

# Jeffrey M. Marcus

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## EDUCATION

- 2002 Ph. D., Department of Biology, Duke University, Durham, North Carolina.  
Advisor: H. Frederik Nijhout. Thesis title: "Color patterns, crossveins, and cell signaling".
- 1996 Master of Philosophy, Department of Genetics, Cambridge University, Cambridge, England. Advisor: Michael Akam. Thesis title: "Molecular markers in *Artemia* development: developmental genetics and arthropod evolution".
- 1995 Bachelor of Arts, Section of Ecology and Systematics, Department of Biology, Cornell University, Ithaca, New York. Advisor: Amy R. McCune.

## HONORS AND AWARDS

- 2005 Participant, Burroughs Wellcome Fund-Howard Hughes Medical Institute Course in Scientific Management
- 2003 Participant, Complex Systems Summer School, Santa Fe Institute, Santa Fe, NM
- 2003 Named one of the Top Ten Participants in the Howard Hughes Medical Institute "Ask a Scientist" Program
- 2002 Awarded Certificate in Teaching College Biology, Preparing Future Faculty Program, Duke University
- 1999, 2000, 2001 (x2) Dean's Travel Awards (Duke University)
- 1999 Dean's Award for Excellence in Teaching Nominee (Duke University)
- 1998-2000 President of the Society of Duke Fellows
- 1996-2001 Howard Hughes Predoctoral Fellowship in Biomedical Sciences
- 1996-2000 James B. Duke Fellowship (Duke University)
- 1995 Churchill Scholarship (Cambridge University)
- 1995 Phi Beta Kappa Honor Society
- 1994 Pew Charitable Trusts Fellowship for Research in Systematics
- 1993 NSF REU at the Rocky Mountain Biological Laboratory
- 1992 Shackelton Point Scholarship (Cornell University)
- 1991-1995 Dean's Scholarship (Cornell University)

## RESEARCH EXPERIENCE

- August 2003-Present Assistant Professor, Department of Biology, Western Kentucky University.
- July 2002-May 2003 Postdoctoral Associate, Department of Biological Sciences, SUNY Buffalo. Creating transgenic butterflies to use as tools for the understanding of the development and evolution of color patterns. Supervisor: Antonia Monteiro

- 1996-2002 Ph. D. Student, Program in Genetics and Departments of Zoology and Biology, Duke University, Durham, North Carolina. Evolution and development of crossveins and crossvein-associated pigmentation patterns in insects.
- 1995-1996 M. Phil. Student, Department of Genetics, Cambridge University, Cambridge, England. Molecular markers in brine shrimp (*Artemia*) development and evolution.
- 1993-1995 Undergraduate Researcher, Division of Biological Sciences, Section of Ecology and Systematics, Cornell University. Ontogeny and phylogeny in the northern swordtail clade of the genus *Xiphophorus*.
- 1993 Research Assistant, Rocky Mountain Biological Laboratory, Crested Butte, Colorado. Behavioral effects of conspecific predation in tiger salamanders (*Ambystoma tigrinum*).

## PUBLICATIONS

### Peer Reviewed Publications

- Marcus, J. M., A. L. Harper\*, S. E. House\*, T. M. Hughes, and A. B. Maupin\*. ms. Molecular phylogenetics and the evolution of mimicry in North American viceroy and admiral (*Limenitis*) butterflies. Submitted to *Evolution*.
- Evans, T. M.\* and J. M. Marcus. In Press. A Simulation Study of the Genetic Regulatory Hierarchy for Butterfly Eyespot Focus Determination. *Evolution & Development*.
- Marcus, J. M. 2005. A Partial Solution to the C-Value Paradox. *Lecture Notes in Bioinformatics* **3678**: 97-105.
- Marcus, J. M. 2005. Jumping Genes and AFLP Maps: Transforming Lepidopteran Color Pattern Genetics. *Evolution & Development* **7** (2): 108-114.
- Marcus, J. M., D. M. Ramos, A. Monteiro. 2004. Transformation of the butterfly *Bicyclus anynana*. *Proceedings of the Royal Society of London B (Supplement: Biology Letters)* **27** (S5): 263-265.
- Marcus, J. M. 2003. Female site-specific transposase-induced recombination (FaSSTIR): A high-efficiency method for fine-mapping mutations on the X-chromosome in *Drosophila*. *Genetics* **163** (2): 591-597.
- Marcus, J. M. 2001. The development and evolution of crossveins in insect wings. *Journal of Anatomy*. **199** (1&2): 211-216.
- Marcus, J. M. and A.R. McCune. 1999. Ontogeny and phylogeny in the northern swordtail clade of the genus *Xiphophorus*. *Systematic Biology* **48** (3): 491-522.

