

Curriculum Vitae: Rachel Dawes-Hoang

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Academic Positions:

- 2005-present: *Assistant Professor*, Biology Dept, Haverford College, USA.
- 2000-2005: *Research Staff Member*, Dept of Molecular Biology, Wieschaus Lab, Princeton University, USA,

Education:

- 1997-2000: *Helen Hay Whitney Postdoctoral Fellow*. Dr. Eric Wieschaus, Princeton University, USA. “The control of cell shape change during *Drosophila* gastrulation”
- 1992-1997: Ph.D., Genetics, Wellcome/CRC Institute, University of Cambridge, UK. Thesis advisor: Dr. Michael Akam, FRS. “Characterisation of the locust *Dax (ftz)* gene: Implications for a family of divergent Hox genes and their changing role in early development”
- 1994: M.A. Natural Sciences. University of Cambridge, UK.
- 1987-1990 B.Sc.(Hons.) Natural Sciences (Part II Genetics), Emmanuel College, University of Cambridge, UK.

Awards and Fellowships:

- Helen Hay Whitney Postdoctoral Fellowship, 1997-2000
- Medical Research Council Graduate Studentship, 1992-1996
- Durham Fund, Kings College Undergraduate Research Fellowship, 1990

Grants:

- 2009 – 2013 - NIH (NICHD) 1R15HD059957-01 “The developmental function and evolutionary history of the *Drosophila folded gastrulation* gene” Award: \$213,530
- 2009-2012 - National Science Foundation MRI, “Acquisition of molecular and cellular imaging instrumentation.” Co-PI, Award: \$996,294.
- 2010-2011: Haverford College Teaching with technology grant: “Facilitating student use of scanning electron and confocal microscopy through development of training videos and a centralized website”
- 2010: Haverford College, Louis Green Fund: Research trip for 5 students to John Hopkins School of Public Health.
- 2009-2010: Haverford College Mellon Brainstorming Grant: “Brainstorming Into Existence a Trico Evolutionary Developmental Biology Group”

Works In Progress:

- Philip Meneely, Rachel Hoang, Iruka Okeke, and Katherine Heston “*Evolution, Genomes & Genetics*”. Textbook proposal under consideration (Dec 2012) with Oxford University Press.
- Arnold, F. J.*, Hofmann, J. J., Dao*, K., Dhawan*, I., Freilich*, S., Garrett*, W. S., Geratowski*, J. D., Sohail*, F., Tripp*, T. B., and Rachel E. Dawes-Hoang “Gastrulation in *Drosophila melanogaster* and *Drosophila pseudoobscura*: a comparison of *folded gastrulation* and *T48* expression profiles”. Manuscript in preparation (to be submitted Feb 2013).
- Mary Welsch*, Jen Hoffmann, Iruka Okeke and Rachel E. Dawes-Hoang “Investigating the relationship between Wolbachia Surface Proteins and localization patterns in *Drosophila* species”. Manuscript in preparation (to be submitted Feb 2013).

Publications (* denotes undergrad. co-author):

- Online Journal Clubs for “Principles of Development” by Lewis Wolpert (Oxford University Press) (2011): I wrote the following Journal Clubs:
 - “How the Hox gene Ubx specifies two different segment identities” Chapter 2.
 - “Interactions Between Vertebrate Hox Genes” Chapter 5.
 - “The Dynamics and Mechanics of Apical Constriction” Chapter 8.
 - “Hox Genes And The Evolution Of The Vertebrate Body Plan” Chapter 15.
- David L. Stern and Rachel E. Dawes-Hoang. “Michael Akam and the rise of evolutionary developmental biology”. *International Journal of Developmental Biology* (2010) 54; 561-565.
- Dawes-Hoang, R.E., Parmar*, K., Christiansen, A.E., Phelps, C., Brand, A., Wieschaus, E. F. folded gastrulation, cell shape change and the control of myosin localization (2005). *Development* 132 (18) 4165-4178.
- Dawes-Hoang, R. E., Zallen, J. A. and Wieschaus, E.F. (2003) Bringing classical embryology to *C. elegans* gastrulation *Dev Cell* 4, 6-8.
- Dawes-Hoang, R. E., and Wieschaus, E. F. (2001). Cell and developmental biology--a shared past, an intertwined future. *Dev Cell* 1, 27-36.
- Averof, M., R. Dawes and D. Ferrier (1996). Diversification of arthropod Hox genes as a paradigm for the evolution of gene functions. *Seminars in Cell and Dev Biol* 7, 539-551.
- Michael Akam, Michalis Averof, Rachel Dawes, Jaime Castelli-Gair, Francesco Falciani and David Ferrier. (1994). The evolving role of Hox genes in arthropods. *Development* 120 Supplement: 209-215.

