

Curriculum Vitae

Mark Peterson

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Professional Positions

Life-Science Innovations
Research and Development
Data Scientist

Willmar, MN
2016 – Present

Professional Positions

Viterbo University
Department of Biology; Department of Mathematics
Assistant Professor

La Crosse, WI
2014 – 2016

Juniata College and Penn State University
Department of Biology; Huck Institutes of Life Science
HHMI Post-Doctoral Fellow in Genomics and Bioinformatics

Huntingdon and State College, PA
2013 – 2014

Education

Indiana University
Department of Biology
PhD in Evolutionary Biology; Minors in Animal Behavior and Genetics

Bloomington, IN
2008 – 2013

- Dissertation Thesis: A genomic perspective on the evolution of sexual dimorphism: The role of hormones and gene expression. Advised by: Ellen Ketterson

University of Minnesota
College of Biological Sciences
Bachelor of Science in Genetics, Cell Biology & Development; and Ecology, Evolution & Behavior

Minneapolis, MN
2004 – 2008

- Research with Dave Stephens (behavior & cognition) and Michael Simmons (genetics)

Publications

15. Marden, J.H.; Mangan, S.A.; **Peterson, MP**; Wafula, E.; Fescemyer, H.W.; Der, J.; dePamphilis, C.W.; and Comita, L.S. 2017. Ecological genomics of tropical trees: how local population size and allelic diversity of resistance genes relate to immune responses, co-susceptibility to pathogens, and negative density dependence. *Molecular Ecology*. [Accepted Author Manuscript](#). doi:10.1111/mec.13999
14. Fudickar, AM; **Peterson, MP**; Greives, TJ; Atwell, JW; Bridge, ES; Ketterson, ED. 2016. Differential gene expression in seasonal sympatry: mechanisms involved in diverging life histories. *Biology Letters*. **12**: 20160069.

