

CURRICULUM VITAE
JAMES R. WALTERS

Ecology and Evolutionary Biology, University of Kansas
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Education

- Ph.D. Cornell University, Ithaca, NY
 Ecology and Evolutionary Biology, 2009
- B.A. Bowdoin College, Brunswick, ME
 Biology, Departmental Honors, *Summa Cum Laude*, 2000
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Appointments

- 2013-present Assistant Professor – University of Kansas, Ecology & Evolutionary Biology
- 2013 Postdoctoral Researcher – Stanford University, Biology
- 2010-2012 U.S. National Science Foundation Bioinformatics Post-Doctoral Fellow
- 2012 Visiting Fellow – Stanford University, Biology Dept.
- 2010-2011 Visiting Fellow – Cambridge University, Zoology Dept.
- 2010-2011 Post-Doctoral Research Associate – St. John’s College, Cambridge University
- 2009 Research Associate – Cornell University, Ecology & Evolutionary Biology
- 2002-2009 Doctoral Student – Cornell University, Ecology & Evolutionary Biology
- 2001-2002 Research Technician – University of Maryland, Biology Dept.
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Publications

In review or nearing submission

Gu L, **Walters JR**, and Knipple D. Convergent pattern of sex chromosome dosage compensation between lepidopterans (WZ/ZZ) and eutherian mammals (XX/XY): insights from a moth neo-Z chromosome. *In review*.

Manduca genome consortium. Multifaceted insights from the genome of the Tobacco hornworm moth, *Manduca sexta*. *In preparation, anticipated submission October 2015*.

Harpel D and **Walters JR**. The sperm proteome of Monarch butterfly, *Danaus plexippus*. *In preparation, anticipated submission November 2015*.

Peer reviewed

Walters JR, Hardcastle TJ, and Jiggins CD. 2015. Sex chromosome dosage compensation in *Heliconius* butterflies: global yet still incomplete? *Genome Biology & Evolution*, *in press*.
doi:10.1093/gbe/evv156

Karr, TL and **Walters JR**. 2015. Panning for sperm gold: Isolation and purification of apyrene and eupyrene sperm from lepidopterans. *Insect Biochemistry and Molecular Biology*, 63, 152–158.

- Harpel D, Cullen DA, Ott SR, Jiggins CD, **Walters JR**. 2015. Pollen feeding proteomics: salivary proteins of the passion flower butterfly, *Heliconius melpomene*. *Insect Biochemistry and Molecular Biology*, 63:7-13.
- Whittington E, Zhao Q, Borziak K, **Walters JR**, and Dorus S. 2015. Characterisation of the *Manduca sexta* sperm proteome: Genetic novelty underlying sperm composition in Lepidoptera. *Insect biochemistry and molecular biology*. 62:183-193.
- Martin SH, Dasmahapatra KK, Nadeau NN, Salazar C, **Walters JR**, Blaxter M, Manica A, Mallet J, and Jiggins CD. 2013. Genome-wide evidence for speciation with gene flow in *Heliconius* butterflies. *Genome Research*.
- Briscoe AD, Munos AM, Kozak KM, **Walters JR**, Yuan F, Jamie GA, Martin SH, Jacquin-Joly E, and Jiggins CD. 2013. Female behavior drives expression and evolution of gustatory receptors in butterflies. *Plos Genetics*, 9, e1003620
- Heliconius* Genome Consortium (K Dasmahapatra & **JR Walters**, shared first-authorship, with 78 co-authors). 2012. A butterfly genome reveals promiscuous exchange of mimicry adaptations among species. *Nature*, 487, 94–98.
- Walters JR**, Stafford C, Hardcastle J, and Jiggins CD. 2012. Evaluating female remating rates in light of spermatophore degradation in *Heliconius* butterflies: pupal-mating monandry versus adult-mating polyandry. *Ecological Entomology*, 37:4, 257–268. **Distinguished as *Editor's Choice* for issue
- Walters JR** and Harrison RG. 2011. Decoupling of rapid and adaptive evolution among seminal fluid proteins in *Heliconius* butterflies with divergent mating systems. *Evolution*, vol. 65 (10) pp. 2855-71
- Walters JR** and Hardcastle TH. 2011. Getting a full dose? Reconsidering sex chromosome dosage compensation in the silkworm, *Bombyx mori*. *Genome Biology and Evolution* vol. 3 pp. 491-504
- Walters JR** and Harrison RG. 2010. Combined EST and Proteomic Analysis Identifies Rapidly Evolving Seminal Fluid Proteins in *Heliconius* Butterflies. *Molecular Biology and Evolution* vol. 27 (9) pp. 2000-2013
- Maroja LM, Andres JA, **Walters JR**, and Harrison RG. 2009. Multiple barriers to gene exchange in a field cricket hybrid zone. *Biological Journal of the Linnean Society*. 97(2):390-402.
- Walters JR** and Harrison RG. 2008. EST analysis of male accessory glands from *Heliconius* butterflies with divergent mating systems. *BMC genomics*, 9: 593.
- Papa R, Morrison CM, **Walters JR**, Counterman BA, Chen R, Halder G, Roberts L, Kapan DD, Jiggins CD, Reed RD, McMillan WO. 2008. Highly conserved gene order and numerous novel repetitive elements in genomic regions linked to wing pattern variation in *Heliconius* butterflies. *BMC Genomics* 9: 345.
- Wright TF, Johns PM, **Walters JR**, Lerner AP, Swallow JG and Wilkinson GS. 2004. Microsatellite variation among divergent populations of stalk-eyed flies, genus *Cyrtodiopsis*. *Genetical Research* 84(1) 27-40
- Graustein A, Gaspar JM, **Walters JR**, Palopoli MF. 2002. Levels of DNA polymorphism vary with mating system in the nematode genus *Caenorhabditis*. *Genetics*. 161 (1) 99-107.
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Grants, Fellowships, & Awards

