

Heather Hardway

CONTACT INFORMATION

Rice University
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RESEARCH INTERESTS

Mathematical biology, partial differential equations, dynamical systems, genetic regulatory networks, developmental biology

EDUCATION

Rice University, Houston, TX

Ph.D., Mathematics, (expected May 2009)

- Thesis Title: *Pattern Formation in Systems of Partial Differential Equations Modeling Genetic Regulatory Networks*
- Advisor: Dr. Robin Forman

M.A., Mathematics, May 2007

University of Central Oklahoma, Edmond, OK

B.S., Applied Mathematics, May 2003

- Summa Cum Laude
- Minor in Biology

TEACHING

Rice University, Houston, TX

Organizer

- Mathematical Methods in Developmental Biology, VIGRE Seminar **2004-2006**
Organized research group studying models for early *Drosophila* development
Supervised undergraduate research projects and paper presentations
Regularly presented original research, papers, and background material

Instructor

- Ordinary Differential Equations, Summer 2007
- Vector Calculus, Spring 2007
- Vector Calculus, Summer 2006

Teaching Assistant

- Partial Differential Equations, Fall 2008; Graded weekly homework
- Calculus of Variations, Spring 2008; Graded weekly homework and posted solutions
- Dynamical Systems, Fall 2007; Graded weekly homework
- Differential Equations with computer lab, Fall 2003; Assisted students with MATLAB computer projects in weekly help sessions
- Calculus II, Spring 2004; Answered questions in biweekly help sessions

Tutor

2004 to present

- Tutored students in high school and college mathematics

EXPERIENCE

National Institutes of Health, Bethesda, MD

Summer Internship in Biomedical Sciences

Summer 2005

- Worked on program involved in virus reconstruction from cryo-electron micrographs
- Created a routine to find the common-lines of an image and test for certain types of symmetry without *a priori* information
- Tested program to find proper orientations of cryo-electron micrographs
- Learned how to program in C/C++ and use a command line UNIX environment

Oklahoma Medical Research Foundation

Research Technician

March 2002 to August 2003

- Developed purification protocol for recombinant human neutrophil protinease-3
- Responsible for the purification of proteins and antibodies
- Trained in basic cell culture/sterile techniques, blots/gels, and various protein and kinetic assays

PUBLICATIONS

Hardway, H., Mukhopadhyay, B., Burke, T., Hichman, T.J., and Robin Forman. "Modeling the precision and robustness of Hunchback boundary during *Drosophila* embryonic development." *Journal of Theoretical Biology*, 254(2):390-399, Sept 2008

WORKING PAPERS

Hardway, H. "Expanding the model for robust Hunchback boundary formation." (in preparation)

Hardway, H. and Li, Yue-Xian. "Stationary and Oscillatory Fronts in a Model of Gene Regulated Protein Networks." (in preparation)

PRESENTATIONS

Modeling Genetic Networks in the Fruit Fly, an invited talk at the University of British Columbia Mathematical Biology Seminar, September 25th, 2008

Robust Protein Gradients in the Drosophila Embryo, a poster presentation at WYRMB, September 3rd, 2008

Robust Protein Gradients in the Drosophila Embryo, a poster presentation at SMB Annual Conference, July 30th, 2008

Waves: Traveling, Pinning, and Dancing, a project presentation at IGTC Summer School in Mathematical Biology, June 9th, 2008

Robust Protein Gradients in the Drosophila Embryo, a presentation at IGTC Summer School in Mathematical Biology, May 25th, 2008

Marking the Midpoint: Models for Robust Protein Gradients in the Drosophila Embryo, a poster presentation at q-bio Conference on Cellular Information Processes, August 9th, 2007

Modeling Drosophila Embryo: Turing Patterns as Means for Midpoint Marking, a student presentation at CTBP, Biological Dynamics Summer School July 18th, 2007

Finding a Mathematical Model to Accurately Mark the Midpoint of an Embryo, a presentation at RICAM, EMS Summer School, Linz, Austria, September 16, 2006

Establishing Robust Protein Gradients in the Drosophila Embryo, a poster presentation at Rice University, VIGRE Research Day, November, 2005

Finding the symmetry of an image using common lines, poster presentation at NIH-IRP, Bethesda, MD, August 4th, 2005.

Assembly Paths for Polyhedral Nano-Structures, a poster presentation at Regional Universities Research Day, University of Central Oklahoma, Edmond, OK, Oct 11, 2002.

CONFERENCES
ATTENDED

Workshop: Pattern Formation and Development in Colonial Organisms, Mathematical Biosciences Institute, Ohio State University, October 13-17, 2008

Workshop for Young Researchers in Mathematical Biology, Mathematical Biosciences Institute, Ohio State University, September 2-5, 2008

Society of Mathematical Biology Annual Conference, University of Toronto, July 30th-August 2nd, 2008

International Graduate Training Center Summer School in Mathematical Biology, University of British Columbia, Vancouver, BC Canada, May 11th-June 11th, 2008

The First International q-bio Conference on Cellular Information Processing, Center for Nonlinear Studies, Los Alamos National Laboratory, August 8-11th

The First International q-bio Summer School on Cellular Information Processing, Center for Nonlinear Studies, Los Alamos National Laboratory, July 23rd- August 8th

Biological Dynamics of Cellular Processes Summer School, Center for Theoretical Biological Physics, University of California San Diego, July 9-18th, 2007

Mathematics in Molecular Cell Biology, European Mathematical Society Summer School, Johann Radon Institute for Computational and Applied Mathematics, Linz, Austria, September 9-23, 2006

Tutorial in Reaction-Diffusion Models, Mathematical Biosciences Institute, Ohio State University, March 9-10th, 2006.

Career options for women in mathematical sciences, Institute for Mathematics and its Applications, University of Minneapolis, February 4-5, 2005.

Mentoring program for women in mathematics: mathematical biology, Institute of Advanced Study and Princeton University, Princeton, New Jersey, May 12-22, 2003

HONORS AND
AWARDS

Rice University

Dean of Natural Sciences Travel Award, July 2007 and 2008

Summer Research Assistantship, Summers 2003-2008

NSF VIGRE Graduate Student Fellowship, 2004-2006

University of Central Oklahoma

University Scholastic Award (highest scholastic grade average among juniors and seniors), 2003

Outstanding Graduating Senior, Department of Mathematics, 2003

Oklahoma State Regents Academic Scholarship (full tuition plus stipend), 2000-2003

Outstanding Achievement Award in Mathematics, 2002

Computer Science, Mathematics, and Engineering Scholarship, 2002

COMPUTER
EXPERIENCE

MATLAB, C/C++, Maple, Mathematica, LaTeX/BibTeX