13. Kimberly A. Rosvall, KA; Bergeon Burns, CM; **Peterson, MP**. 2016. Diving Deeper into Mechanism: Individual and Sex Differences in Testosterone Production, Sensitivity, and Genomic Responses. In Ketterson, ED and Atwell, JW (Ed.) *Snowbird: Integrative Biology and Evolutionary Diversity in the Junco*. (Chapter 7). Chicago, IL: The University of Chicago Press.
12. **Peterson, MP**; Malloy, JT*; Buonaccorsi, VP; Marden, JH. Teaching RNAseq at undergraduate institutions: A tutorial and R package from the Genome Consortium for Active Teaching. 2015. *CourseSource, Vol 2*. *Undergraduate co-author.
11. Simmons, MJ; **Peterson, MP**; Thorp, MW; Buschette, JT; DiPrima, SN; Harter, CL; Skolnick, MJ. piRNA-mediated transposon regulation and the germ-line mutation rate in *Drosophila melanogaster* males. 2015. *Mutation Research/Fundamental and Molecular Mechanisms of Mutagenesis*. 773. 16-21.
10. Rosvall, KA; **Peterson, MP**. Behavioral effects of social challenges and genomic mechanisms of social priming: What's testosterone got to do with it? 2014. *Current Zoology*. 60(6). 791-803.
9. Trexler, R*; Lamendella, R; Solomon, C*; Brislawn, CJ*; Wright, JR*; Rosenberger, A*; McClure, EE*; Grube, AM*; **Peterson, MP**; Keddache, M; Mason, O; Hazen, TC; Grant, CJ. Assessing Impacts of Unconventional Natural Gas Extraction on Microbial Communities in Headwater Stream Ecosystems in Northwestern Pennsylvania. 2014. *Frontiers in Microbiology*. 5(522). *Undergraduate co-author.
8. Rosvall, KA; **Peterson, MP**; Reichard, DG; Ketterson, ED. Highly context-specific activation of the HPG axis in the dark-eyed junco and implications for the Challenge Hypothesis. 2014. *General and Comparative Endocrinology*. 201: 65-73
7. Rosvall, KA; **Peterson, MP**; Buechlein, A; Tang, H; Rusch D; Ketterson, ED., Acute and persistent social challenges elicit widespread shifts in peripheral gene expression without a systemic rise in testosterone. 2014. *Integrative and Comparative Biology*. 54: E179.
6. **Peterson, MP**; Rosvall, KA; Taylor, CA*; Lopez, JA; Choi, JH; Colbourne, JK; Tang, J; and Ketterson. 2014. Potential for sexual conflict assessed via testosterone-mediated transcriptional changes in the liver and muscle of a songbird. *Journal of Experimental Biology*. 217(4): 507-517. *Undergraduate co-author.
5. Buonaccorsi, V; **Peterson, MP**; Trun, N; Tobin, T; Newman, J; Hunt, A; Aguilar, A; Praul, C; Grove, D; Lamendella, R; Roney, J; Roberts, W. 2014. Vision and Change through the Genome Consortium on Active Teaching using Next-Generation Sequencing (GCAT-SEEK). *CBE Life Sci Edu*. 13(1): 1-2.
4. **Peterson, MP**; Rosvall, KA; Choi, JH; Ziegenfus, C; Tang, H; Colbourne, JK; and Ketterson, ED. 2013. Testosterone affects neural gene expression differently in male and female juncos: A role for hormones in mediating sexual dimorphism and conflict. *PLOS One*. 8(4):e61784.
3. **Peterson, MP**; Abolins-Abols, M.; Atwell, J.W.; *Rice, B.J.; MilÃa, B.; and Ketterson, ED. 2013. Variation in candidate genes Clock and ADCYAP1 does not consistently predict differences in migratory behavior in the songbird genus Junco. [v1; ref status: indexed] *F1000Research*. 2:115. *Undergraduate co-author.
2. **Peterson, MP**; Whittaker, DJ; Ambreth, S; Sureshchandra, S; Mockatis, K; Buechlein, A; Podicheti, R; Choi, JH; Lai, Z; Colbourne, JK; Tang, H; and Ketterson, ED. 2012. De novo transcriptome sequencing in a songbird, the dark-eyed junco (*Junco hyemalis*): Genomic tools for an ecological model system. *BMC Genomics*. 13:305. Identified as 'Highly Accessed.'
1. Whittaker, DJ; Dapper, AL; **Peterson, MP**; Atwell, JW; Cardoso, GC; Price, TD and Ketterson, ED. 2012. MHC diversity in a recently diverged songbird population: evidence for selection mediated by a novel environment, with notes on the complex structure of passerine MHC. *Journal of Avian Biology*. 43(2): 109-118.

Teaching Experience

- Assistant Professor, Viterbo University (Fall 2014 – Present). Teaching introductory and advance biology courses with lab, and introductory statistics for both math/science majors and non-majors. Utilizing process oriented guided inquiry learning (POGIL), and the R statistical environment.
- Instructor, RNA-seq breakout session, GCAT-SEEK workshop on Next-gen sequencing, funded by HHMI and NSF (2013 – 2015). Prepare faculty from undergraduate institutions to use next-generation sequencing in their teaching and research focusing on tool use in Linux environments.
- Instructor, Juniata College (2013 – 2014). Designed and taught research-based methods course in bioinformatics with a focus on RNAseq, gene expression, and genetic disorders. Taught Freshman writing seminar to write a full scientific manuscript based on their own lab data studying hemlock woolly adelgid. Taught the genetics module of the introductory Freshman biology lab course focused on DNA digestion, plasmid mapping, and gel electrophoresis. Students developed general laboratory techniques and procedures.
- Instructor, Advanced Biology, Foundations in Science and Mathematics Summer Program (2012). Designed a full preparatory course for students about to take AP biology, including developing my own lectures, labs, and tests.
- Associate Instructor, Biology of Birds, Indiana University, three semesters (2009 – 2011). Led lab and field trip activities, helped students read, comprehend, and present primary literature.