Research Grants

- 2015 **Microsoft Azure for Research Award.** *Advancing the annotation of novel genomes through the application of cloud computing.* (\$20,000 equivalent in cloud computing resources)
- 2015 **University of Kansas General Research Funds.** *Parallel profiling of transcriptional responses to infection in a butterfly and its protozoan parasite.* (\$7,870)
- 2014 **National Science Foundation.** DEB-1457758. *Female heterogamety and constraints on the evolution of sex chromosome dosage compensation: a test in Lepidoptera.* PI: JR Walters. (\$711,000)
- 2013 **British Consulate,** UK-US collaboration seed funding. *Evolutionary genomics of genetic imprinting.* £3,000.
- 2010 **Capacity Challenge Grant, The Genome Analysis Center** [Norwich, UK]: *RNAseq transcriptome analysis of adaptively divergent phenotypes in Passion-flower butterflies (Genus: Heliconius)* (£40,000 equivalent in sequencing services; JRW primary author, PI: Chris Jiggins)
- 2010 **John Fell Fund, Oxford University:** *Molecular evolution of sex-linked and sex-biased genes in moths and butterflies* (£42,450; JRW primary author, PI: Judith Mank)
- 2006 **National Science Foundation Doctoral Dissertation Improvement Grant:** *Effects of mating system on accessory gland evolution in Heliconius butterflies* (\$11,970)

Grants Pending

- 2015 **National Science Foundation.** ABI. doseR: a novel linear modeling framework for dosage compensation analysis. PI: JR Walters.

Smaller Research Grants (less than \$2000)

- 2011 Weis-Fogh Trust Fund [Cambridge]
- 2004-2007 Andrew W. Mellon Foundation [Cornell] (3x)
- 2005-2008 Cornell University Sigma Xi (3x)
- 2007 Orenstein Award [Cornell]
- 2004-2008 Cornell Graduate School Travel Grant (3x)

Fellowships

- 2010-2012 **National Science Foundation** Bioinformatics Post-Doctoral Fellowship
- 2002-2004 **National Science Foundation** Graduate Research Fellowship
- 1999 **Surdna Foundation** Undergraduate Research Fellowship

