

Patrick Kelly
Curriculum vitae

University of North Carolina at Chapel Hill
Department of Biology CB 3280 Coker Hall
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Education

2015-present: PhD candidate in the Biology Department at UNC Chapel Hill.
Co-advised by David Pfennig and Karin Pfennig.

2009: BA, Biology, magna cum laude, Cornell College.

Publications

* indicates undergraduate co-author. † indicates co-first author.

Kelly, P.W., Pfennig D.W., and Pfennig, K.S. 2021. Offspring plasticity as fitness benefit of mate choice. *Trends Ecol. Evol.* In press.

Kelly, P.W., Pfennig D.W., and Pfennig, K.S. 2021. A condition-dependent male sexual signal predicts adaptive predator-induced plasticity in offspring. *Behav. Ecol. Sociobiol.* In press.

Kelly, P.W., Pfennig, D.W., de la Serna, S., and Pfennig, K.S. 2019. Male sexual signal predicts phenotypic plasticity in offspring: implications for the evolution of plasticity and local adaptation. *Phil. Trans. R. Soc. B.* 374: 20180179.

Levis, N.A., **Kelly, P.W.**, Harmon, E.A., Ehrenreich, I.M., McKay, D.J., and Pfennig, D.W. Transcriptomic bases of a polyphenism. In revision at *J. Exp. Zool. B.*

Kelly, P.W. †, Calabrese, G.M. †, Martin, R.A., Pfennig D.W., and Pfennig, K.S. 2021. Female mate preferences predict offspring plasticity and fitness in natural populations. In revision.

Kelly, P.W., Staves, M.*, Boekschoten, R.*, and Pfennig, D.W. In prep. Field and experimental evidence that phenotypic plasticity mediates species coexistence in an anuran community.

Talks and invited lectures

02 January 2021: Contributed talk at the virtual conference of the Society for Integrative and Comparative Biology: “Adaptive plasticity as an indirect fitness benefit of mate choice in variable environments”

17 January 2020: UNC Biology Department “Lunch Bunch”: Gave a talk to the department on my research.

04 January 2020: Contributed talk at the conference of the Society for Integrative and Comparative Biology in Austin, TX: “Sexual Selection and Adaptation in Variable Environments: Offspring Plasticity as an Indirect Benefit of Mate Choice”

12 April 2019: UNC Biology Department “Lunch Bunch”: Gave a one-hour talk to the department on my research.

15 February 2019: Invited guest lecture at Duke University on sexual selection and signaling in spadefoot toads. Delivered a one-hour lecture to an undergraduate herpetology course (Bio290S) taught by Dr. Ron Grunwald and guided students in a data-analysis activity.

07 February 2019: Invited guest lecture on behavioral plasticity for UNC undergraduate course Animal Behavior, BIOL 278, taught by Dr. Cathy Lohmann. Used my research and other empirical examples to explain phenotypic plasticity in the context of animal behavior in the course of a one-hour lecture.

13 August 2018: Contributed talk at the 2018 conference of the International Society for Behavioral Ecology in Minneapolis, MN: “The role of sexual selection in adaptive evolution”; described my most recent findings and their implications for the roles of mate choice and phenotypic plasticity in local adaptation.

13 August 2018: Contributed talk at ISBE 2018: “The role of sexual selection in adaptive evolution”; described my most recent findings and their implications for the roles of mate choice and phenotypic plasticity in local adaptation.

29 July 2018: Together with other Pfennig lab members, led a field trip to spadefoot toad field sites near the Southwestern Research Station for students in a herpetology course at the station.

9 March 2018: UNC Biology Department “Lunch Bunch”: Gave a one-hour talk to the department on my research.

10 July 2017: Invited talk for an EarthWatch group at the Southwestern Research Station on spadefoot toad research performed by Pfennig lab members on and around the station grounds. Also discussed the roles of climate change and agriculture in shaping a spadefoot range expansion.

17 February 2017: Invited guest lecture at Duke University on sexual selection in amphibians. Delivered a one-hour lecture to an undergraduate herpetology course (Bio290S) taught by Dr. Ron Grunwald.

Grants and Awards

2020 UNC Chapel Hill Dissertation Completion Fellowship: covers tuition, fees, health insurance, and living expenses without the requirement of TA or RA duties for one academic career to aid dissertation completion.

2019 American Museum of Natural History Theodore Roosevelt Memorial Grant: \$3,015
Funding given in support of my research on sexual selection and the evolution of plasticity.

2019 UNC Chapel Hill Druscilla French Graduate Student Excellence Award: \$5,000
Awarded in recognition of distinguished mentorship of undergraduates in a research setting.

2018: UNC Chapel Hill Graduate Student Excellence Award: \$1,500
Awarded in recognition of service to the UNC Department of Biology.

2016: Sigma Xi Grants in Aid of Research: \$971
Funding given in support of my research on the evolution of phenotypic plasticity.

Teaching

2017 - 19: Teaching Assistant for Vertebrate Structure and Evolution at UNC Chapel Hill (BIOL 474/474L); led laboratory sections; administered and graded laboratory assignments and exams; taught dissection technique and the use of comparative methods in evolutionary analysis; designed laboratory exercises and wrote exams.

2016 - 20: Teaching Assistant for Anatomy and Physiology at UNC Chapel Hill (BIOL 252/252L); led laboratory sections; administered and graded laboratory assignments and exams.

