Design Studio: Hawaii (visiting instructor), The Design School, ASU
2015 Public Health: From Humans to Social Insects (co-instructor), Biological Sciences, NCSU
2012 Bio-inspired Design, The Design School, ASU
2012 Innovation Space (co-instructor), The Design School, ASU

Field course instructor

2018 Ants of the Southwest 10-day field course (co-instructor), Southwest Research Station, AMNH

Graduate seminar instructor

2022 College Science Teaching, KSU
2022 The Process of Scientific Publication: Writing, Peer Review, & Revision, KSU
2021 Science Communication through Art, Storytelling, and Design, KSU

Guest lectures

2024 Introduction to Agriculture, AU
2024 Applied Biotechnology Seminar, AU
2024 Ecology of Global Change, Hunter College, New York, NY
2023 Applied Biotechnology Seminar, AU
2023 Ecology of Global Change, Hunter College, New York, NY
2022 Biology for Biomimicry, Pratt Institute, New York, NY
2021 Graduate Research Methods (two week module on Biodiversity Science), KSU
2020 3D Printing and the Environment, University of Arizona
2020 Graduate Research Methods (two week module on Biodiversity Science), KSU
2020 Bio-inspired Design, The Design School, ASU
2019 Design for Additive Manufacturing, Ira A. Fulton Schools of Engineering, ASU
2019 Sustainable World (introduction to sustainability), School of Sustainability, ASU

2018 Traveling Design Studio: Galapagos, The Design School, ASU
2018 Artistic Expression of Original Research, School of Life Sciences, ASU
2018 Biomimicry in Practice, College of Architecture & Planning, University of Colorado, Denver
2018 Design for Additive Manufacturing, Ira A. Fulton Schools of Engineering, ASU
2018 Nanoscale Biomimicry, Fashion Institute of Technology, SUNY
2017 Artistic Expression of Original Research, School of Life Sciences, ASU
2017 Advanced Architectural Studio III, The Design School, ASU
2017 Biomimetic Design and the Sonoran Desert, The Design School, ASU
2016 Applied Biogeography, Department of Applied Ecology, NCSU
2013 The Ecology and Evolution of Daily Life, Biological Sciences, NCSU

Teaching Assistant

2011 Anatomy and Physiology Lab, School of Life Sciences, ASU
2010 General Genetics, School of Life Sciences, ASU
2009 Techniques in Animal Behavior, School of Life Sciences, ASU
2008 The Living World Lab (Biology for Non-Majors), School of Life Sciences, ASU
2007 General Biology Lab, School of Life Sciences, ASU
2006 The Living World Lab (Biology for Non-Majors), School of Life Sciences, ASU

Student diversity programs

2015 Initiative for Maximizing Student Diversity, NCSU (2014-2015)
2009 Graduate Partners in Science Education, ASU (2008-2009)
2006 Upward Bound Program, FSU

Mentorship

Masters student advisor (6)
2024 Luke Edenborough (*current*)
2024 Darmon Kahvazadeh (*current*)
2023 Theresa Wolff, Auburn University (*current*)
2022 Katy Chon, Kennesaw State University (*co-advisor*, graduated 2024)
2021 Samantha Kennett, Kennesaw State University (graduated 2023)
2020 Grace Cope, Kennesaw State University (graduated 2022)
2020 Francis Mullan, Kennesaw State University (graduated 2022)
2020 John Paul Hellenbrand, Kennesaw State University (graduated 2022)

Thesis committee member (6)
2024 Kaushik Rahman, PhD, Kennesaw State University (*current*)
2024 Dylan Taylor, MS, Auburn University (*current*)
2024 Ashmita Sapkota, MS, Auburn University (*current*)
2024 Nicole Kennedy Balog, PhD, Purdue University (*current*)
2023 Nicole Baker, MS, Auburn University (graduated 2024)
2021 Rahul Franklin, PhD, Purdue University (graduated 2024)
2021 Yatin Kalki, MS, KSU (graduated 2023)
2021 Rachel Kaplan, MS, KSU (graduated 2023)

