Dr. Carrie F. Olson-Manning
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Google Scholar · Research Gate

RESEARCH INTERESTS

The goal of my lab is to understand the evolution of biochemical pathways. How do novel functions arise? What determines when and how pathways change size? How is flux controlled in biochemical pathways and what evolutionary forces drive control? To answer these questions, my lab studies plant and animal systems using a combination of biochemistry, genetics, molecular and cell biology, and phylogenetic techniques.

EDUCATION

Ph.D. Duke University, Evolutionary Genetics, 2013 Thesis · *Evolution of flux control and function in the glucosinolate pathway*

B.Sc. University of Minnesota, *Summa Cum Laude,* 2007, Thesis · *The effect of random amino acid replacement on function and fitness*

APPOINTMENTS

2016- Assistant Professor of Biology, Augustana University, Sioux Falls, SD

2013-2016 Postdoctoral fellow, University of Chicago, Department of Ecology and Evolution
Advisor · Dr. Joseph Thornton, *Evolution of the corticosteroid pathway in vertebrates*

2007-2013 Duke University, Department of Biology
Advisor · Dr. Thomas Mitchell-Olds

2006-2007 University of Minnesota, College of Biological Sciences
Advisor · Dr. Antony Dean

2004-2006 University of Minnesota, College of Biological Sciences
Advisor Dr. Susan Weller

PUBLICATIONS

C.F. Olson-Manning, □C. Strock, T. Mitchell-Olds. 2015. Flux control in a plant defense pathway is robust to environmental perturbations and controls variation in adaptive traits. G3 Genes|Genomes|Genetics DIO: 10.1534/g3.115.021816

C.F. Olson-Manning, C.R. Lee, M.D. Rausher, T. Mitchell-Olds. 2013 Evolution of flux control in the glucosinolate pathway in Arabidopsis thaliana. Molecular Biology and Evolution 30:14-23. DOI: 10.1093/molbev/mss204

C.F. Olson-Manning, M.R. Wagner, T. Mitchell-Olds. 2012. Adaptive evolution: evaluating empirical support for theoretical predictions. Nature Reviews Genetics 13: 867-877 DOI:10.1038/nrg3322

V.S.K. Prasad*, B. Song*, **C.F. Olson-Manning***…□I. Naqvi…et al. 2012 A Gain-of-Function Polymorphism Controlling Complex Traits and Fitness in Nature. Science. 337:1081-1084. DOI: 10.1126/science.1221636
* These authors contributed equally. □ Indicates undergraduate mentee as co-author

Pedagogical Publication
Wright, R.L., Charlson, A., and **Olson, C.F.** 2005 Review of: A 15-Year Study of 63 Teachers at 24 Institutions Reveals: "What the Best College Teachers Do". Cell Biology Education. 4: 279-280

TEACHING

Training

2014-2016 Attended Workshops from the Center for Teaching and Learning, University of Chicago
2008-2013 Certificate in College Teaching from Duke University

Curriculum development

2012 "Bioinformatics for Undergraduates" (BIOL 490S), Duke University
2010 "Quantitative Genetics of Trichomes in Brassica rapa" for Duke Biology's gateway course (BIOL 102L), Duke University

Courses

2012 Instructor of record, Bioinformatics for Undergraduates (BIOL 490S) Duke University
2008-2012 Teaching assistant, Cell and Molecular Biology Lab (BIOL 184L) Duke University
2011, 2012 Guest Lecturer, Molecular Evolution "Signatures of Selection in Sequences" Duke University
2010-2012 Teaching assistant, Introductory Biology Lab Duke University
2006-2007 Teaching assistant, Animal Diversity Lab University of Minnesota
2005-2006 Peer Mentor, Nature of Life, College of Biological Sciences University of Minnesota