### Other Publications

- Marcus, J. M. 2005. Point of View: Students, Butterflies, and Cancer. *Journal of College Science Teaching*. **35** (3): 8-10.
- Hughes, T. M.\* and J. M. Marcus. 2004. Recombination mapping of P[lacW] transposons. *Drosophila Information Service* **87**: 49-52.
- Marcus, J. M. 2003. Recombination mapping of P-element transposon inserts: A new set of laboratory exercises for an undergraduate genetics course. *Drosophila Information Service* **86**: 168-171.
- Marcus, J. M. 2001. A Teaching Statement. *Chronicle for Higher Education Career Network*. <http://www.chronicle.com/jobs/2001/10/2001100901c.htm>

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\* Undergraduate Student

- Marcus, J. M. and J. E. Seiff. 2000. Why don't creationists use private schools? *Nature* **407** (6805): 671.
- Marcus, J. M. 1997. Book Review of "Phenotypes: their epigenetics, ecology and evolution" by C. David Rollo. *Systematics Association Newsletter* **8**: 6-8.

## ABSTRACTS

- Marcus, J.M. 2004. Recombination mapping of P-element transposon inserts: A new set of laboratory exercises for an Undergraduate Genetics Course. Annual *Drosophila Research Conference* **45**: 892A.
- Monteiro, A., Marcus, J. M., Ramos, D. M. 2004. Using germ line transformations to test the function of genes implicated in the development of butterfly wing patterns. Annual *Drosophila Research Conference* **45**: 940A
- Marcus J.M. and Monteiro A. 2002. Progress in the development and evolution of lepidopteran color patterns. *Integrative and Comparative Biology* **42** (6): 1272.
- Marcus J. M. 2001. When is an eyespot not an eyespot? *Developmental Biology* **235** (1): 309.
- Marcus, J. M. 2001. Epigenetic landscapes, signal transduction, and models of crossvein development. Annual *Drosophila Research Conference* **42**: 573C
- Marcus, J. M. 1999. The development and evolution of crossveins and associated pigmentation patterns in the Lepidoptera and Diptera. *Developmental Biology* **210** (1): 192.

## GRANT AWARDS

- 2004-2009 KY-IDeA Networks of Biomedical Research Excellence Program. National Institutes of Health and the National Center for Research Resources Grant P20 RR16481. PI Nigel Cooper, University of Louisville Medical Center. Subcontract for "A Butterfly Transposon Mutagenesis Screen for the Study of Wingless Signal Transduction." Subcontract PI-Jeffrey Marcus \$519,000.
- 2003-2004 Kentucky NSF EPSCoR REG Grant EPS-0132295. "Genetic transformation and AFLP mapping in the butterfly *Precis coenia*." PI-Jeffrey Marcus. \$25,000.
- 2003-2004 Western Kentucky University Junior Faculty Scholarship Fund. "Creating a Genetic Map for a Butterfly." PI-Jeffrey Marcus. \$4000.

## ADDITIONAL GRANT SUBMISSIONS

- 2005 NSF CAREER Program. "CAREER: Developing robust models for understanding Lepidopteran color pattern development." PI-Jeffrey Marcus. \$1,070,248 Pending.
- 2004 NSF Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences Program. "UBM: Undergraduate Experiences at the Biomathematical Interface." PI-Jeffrey Marcus, Co-PI D. Wayne Tarrant. \$1,247,727. Unfunded.
- 2004 NSF Graduate Teaching Fellows in K-12 Education (GK-12) Program. "Track I, GK-12: Western Kentucky University Multilevel Cooperative Mentoring Program." PI-Heather Dehart, Co-PI Jeffrey Marcus. \$ 1,698,724. Unfunded.