2020 Courtney Linkous, MS, KSU (graduated 2022)

2019 Shannon Whitney, MS, KSU (graduated 2021)

2018 Alayzha Turner-Rodgers, BS Honors Thesis, ASU (graduated 2019)

Undergraduate student advisor (55)

AU: Mary Ortiz, Destiny Brasher, Archel Sutton, Camaya Doxie, Jenna Gaudet, Alice Raybosh, Samantha Bowers, Harrison Himelwright

KSU: Zach Peagler, Layne Buttram, Rebecca Senft, Darmon Kahvazadeh, Amjad Alkawam, Megan Brooks, Camryn Carter, Sofia Castro, Katy Chon, Sofia Cuenca Rojas, Ben Ducre, Jayce Easterwood, Alexia Ego-Aguirre, Thomason Gilchrist, Bryce Gos, Gracie Evans, Sedona Griffith-Tesch, Armeta Hadjimirzaei, Delaney Hayman, Myranda Hernandez, Jaden Keys, Taylor Moon, Chidimma Onyirimba, Nick Parbhoo, Christelle Price, Audrey Quenneh, Diamond Thompson, Rocksy Velasquez Diaz, Cristian Rodriguez, Abby Tharp, Andrea Moreno Vazquez, Katherine Walker

ASU: Steven Prager, Beth Trobaugh, Neale Copple, Derek Goss, Barbara Birtcil, Jordan Bednarz, Violet Konopka, Alayzha Turner-Rodgers

NCSU: Joseph Karlik, Jacquelyn Fitzgerald, Catherine Crofton, Bria Pearson, Omar Halawani, Nikki Knapp, Tiara Butler-Smith, Abdul Matin, Kaetlyn Ryan, Samantha Dietz, Matt Farrell, Chris Williams, Jakini Kauba, Mary Vincent, Natavia Ray, Victoria Figueiredo Paixao

High school student advisor (3)

Michael Taffe, Paloma Carignano, John Delpapa, and Lowell Hensgen

**Underlined students were co-authors on published papers and/or funded grants.*

PROFESSIONAL SERVICE

Program coordinator

2019 Manager of the Biomimicry Seed Grants program - *Biennial program awarding $15,000-30,000 to interdisciplinary teams to develop research projects in biomimicry.* (2018-2019)

2019 Manager of the Biomimicry Center faculty Affiliates program - *Included 44 faculty from 18 departments on ASU's campus.* (2018-2019)

Conference & Symposium organizer

2024 Co-organizer, *Plants, Insects, and Microbes Symposium*, Auburn, AL – over *100 attendees and presenters*

2022 Symposium co-organizer, "The effects of anthropogenic warming and increasing thermal variability on social insects," 19th Congress of the International Union for the Study of Social Insects (IUSSI), San Diego, CA

2020 Symposium co-organizer, "Current Research in Social Insect Behavior, Ecology, and Evolution in Eastern & Southeastern U.S.," Eastern and Southeastern Branch meeting of the Entomological Society of America, Atlanta, Georgia, USA [cancelled due to COVID-19]

2019 Workshop co-organizer, "Hidden treasures: Discovering the design potential of natural history collections," 13th European Academy of Design conference, University of Dundee, Scotland, UK

2018 Workshop co-organizer, "Developing partnerships for interdisciplinary design-based learning," 48th Annual Conference of the International Society for Exploring Teaching and Learning (ISETL), Tempe, AZ.

2018 Symposium co-organizer, “Social insect eco-physiology across scales,” 18th Congress of the International Union for the Study of Social Insects (IUSSI), Guarujá, Brazil – *10 speakers from 7 international institutions*

2018 Conference co-organizer, “Generous Cities Summit,” two-day international conference, Tempe, AZ – *100 attendees from more than 20 public organizations and private industries.*

2016 Meeting organizer, "Warm Forests/Warm Cities” breakout meeting, Hunt Library, Raleigh, NC – *30 attendees from 9 institutions*

2010 Conference co-organizer, “Social Biomimicry: Insect Societies and Human Design,” international conference, Arizona State University, Phoenix, AZ – *80 attendees from 18 institutions*

Outreach event organizer

2025 Co-organizer, Ant collective behavior 2-day lesson for K-6 students, Wildwood Nature School, Kreher Nature Preserve, Auburn, AL – *15 participants*