- Rachel Dawes, Iain Dawson, Francesco Falciani, Guy Tear and Michael Akam (1994). Dax, a locust Hox gene related to fushi-tarazu but showing no pair-rule expression. *Development* 120 (6): 1561 - 1572.
- Michael Akam and Rachel Dawes. (1992) More than one way to slice an egg. *Current Biology*, 2: 395-398.

Research Talks & Presentations (since arriving at Haverford, * denotes undergrad. co-author):

- 2008 Society for Developmental Biology 67th Annual Meeting, in Philadelphia. Poster presentation. “Evolution of the *Drosophila folded gastrulation* gene”. Rachel E. Hoang, Kim Dao*, Mitra Eghbal*, Tovah Tripp*. Abstract Published: *Developmental Biology* Volume 319, Issue 2, 15 July 2008, Page 495.
- 2010 Society for Developmental Biology, Baltimore June 2010. Poster. “Evolution of the folded gastrulation gene” Rachel E. Hoang, Kim Dao*, Mitra Eghbal*, Tovah Tripp*, Rutwik Kharkar*.
- 2011 Mid-Atlantic Society for Developmental Biology, Philadelphia. Poster. “Ventral Furrow Formation in *Drosophila pseudoobscura*. Frederick J. Arnold*, Jill D. Geratowski*, Raul Hernandez* and Rachel E. Hoang.
- 2011 70th Annual Meeting of the Society for Developmental Biology, Chicago. Poster. “Evolution of *folded gastrulation*: A comparison between *Drosophila melanogaster* and *Drosophila pseudoobscura*. Rachel E. Hoang, Kimberly Dao*, Frederick J. Arnold*, Jill D. Geratowski*.
- 2012 Invited Seminar Speaker, Dept, of Biochemistry, Drexel University College of Medicine, Philadelphia. April 2012 “Cutting through the fog – evolution of the *folded gastrulation* gene in insects”.
- 2012 71st Annual Meeting of the Society for Developmental Biology, Montreal Canada, Poster. “Gastrulation in *Drosophila melanogaster* and *Drosophila pseudoobscura*: a comparison of *folded gastrulation* and *T48* expression profiles.” Frederick J. Arnold*, Kimberly Dao*, William Garrett*, Jill D. Geratowski*, Faraz Sohail* and Rachel E. Hoang.
- 2013 Invited Seminar Speaker, Biology Department, St. Joseph’s University, Philadelphia. January 2013 “Cutting through the fog – evolution of the *folded gastrulation* gene in insects”.

Student Research Presentations (since arriving at Haverford, * denotes undergrad. co-author):

- 2006 Regional HHMI Undergraduate Science Research Symposium at Dickinson College. Poster: “Evolution of the Folded Gastrulation Gene” Kim Dao*, Sarah Freilich* and Rachel Hoang.
- 2007 The Genetics Society of America’s 48th Annual *Drosophila* Research Conference in Philadelphia. Poster presentation by two undergraduates: “The evolution of gastrulation in *Drosophila* and beyond” Sarah B. Freilich*, Jennifer M. Paroulek*,