Awards

- 2009 Outstanding Teaching Service, Ecology & Evolutionary Biology [Cornell]
- 2009 Society for Molecular Biology & Evolution Graduate Student Travel Award
- 2003 ‘Best Talk by a First Year Student’ in EEB Graduate Student Symposium [Cornell]
- 2000 Macomber Prize for outstanding senior majoring in biology [Bowdoin]
- 1999 Moulton Prize for outstanding junior majoring in biology [Bowdoin]
- 1999 Phi Beta Kappa [Bowdoin]

Research experience

- 2013-Present *Principle Investigator* University of Kansas, Lawrence, KS
- Directing a research program focused on functional and comparative genomics of Lepidoptera, with an emphasis on sex chromosome evolution and sperm proteomics.
- 2013 *Post-doctoral research* Stanford University, Palo Alto, CA
- Population genomic analysis of genomic imprinting in mouse and humans, synthesizing genome-wide allele-specific expression and population-resequencing data to address patterns of adaptation and diversity at imprinted loci.
- 2010-2012 *Post-doctoral research* Cambridge University, Cambridge, UK
- Genomic analyses of sex-chromosome evolution in Lepidoptera using microarrays, RNA-seq, and genome re-sequencing to address dosage compensation, molecular adaptation, and expression divergence.
 - Leading researcher in *Heliconius melpomene* genome project, coordinated research consortium and implemented gene predictions. Active contributor to *Manduca sexta* genome project.
- 2011 *Post-doctoral research* European Bioinformatics Institute, Hinxton, UK
- Automated gene prediction of *Heliconius melpomene* genome and quality assessment of draft genomic assemblies. 6-month appointment.
- 2009 *Research Associate* Cornell University, Ithaca, NY
- Grant writing and project development for a population genomic analysis of the amphibian-killing chytrid fungus. 4-month appointment.
- 2002-2009 *Doctoral research* Cornell University, Ithaca, NY
- Discovery, characterization, and molecular evolution of seminal fluid proteins in *Heliconius* butterflies achieved via a synthesis of tropical field work, EST libraries, proteomics, phylogenetics, and bioinformatics.
- 2001-2002 *Laboratory Technician* University of Maryland, College Park, MD
- Tissue collection and RNA-isolation for cDNA libraries. Optimized microsatellite primers for high-throughput genotyping. 10 month appointment.
- 1999-2000 *Undergraduate Thesis* Bowdoin College, Brunswick, ME
- Molecular evolutionary analysis of a *C. elegans* sperm protein; PCR, cloning, sequencing.
- 1998 *Research Assistant* Missouri Ozark Forest Ecosystem Project
- Mist-netting, nest-searching, and spot-mapping song birds. 3-month appointment.

Research Training

- 2015 University of Maryland, Gaithersburg, MD
- *Insect Transgenic Technologies Workshop*, 5-day course in theory and application of transgenic methods in insects.
- 2011 European Bioinformatics Institute, Hinxton, United Kingdom
- *Advanced RNA-seq analysis*: 2-day course covering quality control and genome-wide differential gene expression analysis using RNA-seq data.
- 2008 National Evolutionary Synthesis Center (NESCent), Raleigh, NC
- *Computational Phyloinformatics Workshop*: 10-day course focused on writing custom BioPerl scripts and testing molecular evolutionary hypotheses.
- 2007 Woods Hole Marine Biological Laboratory, Woods Hole, MA
- *Workshop on Molecular Evolution*. 2-week intensive course on computational methods and analyses used in molecular evolutionary research.

Mentoring and Teaching

Mentoring

Post-doctoral researchers

2014-present Dr. Christopher Hamm

2015-present Dr. Luiqi (Aloy) Gu

Graduate Students, Primary advisor

2013-2015 Desiree Harpel, MS completed 2015. Currently a PhD student at University of Florida

2014-present Andrew Mongue. PhD candidate EEB, KU

Graduate Students, Committee member

2013- present Boryana Koseva (PhD Candidate EEB, KU)

2013- present Alexis Erwin (PhD Candidate EEB, KU)

2013- present Lucas Hemmer (PhD Candidate EEB, KU)

2013- present Kaila Colyott (PhD Candidate EEB, KU)

2013- present Luke Campillo (MS Candidate EEB, KU)

Undergraduate Students

2014-present Channing Shives. KU Gould summer fellowship & Independent study.