Guest Lectures

- R tutorials, Juniata College (2013 – 2014). Multiple R tutorial sessions for faculty and students.
- Biostatistics, Juniata College (2013). Taught multiple computer based lab sessions working in the R Statistical Environment. Redeveloped previously taught labs to teach students R while learning statistics content. Wrote and presented lecture on Bayesian Statistics.
- Teaching University Science, Indiana University (2013, 2015). Part of a diverse panel of college instructors discussing teaching and faculty development with late-stage PhD students interested in teaching.
- Biology and AP Biology, New London- Spicer High School, Minnesota (2010 – 2013). Taught multiple lectures and labs of my own design; led hands-on experiences with wild birds.
- Animal Behavior, Indiana University (2012). Mathematic modeling in biology using game theory.
- Methods in animal behavior, Indiana University (2011). Hormone challenges and bird handling. Instructed graduate students in bird research methods including hormone challenges and analysis.

Mentoring Experience

- Undergraduate research mentor, Viterbo University (2014 – 2015). Working with 3 undergraduate students (including 2 women) to analyze Facebook networks of Viterbo students and variability in bacterial communities in published works.
- Undergraduate research mentor and co-mentor, Juniata college (2013 – 2014). Working three with students to extend my research on sexual dimorphism in *Juncos*. Working with seven students from other labs in Biology and Psychology to apply R to their diverse research questions.

- Mentor to three undergraduate and one high school student, Indiana University (2010 – 2013). Trained students in lab techniques, experimental design, and reading scientific literature. Resulted in two peer-reviewed publications and several poster and oral presentations.

Grants and Fellowships

Funded

- National Science Foundation – Doctoral Dissertation Improvement Grant (\$14,975 in research funds) "Individual variation and sexual dimorphism: the role of testosterone and gene expression."
- National Institutes of Health – Training Fellowship (two years of support; \$4,000 in research funds) "Testosterone-induced gene expression in the Dark-eyed Junco."
- Indiana Academy of Science – Research Grant (\$2,990 in research funds) "Induction of liver gene expression by testosterone: the role of energy in systemic responses to testosterone that mediate both behavior and physiology."
- American Ornithologists Union – Research Grant (\$2,360 in research funds) "Seasonal Profile of Gene Expression in the Dark-eyed Junco."
- National Science Foundation – IGERT Fellowship (one year support; \$6,000 in research funds) "Microarray Analysis of Seasonal Variation in Gene Expression."
- National Science Foundation – Graduate Research Fellowship Program (Honorable Mention) "The evolution of monogamy driven by the expression of a single gene."
- University of Minnesota – Undergraduate Research Opportunity (\$1,670 in research funds) "Memory Retention Across Generations of Experimental Evolution in *Drosophila melanogaster*."

Pending

- National Science Foundation – Collaborative Research Grant (\$967,767 total across four institutions) "Linking animal migration and infectious disease: patterns, processes, and predictions across the continent-wide range of a common songbird"

Service

- **Core Curriculum Working Group; Viterbo University.** Active participant in the assessment and revision of the core curriculum.
- **Elections Committee; Viterbo University.** Served as elected member of committee and organized, ran, and analyzed Faculty Elections.
- **Institutional Animal Care and Use Committee; Indiana University.** Oversaw all animal research at Indiana University and ensured compliance with laws and regulations while allowing research to proceed
- **Reviewer and evaluator.** Reviewer for NSF research proposals. Ad hoc reviewer for journals (*Behavioral Ecology and Sociobiology*, *Molecular Ecology Resources*), and *CourseSource*; recommender for F1000Prime, F1000 Specialist, and internal institutional grant reviewer.

- **Center for Integrative Study of Animal Behavior Conference Planning Committee; Indiana University.** Arranged and coordinated presentations and travel for visiting scientists; assisted in general event planning
- **Responsible Conduct of Research Workshop Panelist; Indiana University.** Discussed data management best practices, including storage, ownership, sharing, and security to ensure ethical conduct of research
- **Graduate Recruitment Weekend Planning Committee; Indiana University.** Arranged events and catering for applicants

Submitted and In Preparation Manuscripts

1. **Peterson, MP;** Rosvall, KA; Bergeon Burns, CM; Buechlein, A; Rusch, DB; and Ketterson, ED. Natural variation in gene expression and testosterone production: implications for the evolution of hormone-mediated phenotypes. *In Prep.*