2024 Co-organizer, Urban insect ecology outreach exhibit, Alabama Science and Engineering Fair (ASEF) Expo, Auburn, AL

2022 Co-creator and administrator, Project ManhattAnt on iNaturalist (2022-present) – *190 contributors*

2022 Co-organizer, Collective decision making outreach exhibit, 32nd Annual *Insectival*, State Botanical Garden of Georgia, Athens, GA – *1,000 attendees*

2021 Co-exhibitor, collaboration with Mexican artist Lorena Mal, "Common Frequencies/ Frecuencias Comunes,” BioBAT Art Space, Brooklyn, NY (May 1, 2021 - October 15, 2021)

2018 Co-creator and administrator, Beats Per Life project on SciStarter (2018-2021)

2018 Co-organizer, *Designed to Move: How Seeds Fly, Float, and Hitchhike through the Desert Southwest,* photography exhibit, ASU Gallery of Design, Tempe, AZ

2017 Science content developer, DOTS: Biomimicry Kits educational project, Tempe, AZ – *Funded by the Walton Family Foundation to create educational kits for museums and schools*

2016 Co-organizer, *The Insects of M.C. Escher* outreach exhibit*,* college night at the North Carolina Museum of Art, Raleigh, NC – *1,600 attendees*

2015 Co-organizer, *The Physics of Ant Colonies* outreach exhibit*.* BugFest, North Carolina Museum of Natural History, Raleigh, NC – *35,000 attendees*

2015 Co-organizer, *Ants In Space* outreach exhibit at the *Cocktails and Cosmonauts* event, Museum of Life and Science, Durham, NC – *150 attendees*

2014 *Ants In Space*, an education project through BioEdOnline and NASA; provided pavement ant colonies that traveled to the International Space Station

2014 Co-organizer, *School of Ants* outreach exhibit for the NSF section NSF, USA Science and Engineering Festival, Washington, DC – *350,000 attendees*

2014 Co-organizer, *Social insect biology* outreach exhibit at BugFest, North Carolina Museum of Natural History, Raleigh, NC – *35,000 attendees*

2013 Organizer, *What is that smell?* outreach exhibit and event on identifying ants by smell at BugFest, North Carolina Museum of Natural History, Raleigh, NC – *40,000 attendees*

2010 Co-organizer, Social Insect Science EXPO, community event, Phoenix Desert Botanical Gardens, Phoenix, AZ – *150 attendees*

College & Department service

2022 Master of Science in Integrative Biology (MSIB) Program Committee, College of Science and Mathematics, KSU (2022-2023)

2022 Task force for teaching assessment and recognition, College of Science and Mathematics, KSU (2021-2023)

2022 Faculty search committee (cluster hire for five faculty members), Assistant/Associate/Full Professor rank in the College of Science and Mathematics (2021-2022)

2021 Department chair search committee, Department of Ecology, Evolution, and Organismal Biology (2021-2022)

2020 Faculty search committee, Assistant Professor position in Aquatic Animal Ecology (2019-2020)

2019 Department Faculty Council (DFC), Department of Ecology, Evolution, and Organismal Biology, KSU (2019-2022)

2011 Facilities committee, graduate student representative, School of Life Sciences, ASU (2011-2012)

Reviewer

The American Naturalist, Animal Behaviour, Annals of the Entomological Society of America, Apidologie, Applied Sciences, Behavioral Ecology and Sociobiology, Biological Invasions, Biology Letters, Biomimetics, BioScience, Communications Biology, Conservation Physiology, Current Zoology, Ecography, Ecological Entomology, Ecology, Ecology Letters, Entomological Science, Environmental Conservation, European Journal of Entomology, F1000Research, Frontiers in Global Ecology and Biogeography, Insect Conservation and Diversity, Insect Molecular Biology, Insectes Sociaux, Insects, iScience, Journal of Animal Ecology, Journal of Agricultural Biotechnology and Sustainable Development, Journal of Behavior, Journal of Economic Entomology, Journal of Experimental Biology, Journal of Insect Science, Journal of Thermal Biology, Methods in Ecology and Evolution, Molecular Ecology, Myrmecological News, Nature Cities, Naturwissenschaften–The Science of Nature, Oikos, PeerJ, Physiological Entomology, PLOS One, Proceedings of the Royal Society B, Scientific Reports, Urban Ecosystems.