## REVIEWING ACTIVITY

I have reviewed papers for the journals *Evolution & Development*, the *Biological Journal of the Linnean Society*, and *Copeia*. I have also reviewed Genetics textbooks for John Wiley & Sons and Thomson Learning-Brooks/Cole.

## TEACHING EXPERIENCE

As a faculty member, I have taught courses in Genetics, (during the regular academic term and during summer session) and in the History of Biology (as a 2 week study abroad course in London). While in Graduate school, I served as a teaching assistant for Genetics, Cell Biology, Microbiology, and Introductory Biology at Cambridge University, Duke University, and Elon College.

## PROFESSIONAL SERVICE

- 2005 Permit holder and organizer of the All Taxa Biological Inventory of Lepidoptera in Mammoth Cave National Park. Responsible for coordinating the activities of amateur and professional lepidopterists and park employees to generate a comprehensive list of butterfly and moth species found in the park, and to make recommendations for conservation and land use strategies that will protect rare, threatened, or endangered species of Lepidoptera that are found during the inventory.
- 2005 Sygen Chair in Biotechnology Faculty Search Committee, Department of Biology, Western Kentucky University
- 2004 Neuroscience Faculty Search Committee, Department of Biology, Western Kentucky University
- 2004-present Consultant, Butterfly Conservatory, Lost River Cave Foundation, Bowling Green, Kentucky
- 2004-present Executive Board Member-At-Large, Society of Kentucky Lepidopterists
- 2003-present Coordinator of Lepidoptera Surveys, Upper Green River Biological Preserve, Hart County, Kentucky
- 2003-present Ad Hoc Committee for Mission Statement Review, Search Committee for Core Laboratory Manager, Admissions Committee Biotechnology Certification Program, Biotechnology Center, Western Kentucky University.
- 1999-present Correspondent, Ask a Scientist Program, Howard Hughes Medical Institute
  - Named one of the "Top ten" scientist participants in September 2003
  - Profile featured as part of "Scientist of the Month" May 2001
- Ask a Scientist Correspondence featured on HHMI web site:
  - "Why do females show sex-linked traits so rarely despite the fact that X-inactivation occurs all the time?" August 2005
  - "What makes a predator a predator and prey, prey?" June 2005
  - "Why are some species rare while others are abundant?" May 2001
  - "What is the mechanism that allows bacteria taken out of the deep sea to adjust to the change in pressure?" March 2001
  - "Since almost all humans survive to reproduce and there is little or no natural selection, is there any evolution occurring in the human race?" June 2000
  - "Why are there equal numbers of male and female babies and what happens when sex ratio gets out of balance?" April 2000

## SOCIETY MEMBERSHIPS

American Association for the Advancement of Science, Genetics Society of America, Society for Developmental Biology, Society for the Study of Evolution, Society for

Integrative and Comparative Biology, Society of Kentucky Lepidopterists, Society of Systematic Biologists, Sigma Xi, Systematics Association (UK), The Lepidopterists' Society