Invited Research Presentations

- **Peterson, MP.** 2015. "Bioinformatics: General Principles and broad applications." Keynote address at the GCAT-SEEK Bioinformatics Workshop.
- **Peterson, MP.** 2014. "Using bioinformatic tools across data science domains." at University of Minnesota - Morris.
- Lamendella, R; **Peterson, MP** ; Buonaccorsi, V. 2013. "Improving Genomics Education Through the GCAT-Seek Network." at Franklin & Marshall College.
- **Peterson, MP.** 2012. "How gene expression and hormones contribute to sexual dimorphism: Natural variation and experimental manipulation in an ecological model species, the dark-eyed junco." at Penn State University, Department of Biology.
- **Peterson, MP.** 2011. "Gene expression in the brain of a non-model songbird: sexual dimorphism and the role of testosterone." Oral Presentation at Keck Center for Behavioral Biology, Annual Student & Postdoc Symposium. Raleigh, North Carolina. *Won 'Best Oral Presentation.'*

Selected Research Presentations

- Partsch, J*; von Dongen, G*; Rodriguez, D*; **Peterson, MP.** 2015. "Testosterone and sex: the role of hormones in sexual dimorphism." Experimental Biology 2015 in conjunction with The American Society for Biochemistry and Molecular Biology (ASBMB) Annual Meeting. **Undergraduate co-author*
- Malloy, JT*; Lutz, A*; Grant, CJ*; **Peterson, MP.** 2014. "Brook Trout Population Genomics: Potential Effects of Pollution" Landmark Conference Summer Research Symposium. Huntingdon, PA. **Undergraduate co-author*
- Koestler, A*; Buser, V*; Park, S*; **Peterson, MP;** Gilman, AT. 2014. "Auditory clipping complicates pitch change detection." Annual Meeting of the Eastern Psychological Association. Boston, MA. **Undergraduate co-author*
- Sickler, A*; **Peterson, MP;** Buonaccorsi, V. 2014. "Genome Annotation of Two Pacific Rockfishes Differing in Longevity." Plant and Animal Genome meeting. San Diego, CA. **Undergraduate co-author*

- Scales, J*; **Peterson, MP**; Keeney, J. 2014. "RTT105 in retrotransposition: a role in gag particle formation?." Keystone Symposium on Mobile Genetic Elements and Genome Evolution (C2). Santa Fe, NM. **Undergraduate co-author*
- **Peterson, MP**; Aguilar, A; Grove, D; Hunt, A; Lamendella, R; Newman, J; Praul, C; Tobin, T; Trun, N; Roberts, W; Roney, J; Buonaccorsi, V. 2013. "The GCAT-SEEK network: Bringing genomic data, tools, and competencies to undergraduate education." Ecological Genomics Symposium. Kansas City, Missouri.
- **Peterson, MP**; Rosvall, KA; Bergeon Burns, CM; Buechlein, A; Rusch, DB; Ketterson, ED. 2012. "Natural variation in gene expression and testosterone production: implications for the evolution of hormone-mediated phenotypes." Ecological Genomics Symposium. Kansas City, Missouri.
- **Peterson, MP**; Rosvall, KA; Ketterson, ED. 2012. "Circadian changes in gene expression: Investigating the brain and body of a songbird" Indiana University Animal Behavior Conference.
- **Peterson, MP**; Atwell, JW; Mila, B; Abolins-Abols, M, Rice, BJ*; Ketterson, ED. 2012. "Candidate genes and rapidly evolving migratory behavior in the genus *Junco*." SICB- poster session. Charleston, South Carolina. **Undergraduate co-author*
- **Peterson, MP**; Rosvall, KA; Ketterson, ED. 2011. "Sex differences in the liver: transcriptional responses to testosterone in a wild songbird." Ecological Genomics Symposium. Kansas City, MO.
- **Peterson, MP**; Rosvall, KA; Choi, JH; Tang, H; Ketterson, ED. 2011. "Gene expression in the brain of a non-model songbird: sexual dimorphism and the role of testosterone." Oral Presentation at Behavior 2011. Bloomington, IN.
- **Peterson, MP**; Bleecker, H*; Ketterson, ED. 2010. "Sequence variation of the androgen receptor in the Dark-eyed Junco." Indiana University Animal Behavior Conference- poster session. Bloomington, Indiana. **High School Student co-author*.