2016: Teaching Assistant for Ecology and Evolution at UNC Chapel Hill (BIOL 201); led recitations, administered homework assignments and exams, graded assignments and exams.

2015 - 2016: Teaching Assistant for Principles of Biology (BIOL 101/101L) at UNC CH.

Outreach, Leadership, and Departmental Service

16 March 2019: With other Pfennig lab members, hosted an interactive display at the North Carolina Museum of Natural Sciences annual Reptile and Amphibian Day event. Used my research in combination with that of others in the Pfennig lab as examples; engaged the lay public in discussions of evolution and how evolution is studied by biologists. The event drew 7,961 visitors.

August 2017 – 2018: Biology Graduate Student Association (BGSA): served as BGSA President. Led the organization, funding, and hosting of events for graduate students, post-docs, and faculty at UNC, including social events, working groups, and the annual Biology Department Research Symposium. Liaised between grad students, faculty, and administrative personnel.

August 2017: Designed an educational game based on my research for use in high school classrooms to teach sexual selection. The game was presented by Pfennig lab members to K-12 STEM educators at the annual SciREN conference in Raleigh.

April 2017 and 2018: UNC Science Expo: With other Pfennig lab members, hosted an interactive display with educational modules on evolution, sexual selection, hybridization, and frog conservation. Used my research in combination with that of others in the Pfennig lab as

examples; engaged the lay public in discussions of evolution and how evolution is studied by biologists. The Science Expo draws as many as 10,000 visitors annually.

11 February 2017: With other Pfennig lab members, hosted an interactive display at the North Carolina Museum of Natural Sciences annual Darwin Day event. Used my research in combination with that of others in the Pfennig lab as examples; engaged the lay public in discussions of evolution and how evolution is studied by biologists. The event drew 4,811 visitors.

October 2016: Provided mock graduate school admissions interviews for ten UNC undergraduates enrolled in the Chancellor's Science Scholars (CSS) program; this program promotes entry of women and underrepresented minorities to graduate- and professional-degree programs.

August 2016 – Present: UNC Pre-Graduate Education Advising Program: provided one-on-one advising for UNC undergraduate students seeking help with the graduate school application process. Aided students in school selection, contacting potential advisors, developing research ideas, test preparation, garnering funding, essay writing, application materials, and preparation for graduate studies.

August 2016 – 2017: UNC Biology Graduate Student Association: served as Treasurer; managed BGSA funds and expenditures in accordance with UNC regulations and state and federal law; helped organize and host social and academic events, including the annual Biology Department Research Symposium.

April 2016: UNC Science Expo: Provided tours of the Pfennig laboratory for the lay public. Showcased my research using lab equipment and preserved and live animals for illustration; spoke with K-12 educators and students about undergraduate and graduate studies in biology. The Science Expo draws as many as 10,000 visitors annually.

July 2016: NC Museum of Natural Sciences Natural World iLab Exhibit: Co-hosted an interactive museum exhibit showcasing phenotypic plasticity, evolutionary ecology, and other topics studied in the Pfennig lab. Helped children and young adults learn to use dissection microscopes and other equipment; provided information and answered questions for approximately 100 museum visitors.

July 2016: NC Museum of Natural Sciences Micro World iLab Exhibit: Co-hosted an interactive museum exhibit showcasing hybridization and related phenomena studied in the Pfennig lab. Helped children and young adults with DNA extraction and other activities; provided information and answered questions about various genetics techniques and their applications in the study of hybridization and evolution for approximately 100 museum visitors.

Professional Positions

(references available upon request)

2014-15: Senior Manufacturing Associate at KBI Biopharma in Boulder, CO.
Biopharmaceutical manufacturing at scale, document writing (SOPs, batch records, protocols,

reports, etc.), tech-transfer/scale-up, qualification/validation, equipment maintenance, and laboratory-scale process-development work. *E. coli* fermentation, *E. coli* seed bank production, protein refolding, HPLC protein purification, and tangential-flow filtration at bench, pilot, and manufacturing scales. Personally developed numerous protocols and associated documentation for new drug-manufacturing processes while interfacing with scientists and engineers from client companies.

2014: Contract position at Reckitt-Benckiser Pharmaceuticals in Fort Collins, CO. Researched, planned, and began implementation and qualification of a new human visual-inspection program for prefilled syringes.

2010-13: Technician at Merck biopharmaceutical facility in Boulder, CO. Biopharmaceutical manufacturing at scale, document writing (SOPs, batch records, protocols, reports, etc.), tech transfer/scale-up, qualification/validation, equipment maintenance, and laboratory-scale process development work. *E. coli* fermentation, protein refolding, HPLC protein purification, and tangential-flow filtration at bench, pilot, and manufacturing scales. Included a three-month assignment in the Netherlands aiding Dutch colleagues with HPLC operations.

Honors and Distinctions

Graduated Cornell College magna cum laude 2009

Cornell College Deans' list 2005-2009

Frank G. Brooks Outstanding Cornell College Senior Biology Major Award 2009

Frank G. Brooks Outstanding Cornell College Junior Biology Major Award 2008

Academic and Professional Societies

American Association for the Advancement of Science: member

American Society of Naturalists: member

Society for the Study of Evolution: member

International Society for Behavioral Ecology: member

Animal Behavior Society: member

Society for Integrative and Comparative Biology: member

Association of Southeastern Biologists: member

Society for the Study of Amphibians and Reptiles: member

Sigma Xi Scientific Research Society: member

Tri-Beta Biological Honor Society: member

North Carolina Herpetological Society: member