RESEARCH ADVISEES

2016- Augustana undergraduates Alexandra Peterson, Skyy Pineda, Sydney Kreutzmann, and Nicholas Antonson on Papilio polytes behaviour project at the Butterfly House and Marine Cove in Sioux Falls, SD in collaboration with Dr. Erica Westerman at the University of Arkansas
2016- Augustana undergraduates Tori Leann and Jessa Kack, "Environmental and genetic control of the indolic glucosinolate pathway in Arabidopsis thaliana"
2016- Augustana undergraduates Maggie Donovan and Madeline Valentin, "The evolution of allosteric regulation of CYP11B in Old World primates"
2011-2013 Duke undergraduate, Allison Khoo, on senior honors thesis "Functional analysis of molecular evolution in an anti-herbivory enzyme from Boechera stricta"
2011 Gettysburg College undergraduate, Chris Strock, on summer project (co-author on Olson-Manning, Strock, and Mitchell-Olds G3 2015)
2010-2011 Duke undergraduate, Rui Jiang, on senior honors thesis "Evolutionary forces on the glucosinolate pathway in Arabidopsis thaliana"
2009-2010 Duke undergraduate, Ibtehaj Naqvi, on undergraduate research project (was co-author on V.S.K. Prasad*, B. Song*, C.F. Olson-Manning* et al. Science 2012)
2009-2010 Duke undergraduate, Kathy Chu, on undergraduate research project

FELLOWSHIPS AND GRANTS

2014-2016 NIH Ruth L. Kirschstein National Research Service Award Individual Postdoctoral Fellowship ($104,812)
2012-2013 Duke Graduate School Bass Instructorship ($25,950)
2012, 2013 Society of Molecular Biology and Evolution Student travel award ($1,500)
2011 Department of Biology Grant-in-Aid ($1,000) "Enzyme polymorphism on a geographic landscape"
2010-2013 Duke University Graduate Travel Grant ($500)
2010 National Science Foundation Doctoral Dissertation Improvement Grant ($14,700) "Evolution of novel phenotypes: The role of generalized enzyme function in adaptation"
2010 Student Science Outreach Grant ($540) Project to teach 6-8th graders about the scientific method through baking experiments
2009 Department of Biology Grant-in-Aid ($1,000) "An empirical test of flux control, pathway position and selective constraint"

2008 Department of Biology Grant-in-Aid ($1,000) “Functional characterization of a herbivore resistance QTL”

SERVICE AND OUTREACH

2014-2016 Workshop for Expanding Your Horizons, Chicago, IL
2011-2012 Lead Science Coach for Building Opportunities and Overtures in Science and Technology (BOOST)
2011 Workshop on Scientific Method for 6th-8th grade, Moorhead, MN and Durham, NC
2008-2010 Women and Math Mentoring Program for 8th grade girls, Durham County
2009 Plant Biology Workshop with 2nd grade, Durham, NC
2009 DNA Extraction Workshop with 5th grade, Moorhead, MN

PROFESSIONAL MEMBERSHIP AND SERVICE

Member

The Society for Molecular Biology and Evolution, The Society for the Study of Evolution, The Society of Plant Biology (2011), The Entomological Society of America (2005-2006)

Reviewer

Evolution, Plant Physiology, Plant Journal, PLoS Biology, Science, BMC Evolutionary Biology, New Phytologist

PRESENTATIONS

Invited Seminars

2015 Augustana University, Sioux Falls, SD
2015 Harvey Mudd College, Claremont, CA
2015 St. Norbert College, De Pere, WI
2014 St. Thomas University, St. Paul, MN

Selected Symposium Presentations

2015 Menten Keynote, Mechanisms of Protein Evolution III, SMBE
2013 Society of Molecular Biology and Evolution, Walter M. Fitch Award Finalist
2013 Mechanisms of Protein Evolution II, SMBE
2012 Society of Molecular Biology and Evolution
2010 Duke Biochemistry Departmental Retreat

Research Seminars

2009-2011 Duke Population Biology Seminar
2010 Evolution Society Meeting

Poster Presentations

2016 Evolution Meeting, Austin, TX
2015 Gordon Conference Molecular Mechanisms of Evolution, Easton, MA
2011 Plant Biology Meeting, Minneapolis, MN
2007 Undergraduate Poster Presentation, University of Iowa
2005-2007 Undergraduate Poster Presentation, University of Minnesota
2005 Entomology Society Meeting

Symposium Co-authorship

2015 European Society on Evolutionary Biology, Genomics of Local Adaptation
2015 Fritz Muller Symposium, Evolution

Computer Language Proficiency
Python (Intermediate), Unix (Intermediate), R (Beginner)