2015 Danny Thiesen. Spring semester volunteer.

2015 Derrick Harms. Summer REU student.

2015 T. Jeffry Cole. Summer REU student.

2014 Margaret Stratton. Summer REU student.

Teaching

2013 – Present *Instructor* University of Kansas

R programming for biologists (BIOL701). Fall 2013 & 2015

- 3 credit graduate seminar with 10-20 students.
- a semester long comprehensive introduction to the R statistical programming language focusing on biological research applications.
- Student evaluation score: 4.63 of 5 possible points

Principles of genetics (BIOL350). Fall 2014, Spring 2015

- 4 credit undergraduate lecture with discussion sections (co-taught 50%). 100-200 students.
- Introductory genetics course required for all KU biology majors.
- Student evaluation score: 4.57 of 5 possible points

2002-2009 *Teaching Assistant* Ecology & Evolutionary Biology, Cornell University

- Special Assistant to curriculum/lecture revision team for Intro Evolutionary Biology
- Evolutionary Biology: *Writing in the Majors*, a selective writing-intensive section of the introductory course for which I independently developed the curriculum
- Topics in Ecology and Evolution, the first-year graduate student core course
- Macroevolution
- Speciation

Presentations and Seminars

Invited Seminars

- 2015 Ecology and Evolution, Kansas State University, Manhattan, KS
- 2015 University of California, Riverside, Entomology
- 2013 University of Edinburgh, Institute of Evolutionary Biology
- 2013 University of California, Berkeley, Museum of Vertebrate Zoology
- 2012 Ecology and Evolution, University of Kansas, Lawrence, KS
- 2009 Bowdoin College, Brunswick, ME
- 2009 Ecology and Evolutionary Biology, Cornell University
- 2008 Department of Biology, Duke University

Invited Conference Presentations

- 2016 (Forthcoming) International Congress of Entomology, Orlando, FL
- 2015 (Forthcoming) Entomological Society of America, Minneapolis, MN
- 2015 Arthropod Genomics Symposium, Manhattan, KS
- 2014 International conference on the Biology of Butterflies, Turku, Finland

Contributed Conference Presentations

- 2014 International workshop on molecular biology and genetics of the Lepidoptera
- 2012 Society for the study of evolution, Ottawa, Ontario, Canada
- 2011 Society for the study of evolution, University of Oklahoma, Norman
- 2010 Unifying behavioural & genomic in sexual selection research, University of Bath, UK
- 2009 Society for molecular biology and evolution, University of Iowa
- 2008 Society for the study of evolution, University of Minnesota
- 2008 Ecology and evolution graduate student symposium, Cornell University
- 2007 Eastern great lakes molecular evolution, University of Toronto
- 2006 Society for the study of evolution, SUNY Stony Brook
- 2006 Ecology and evolution graduate student symposium, Cornell University
- 2003 Ecology and evolution graduate student symposium, Cornell University

Conference Posters

- 2014 Society for the study of evolution, Raleigh, NC
- 2013 Society for molecular biology and evolution, Chicago, IL
- 2012 Ecological Genomics, Kansas State University
- 2011 Ecological & Evolutionary Genomics, Gordon Conference, University of New England
- 2011 Arthropod Genomics Symposium, Kansas State University
- 2010 Arthropod Genomics Symposium, Kansas State University
- 2007 Society for molecular biology and evolution, Dalhousie University
- 1999 Eastern great lakes molecular evolution, SUNY Albany

Service

University and Department

2015-ongoing KU Research computing executive advisory committee

2014-ongoing KU EEB Graduate Admissions Committee

2013-2014 KU EEB Website Committee

Referee Service

Molecular Biology and Evolution, Genome Biology and Evolution, PNAS, PLoS ONE, Molecular Ecology Resource, Heredity, Genetics, Proceedings of the Royal Society B, Journal of Molecular Evolution, Insect Biochemistry and Molecular Biology, Insect Molecular Biology, Invertebrate Development and Reproduction