Book reviewer

University of Chicago Press

Grant/award reviewer

National Science Foundation (NSF), McArthur Foundation Fellows Program, DOC Fellowship Programme of the Austrian Academy of Sciences, Biomimicry Global Design Challenge (Biomimicry Institute & the Ray C. Anderson Foundation), ASU Graduate & Professional Student Association, ASU Biomimicry Center

SCIENCE WRITING & MEDIA COVERAGE

Popular science writing (selected)

2022 "How E.O. Wilson helped me disappoint my parents and become a barber for ants," *Zygote Quarterly* (special issue honoring E. O. Wilson)

2021 "Top 10 Reasons to Study Urban Ants," *SIRG Magazine*

2019 "Wisdom of the hive," *The Cactus Wren•dition*, Maricopa Audubon Society

2018 "Why is a 45 year-old pesticide back in the news? The story of Glyphosate," *Survivors' Table*

2017 "Strange Worlds in Familiar Places," *Zygote Quarterly* (cover feature)

2017 "Illustrating Insect Diversity with the New Species Scape," *Verve* postdoc magazine

2016 "High-fructose Honey and the Diet of Urban Bees," *Oxford University Press* blog

2016 "The World's Coolest Ants," *North Carolina Naturalist*

2015 "The Secrets of Insect 'Skin'," *Journal of Investigative Dermatology* blog

2014 "Fifth Avenue and the Entangled Bank: Fashion in Field Biology," *Your Wild Life* blog
2014 "The Art and Science of Life After Chernobyl," *Your Wild Life* blog
2013 "The Best Thing About Baby Ants," *Buzz Hoot Roar* (illustration)
2013 "The Odor of the Odorous House Ant," *Your Wild Life* blog
2013 "Seeking Intelligence Inside the Swarm," *Zygote Quarterly*
2013 "Top 10 Ways an Ant's House is Similar to Your House," *Your Wild Life* blog
2012 "I, For One, Welcome Our Robot Overlords," *SOLS* magazine
2011 "Conservation: The Great Bustards of Mongolia," *SOLS* magazine (cover feature)
2010 "Amazon's Small Reserve Reveals Largest Biodiversity on Earth," *SOLS* magazine

Television and video appearances (selected)

2023 "Planet Earth III: episode 'Human'," *BBC*
2020 "The Nature of Things: episode 'Nature's Cleanup Crew,'" *CBC-TV*
2019 "Catalyst," Arizona *PBS*
2018 "Cities: Nature's New Wild," *BBC Two*
2016 "Ants Fight to Share Dominance," *Explained by the Author* web series
2015 "Scientists Create Tiny Zones of Climate Change," *National Geographic*
2015 "NC State Researchers Explore Future of Climate Change on Ecosystems," *WRAL*
2015 "Strange Truth: episode 'The Incredible Indian Jumping Ant,'" *National Geographic Channel*
2014 "Ant Battles Offer Insights to Gene Expression," *Reuters*
2014 "The Ant Queen is Dead. Let the Battles Begin.," *The New York Times*

Radio and podcast appearances (selected)

2024 "Scientists Identify The 'ManhattAnt' Spreading Across NYC," *Science Friday*, *NPR*
2024 "Meet the ManhattAnt, the ant that's taken New York's streets by storm," *All Things Considered*, *NPR*
2024 "Ants and Urban Ecology with Dr. Clint Penick," *The Science Signal, WEGL*
2024 "Ants treat certain leg injuries with lifesaving amputations," *All Things Considered*, *NPR*
2022 "It's not all bad for urban bees," *WABE*, *NPR*
2021 "The Incredible Shrinking And Growing Brains Of Indian Jumping Ants," *Weekend Edition, NPR*
2021 "These ants shrink their brains for motherhood," *CBC Quarks & Quarks*
2021 "Social Insects," *Dunc tank* podcast
2021 "Indian jumping ants have a rare survival technique," *BBC World Service*
2020 "Adjusting to Research & Teaching Under Lockdown: The Ants Go Marching On for Clint Penick," *Research 2030* podcast hosted by Elsevier
2019 "What Do an Army of Ants and an Online Encyclopedia Have in Common?" *Plays Well With Others* podcast, Creative Commons Foundation
2016 "City Bees Forego Fast Food to Feed on Flowers," *All Things Considered*, *WUNC NPR*
2016 "How Do Animals Choose Their Leaders," *Completely Optional Knowledge* podcast
2015 "This Ant Stinks," *NPR Science Friday*, *NPR*
2015 "Pests in the City," *Science for the People* podcast, *NSF Science360*
2014 "Ant-agonist Play Game of Thrones," *CBC Quirks & Quarks*