- Aislinn R. Sowash*, Rowan M. Spivey*, Tripti Tewari*, Kimberly A Dao*, Justin Jiulianti, and Rachel E. Dawes-Hoang.
- 2008 Micronet: Undergraduate Microbiology Research Symposium, at Swarthmore College. Poster presentation. “"Bugs" within bugs: Investigating the relationship between Wolbachia Surface Proteins and localization patterns in *Drosophila* species”. Sunil U. Adige*, Paul J. Bloch*, Heidi S. Bretscher*, Jennifer L. Crowe*, Kimberly A. Dao*, Shivani J. Gandhi*, Sarah E. Graves*, Pritika Gupta*, Janice M. Harlow*, Rebecca A. Harris*, Abigail M. Huff*, Jennifer Hwang*, Laura N. Jones*, Jessica N. Kim*, Dean D. Laganosky*, Hannah S. Land*, Justin Mancini*, Jennifer S. Millman*, Mary F. Mulqueen*, Timothy D. Ouellette*, Luke F. Pennington*, Lisa C. Perkins*, Naomi H. Philip*, Elliot C. Rabinowitz*, Numa T. Rahman*, Whitney A. Reid*, Adam V. Subhas*, Samuel J. Vidal*, Mary S. Welsh*, Brian B. Wexler*, Mitra Eghbal*, Iruka N Okeke and Rachel Hoang.
 - 2008 Regional HHMI Undergraduate Science Research Symposium, at Haverford College. Poster. “Evolution of the Folded Gastrulation Gene”. Kimberly Dao*, Sarah Freilich*, Mitra Eghbal*, Rutwik Kharkar*, Tovah Tripp*, and Rachel Hoang.
 - 2008 Regional HHMI Undergraduate Science Research Symposium, at Haverford College. Poster presentation. “The evolution of *fog* across different species”. Rutwik Kharkar*, Mitra Eghbal* and Rachel Hoang.
 - 2008 Regional HHMI Undergraduate Science Research Symposium, at Haverford College. Poster presentation. “Myosin Activity During Early Embryogenesis of *Drosophila melanogaster* and *Drosophila pseudoobscura*”. Megan Raime*, Asia Gobourne* and Rachel Hoang.
 - 2009 109th General Meeting of the American Society for Microbiology, in Philadelphia. Poster. “Investigating the relationship between Wolbachia Surface Proteins and *Wolbachia* localization patterns across *Drosophila* species”. Mary S. Welsh*, Laboratory in Molecular Biology*, Iruka N. Okeke and Rachel E. Dawes-Hoang.
 - 2010 110th General Meeting of the American Society for Microbiology, San Diego. Poster. “Bacterial autoaggregation conferred by self-associating Wolbachia surface proteins” Yoonjie Chung*, Jessica Glaubman, Laboratory in Molecular Microbiology Class*, Rachel Hoang and Iruka N Okeke.
 - 2010 Regional HHMI Undergraduate Science Research Symposium, at Haverford College. Poster presentation. “Characterization of Embryonic Development in *Drosophila melanogaster* vs *Drosophila pseudoobscura* using Scanning Electron Microscopy” Jill D Geratowski* and Rachel Hoang.
 - 2010 Regional HHMI Undergraduate Science Research Symposium, at Haverford College. Poster presentation. “In situ hybridization analysis of the folded gastrulation (*fog*) gene in *Drosophila melanogaster* and *Drosophila pseudoobscura* provides new insights into the evolution of *fog*'s role in insect gastrulation” Eric Arnold* and Rachel.
 - 2010 Regional HHMI Undergraduate Science Research Symposium, at Haverford College. Poster presentation. “Jumping into gastrulation: A comparative study of *Drosophila* and the house cricket *Acheta domesticus*” Jennifer Schwartz* and Rachel Hoang.

- 2011 Regional HHMI Undergraduate Science Research Symposium, at Haverford College. Poster presentation. “Live Imaging of ventral furrow formation in *D. melanogaster* and *D. pseudoobscura*”. Andrew Moore* and Rachel Hoang.
- 2011 Regional HHMI Undergraduate Science Research Symposium, at Haverford College. Poster presentation. “Analysis of folded gastrulation expression levels in *D. melanogaster* and *D. pseudoobscura*”. Eric Arnold* and Rachel Hoang.
- 2011 Regional HHMI Undergraduate Science Research Symposium, at Haverford College. Poster. “Cloning the T48 gene”. Faraz Sohail* and Rachel Hoang.
- 2012 Regional HHMI Undergraduate Science Research Symposium, at Haverford College. Poster presentation. “*T48* expression during gastrulation of *Drosophila melanogaster* and *Drosophila pseudoobscura*”. Ishita Dhawan* and Rachel Hoang.

Other Conferences/Talks (since arriving at Haverford):

- 2006 Pennsylvania Muscle Institute Symposium “Cytoskeletal Dynamics of Living Cells” in Philadelphia. Attended with two undergraduate students.
- 2006 Society for Developmental Biology 65th Annual Meeting, Ann Arbor MI. Meeting participant and selected participant in the “Boot Camp for New Faculty” two day workshop.
- 2006 Haverford College, KINSC Summer Journal Club. Talk: “Humans & Chimps - Genomes & Origins”
- 2008 "Mendel in the 21st Century: The Scientific, Social, and Ethical Impact of Genetics in Our World," Conference at Villanova University. Attended.
- 2008 American Society of Human Genetics 58th Annual Meeting, Philadelphia. Invited participant of the Undergraduate Genetics Education Workshop.

Related Activities & Outreach:

Haverford Summer Science Institute (HSSI) - an intensive, residential, five-week introduction to college-level science study for incoming first-year students. HSSI seeks highly-motivated students who come from groups that are traditionally underrepresented in science, or from families with little or no college experience. I have taught a week of classes in the “problem solving in biology” series for many summers that this program has been offered (2006, 2007, 2009 and 2010).

Instructor for Expanding Your Horizons - conferences designed to nurture middle school girls' interest in science and math courses and to encourage them to consider science and math-based career options (Swarthmore 2006, 2008).

Mentor for students undertaking international internships with the Center for Peace and Global Citizenship and HHMI Science In Society programs. (2006 - Claire Roden “Prenatal care of HIV positive mothers” Paris France; 2007 - Kim Dao “Pediatric medical care and HIV/AIDS orphanages” Vietnam).

Mentor for students in the Multicultural Scholars Program - mentorship also includes providing lab employment, research experience, attendance at lab meetings and regional scientific meetings, and summer research experience (2005-present).