## CONFERENCES ATTENDED

- 3<sup>rd</sup> RECOMB Comparative Genomics Satellite Workshop, Dublin, Ireland, September 2005  
"A partial solution to the C-value paradox."
- Evolution 2005, Fairbanks, Alaska, June 2005 "Simulation models of gene expression during butterfly color pattern development."
- Posters at the Capitol, Frankfort, Kentucky, February, 2005, "PiRaTe-PYG: A New Genetic Construct for Studying Gene Expression in Butterflies" Brooke Polen\* and Jeffrey Marcus.
- Society of Kentucky Lepidopterists 31<sup>st</sup> Annual Meeting, Lexington, Kentucky, November, 2004 "Making Genetic Maps in the Lepidoptera."
- Kentucky Academy of Science 90<sup>th</sup> Annual Meeting, Murray, Kentucky, November, 2004 "Jumping Genes and AFLP Maps: Transforming Lepidopteran Color Pattern Genetics."
- XXII International Congress of Entomology, Brisbane, Australia, August 2004.  
Symposium: Understanding Microevolution & Development in the Arthropods, "Jumping Genes and AFLP Maps: Transforming Lepidopteran Color Pattern Genetics"; Symposium: Genomics of Lepidoptera, "New Transgenic Tools for use in Lepidopterans."
- Evolution of Developmental Diversity Conference, Cold Spring Harbor Laboratory, Cold Spring Harbor, New York, April 2004. "New Genetic Tools for Understanding the Developmental Basis of Lepidopteran Color Pattern Diversity."
- 45<sup>th</sup> Annual *Drosophila* Research Conference, Genetics Society of America, Washington, District of Columbia, March 2004. "Recombination mapping of P-element transposon inserts: A new set of laboratory exercises for an Undergraduate Genetics Course."
- Society of Kentucky Lepidopterists 30<sup>th</sup> Annual Meeting, Louisville, Kentucky, November, 2003 "Lepidopteran field trips: Past and prospective."
- Kentucky Academy of Science 89<sup>th</sup> Annual Meeting, Bowling Green, Kentucky, November, 2003 "How butterflies and moths get their spots."
- Society of Integrative and Comparative Biology Annual Meeting, Toronto, Canada, January 2003. "Progress in the development and evolution of lepidopteran color patterns."
- First Annual Conference on Recent Work in Biology and Philosophy: The Relationship between Evolution and Development, Durham, North Carolina, June 2002. "The development of crossveins in insect wings and the evolution of modes of insect flight."
- Howard Hughes Medical Institute Fellows Meeting, Chevy Chase, Maryland, November 2001. "A new high-efficiency method for fine-mapping mutations on the X chromosome in *Drosophila*."
- 8th Congress of the European Society of Evolutionary Biology, Aarhus, Denmark, August 2001. "When is an eyespot not an eyespot?"
- Society for Developmental Biology Annual Meeting, Seattle, Washington, July 2001.  
"When is an eyespot not an eyespot?"
- UNC-Duke Biology Graduate Student Symposium, Chapel Hill, North Carolina, April, 2001. "The development and evolution of crossveins in insect wings."
- 42nd Annual *Drosophila* Research Conference, Genetics Society of America, Washington, District of Columbia, March 2001. "Epigenetic landscapes, signal transduction, and models of crossvein development."

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\* Undergraduate Student

Evolution of Developmental Mechanisms Symposium, Anatomical Society of Great Britain and Ireland, Egham, Surrey, England, January 2001. "The evolution of crossvein development in insect wings."

Evolution 2000, Society for the Study of Evolution, Bloomington, Indiana, June 2000. "The development and evolution of crossveins and their associated pigmentation patterns."

Graduate Student Symposium, Durham, North Carolina, October 1999. Invited Speaker representing the Department of Zoology, Duke University. "Color patterns, crossveins, and cell-signaling."

Evolution '99, Society for the Study of Evolution, Madison, Wisconsin, June 1999. "Morphometric analysis of a *Drosophila* mutant with a wing phenotype of variable expressivity."

Society for Developmental Biology Annual Meeting, Charlottesville, Virginia, June 1999. "The development and evolution of crossveins and associated pigmentation patterns in the Lepidoptera and Diptera."

39th Annual *Drosophila* research conference, Genetics Society of America, Washington, District of Columbia, March 1998.

Evolution '97, Society for the Study of Evolution, Boulder, Colorado, June 1997. "Ontogeny and phylogeny of *Xiphophorus*."

International symposium on the relationships of major arthropod groups, Systematics Association (UK), London, England, April 1996.

#### **INVITED TALKS**

Department, of Biological Sciences, Murray State University, Murray, Kentucky, February 2004.

Department of Biology, Western Kentucky University, Bowling Green, March 2003.

Department of Biology, Indiana University, Bloomington, February 2003.

Department of Biology, University of North Carolina-Greensboro, April 2002.

Department of Biology, University of Montana, Missoula, March 2002.

Department of Biology, State University of New York at Buffalo, February 2002.

Cambridge University Museum of Zoology, Cambridge, England, January 2001.