Print and online interviews (selected)

2024 "Scientists identified the 'ManhattAnt' and they have theories on why it's taking over NYC," CNN

2024 "'ManhattAnts' are taking over New York City. Researchers have finally identified the invasive insects," CBS *News*

2024 "Researchers predict the invasive 'ManhattAnt' could make its way up north, including to Connecticut," *CT Insider*

2024 "Invasive 'ManhattAnts' Are Taking Over New York City and Spreading Quickly," *Smithsonian Magazine*

2024 "Infamous 'ManhattAnt' species finally ID'd after infiltrating NYC for over a decade," *New York Post*

2024 "Manhattan's elite ant species is expanding its sphere of influence," *Gothamist*

2024 "Pest spotlight: Central European bicolored ant, or 'ManhattAnts'," *Pest Management Professional*

2024 "Ant face patterns like swirls and stubble might have practical value," *Science News*

2022 "In N.Y.C. Apartments, the Ants Go Marching Up," *The New York Times*

2022 "Brain teaser," *Ranger Rick* magazine,

2022 "ManhattAnt, la formica che ama scalare i grattacieli di New York," *VNY: La Voce di New York*

2021 "The Sophisticated, Scent-Centric Language of Ants," *The Slowdown*

2021 "Indian jumping ants have ability to shrink brain and re-grow it," *The Guardian*

2021 "A Tiny Ant Brain Is Still Too Big for Reproduction," *The Atlantic*

2021 "These ants can shrink and regrow their brains," *National Geographic*

2021 "Ants shrink their brains for motherhood," *Nature*

2021 "These Ants Shrink Their Brains for a Chance to Become Queen," *The New York Times*

2021 "The Curious Strength of a Sea Sponge's Glass Skeleton," *Quanta Magazine*

2020 "Why can some people smell ants? Here's the answer to TikTok's latest mystery," *Popular Science*

2020 "Apotheke der Insekten," *Technology Review* (German)

2019 "An ASU Researcher Spends His Time With Ants," *AZ Central*

2019 "Ant-patterned Pillows Raise Biodiversity Awareness," *ASU Thrive Magazine*

2018 "Drugs From Bugs: Bioprospecting Insects to Fight Superbugs," *Discover Magazine*

2017 "Get Ready for More Mosquitoes and Ants Thanks to Climate Change," *Vice*

2017 "These Ants Do a Lion King-Like Ritual but With Chemicals," *Gizmodo*

2016 "How Wild Animals Are Hacking City Life," *National Geographic*

2016 "City Bees Stick to a Flower Diet Rather Than Slurp Up Soda," *The New York Times*

2016 "Inside an Ant Royal Rumble," *Discover Magazine*

2016 "City Bees Feed On Flowers, Not Junk Food," *Newsweek*

2015 "Movies and Other Media Inspire Interest in Scientific Concepts," *Alaska Airlines Magazine*

2015 "NC State Scientists Study the Odor of Ants," *Raleigh News and Observer*

2015 "NC State Researcher Is Fascinated By Aromas Of Ants," *Charlotte Observer*

2015 "From Punk Guitarist to Research Entomologist," *NC State News*

2015 "Ants On New York City's Streets Survive On Junk Food And Meat," *The Guardian*

2015 "These Urban Ants Love Junk Food As Much As We Do," *Fast Company*

2015 "The Ants That Smell Like Blue Cheese—Or Is That Pine-Sol?" *WIRED*

2015 "Junk Food is Making NYC Ants More Like Humans," *LiveScience*
2015 "Our Cheeseburgers Are Changing Ants' Bodies," *Mental Floss*
2014 "Ants of New York," *The New Yorker*
2014 "Ants…In…Space," *NC State News*