Ad hoc reviewer for PLOS Biology and Developmental Biology Journals

NSF grant proposal reviewer (non-panelist) – 2008, 2012

Annual Biomedical Research Conference For Minority Students: serve as a judge for submitted presentation proposals (2006-present).

Regional Society For Developmental Biology Meeting: judge for graduate student and postdoctoral researcher poster presentation awards (2010)

PJAS Science Fair, 2000-2005. Judge for regional science fair.

Postdoctoral Society, Dept. Molecular Biology, Princeton University, 2000-2002. Established and ran a forum for postdocs specific concerns and issues.

Short Circuit – Science Documentary, ITV television, UK, 1995.

Museum Exhibit, National Science Museum, London, UK. 1993.

Haverford College Committees & Activities:

Institutional Biosafety Committee and Laboratory Safety Committee (2010-present, Chair 2012-present)

Special Student Advisor, Medicine: (Committee member 2011-present)

Study Abroad Advisor For Biology (2011-present)

Committee on Student Standing and Programs (CSSP): (2006 - 2009)

Center for Peace and Global Citizenship Steering Committee: (2007-2008)

Search Committee – Biology Department ‘Evo-Devo’ Search, Bryn Mawr College: (2007-2008)

Goldwater and Churchill Fellowship College Selection Committee (2008, 2010, 2011)

Rhodes Scholar – Mock Interviewer (2008)

Presenter for student teacher to Teacher Education Committee (2009)

Humanities Center Steering Committee: (2006-2007)

Koshland Integrated Natural Sciences Center Summer Journal Club: participant and presenter (2006).

Biology Faculty Summer Data Club: participant and presenter (2006).

Teaching at Haverford:

TLI Seminar: I participated in the Faculty Seminar of the Teaching and Learning Initiative during the Fall semester of 2008. This entailed weekly meetings (2 hrs) and writings about pedagogy, and working with a student consultant (weekly visits to my class, written feedback and weekly meetings). I also participated in the workshop offered by visiting TLI fellow Dr. Ken Bains in Fall 2010.

First Year Course (non-majors)

- *Bio130 Origins – Evolution and Animal Diversity* (limited enrollment - 26 students in Spring '06, 58 students in Spring '07, 30 students Spring 2009, half semester course)

Intro courses to the major (sophomore level, also taken by many who will not major in Biology)

- *Bio200 Cell Structure and Function* (75 students, Fall '06, taught a half semester unit (2 lectures, 3 labs per week), 99 students Fall 2010 taught 2 of the 4 weekly labs for full semester, Fall '11 taught a half semester unit, 110 students; Fall '12 taught a half semester unit, 106 students)
- *Bio220 Unlocking Key Concepts in Biology* (6 students Fall '07, 7 students Fall '08, 11 students Fall 2010, full semester course)

Half-semester courses for the Jr. and Sr. Biology major (also taken by Biochemistry and Neuroscience concentrators)

- *Bio300 Laboratory in Biochemistry and Molecular Biology* (SuperLab-half semester novel research projects) (34 students Spring '06, 30 students Spring '08, and 36 students Spring '09, 26 students Spring 2011, 34 students Spring '12, 43 students Fall 2012)
- *Bio301 Advanced Genetics* (34 students Fall '08)
- *Bio312 Development and Evolution* (19 students Fall '05, 17 students Fall '06, 29 students Fall '07, 22 students Spring '12)
- *Bio358 Senior Seminar in Developmental Genetics* (3 students Spring '08, 11 students Spring 2011, 16 students Fall 2011)

Senior Research Course

- *Bio411 Senior Research Tutorial on The Control of Cell Shape: Molecular & Evolutionary Approaches* (4 students '05-'06, 5 students '06-'07, 5 students '07-'08, 5 students '08-'09, 4 students 2010-2011, 4 students 2011-2012, 4 students 2012-2013, year-long course)

Additional teaching

- *Bio499: Senior Dept Studies* (~30 students, co-taught '05-'06 & '07-'08, year-long)
- *Bio489: Independent Research* (1 student Spring '06, 1 Fall '06, 1 Spring 2013)
- *Statistics Workshops:* designed and taught with Prof Huber (Math - visitor) and Okeke (Biology) as part of Bio499 Fall '06.

Other Teaching Experiences:

Research Supervision, Princeton University, 1997-2003. Supervising undergraduate thesis projects and graduate rotation projects on the cell biology of early *Drosophila* development.

Undergraduate research and course support, University of Cambridge, 1993-1997. Weekly tutoring of undergraduate course work, lab class teaching assistant, supervisor of research based undergraduate thesis projects.

High School Teaching. South Africa, 1991. I taught math and biology to students in their last two years of high school, in a Kwazulu township school outside Durban.