Other media coverage

Associated Press, ASU Now, CBS New York, Chromatography Today, The Citizen, The Conversation, Cronkite News, Culture: The Word on Cheese, Daily Kos, Daily Mail (2), EGU Biogeosciences blog, El País, Entomology Today, Food Network Magazine, Food & Wine, Huffpost UK, Improbable Research, IFL Science (2), La Voce di New York, Mirror, Mitchell News-Journal, Myrmecos, Nature, Nature World News, New Atlas, New York Post, NC State Alumni Magazine, NCSU Technician, Pest Control Technology, SciArt Magazine, Seeker, Science, Scientific American, Science News, The Sun, thrillist, TIME, Washington Post, The Wildlife Society, KWMU St. Louis Public Radio (NPR affiliate), 3D Printing Industry, KCBS San Francisco, 1010 WINS NYC, WFVU Cityscape NY, and WKNC Raleigh.

Conference presentations

2025 Alabama Pest Control Association Winter Meeting, Auburn, AL
2024 Entomological Society of America Annual Meeting, Phoenix, AZ
2024 Alabama Pest Control Association Winter Meeting, Auburn, AL
2024 National Conference on Urban Entomology & Invasive Ant Conference, Mobile, AL
2024 Southeastern Branch Meeting of the Entomological Society of America, Augusta, GA
2023 Entomological Society of America Annual Meeting, National Harbor, MD
2022 IUSSI XIX International Congress, San Diego, CA
2022 Society of Integrative and Comparative Biology (SICB), Phoenix, AZ
2021 Entomological Society of America Annual Meeting, Denver, CO
2021 Southeastern Branch Meeting of the Entomological Society of America (virtual)
2021 Interdisciplinary STEM UN-Conference at KSU (virtual)
2019 Biocene Tools Workshop, NASA Glenn Research Center, Cleveland, OH
2019 13th European Academy of Design conference, University of Dundee, Scotland, UK
2019 Workshop on Insect Inspired Models for Social Behavior, Tempe, AZ
2018 48th Annual Conference of the ISETL, Tempe, AZ
2018 IUSSI XVIII International Congress, Guarujá, Brazil
2018 Generous Cities Summit, Tempe, AZ
2017 Ecological Society of America Annual Meeting, Portland, OR
2016 International Conference of Entomology (ICE) XXV, Orlando, FL
2016 Georgia Entomological Society Meeting, Pine Mountain, GA
2016 Southeastern Branch Meeting of the Entomological Society of America, Raleigh, NC
2015 Experimental Biology Annual Meeting, Boston, MA
2015 W.M. Keck Center for Behavioral Biology Student/Postdoc Symposium, Raleigh, NC
2014 Entomological Society of America Annual Meeting, Portland, OR
2014 IUSSI XVII International Congress, Cairns, Australia
2014 Evolution Annual Meeting, Raleigh, NC
2014 NC State Postdoc Association Research Symposium, Raleigh, NC
2013 Entomological Society of America Annual Meeting, Austin, TX
2013 Biomimicry 3.8: Education Summit and Global Conference, Boston, MA

2013 W.M. Keck Center for Behavioral Biology Student/Postdoc Symposium, Raleigh, NC
2012 IUSSI Breakout Meeting of the North American Section, Greensboro, NC
2011 Entomological Society of America Annual Meeting, Reno, NV
2011 Animal Behavior Society Annual Meeting, Bloomington, IN
2010 Entomological Society of America Annual Meeting, San Diego, CA
2010 IUSSI XVI International Congress, Copenhagen, Denmark
2010 Social Biomimicry: Insect Societies and Human Design Conference, Tempe, AZ
2009 Graduates in Earth, Life, and Social Sciences, Tempe, AZ
2008 IUSSI Breakout Meeting of the North American Section, Puerto Rico
2008 RISE symposium, Tempe, AZ
2006 IUSSI XV International Congress, Washington D.C.
2005 Entomological Society of America Annual Meeting, Miami, FL