

Curriculum Vitae—Jeff Hardin

Date of birth: October 2, 1959    Birthplace: Milwaukee, Wisconsin    Citizenship: U.S.

Education and Professional Experience

*Undergraduate*

**1981—B.A. in German; B.S. in Zoology, Michigan State University** (Phi Beta Kappa, magna cum laude)

*Doctoral*

**1987 - Ph.D. in Biophysics, University of California-Berkeley**

Ph.D. under Drs. Ray Keller and Fred Wilt; project involved analysis of morphogenetic movements during gastrulation in amphibian and echinoderm embryos, using time-lapse Nomarski microscopy, scanning electron microscopy, immunostaining, and mechanical modeling

*Postdoctoral*

**1987-1991: Postdoctoral fellow, Department of Zoology, Duke University**

Postdoctoral fellow under Dr. David McClay; project involved the cellular and molecular basis of pattern formation by mesenchymal cells in the sea urchin gastrula, using microsurgery, micromanipulation, cell transplantation, time-lapse Nomarski microscopy, scanning electron microscopy, antibody production, in situ hybridization, standard molecular biology.

*Faculty*

**1991-1997: Assistant Professor of Zoology, University of Wisconsin-Madison**

**1997-2002: Associate Professor of Zoology, University of Wisconsin-Madison**

**2003-present: Professor of Zoology, University of Wisconsin-Madison**

**2008-present: Chair, Department of Zoology, University of Wisconsin-Madison**

Principal Investigator of laboratory studying cellular and molecular mechanisms of morphogenesis. Techniques used by the laboratory include four dimensional Nomarski microscopy, laser ablation, low-intensity fluorescence imaging, two-photon excitation and laser scanning confocal microscopy, digital image analysis, micromanipulation, ultrastructural analysis using low-voltage scanning and transmission electron microscopy, production and use of mono- and polyclonal antibodies, standard molecular biology, in situ hybridization, microinjection, anti-sense RNA injections, DNA construct injections, and developmental genetics. We study the molecular mechanisms of morphogenesis, predominantly using the embryonic hypodermis of *C. elegans* as a model system.

Honors

*Undergraduate*

Phi Beta Kappa, National Merit Scholar, Alumni Distinguished Scholar, Ryder Scholar

*Predoctoral*

National Science Foundation Fellow, Regents Fellow, Dean's Training Fund awards, 1985-1987

*Postdoctoral*

Lucille P. Markey Scholar in the Biomedical Sciences, National Institutes of Health Postdoctoral Fellow, Duke University Hargitt Fellow

Awards

1986—Young Investigator Award, First Place, Society for Developmental Biology

1987—Western Regional Meeting of Electron Microscopists and Microbeam Analysts, First Place Award, Biological Sciences  
Presidential Student Award, Electron Microscopy Society of America  
1991—University of Wisconsin/American Cancer Society research award  
1992-99 — NSF Young Investigator Award  
1999-2001 --- University of Wisconsin Vilas Associate Award  
2009 – University of Wisconsin Kellett Mid-Career Award  
2011 — Chancellor’s Distinguished Teaching Award

Graduate Training Programs

Cellular and Molecular Biology, Medical Scientist Training Program (M.D./Ph.D. program), Genetics, Cellular and Molecular Pathology, Molecular and Cellular Pharmacology, Biophysics

Professional Societies

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

Symposia/Invited Lectures (recent)

1996 — Invited Speaker, 1st South African International Symposium on Cell & Developmental Biology; Invited speaker, Developmental Biology of the Sea Urchin, Woods Hole; Invited speaker, 2nd Symposium on Integrated Microscopy, Madison, WI

1997 - Invited speaker, Department of Biology, University of California, Santa Cruz  
Invited speaker, Department of Genetics, University of Wisconsin-Madison  
Invited speaker, Developmental Biology of the Sea Urchin, Woods Hole

1998 - Invited speaker, Hörstadius Symposium, Stockholm  
Invited speaker, Sunflower Developmental Genetics Symposium, Overland Park, KS  
Invited speaker, Department of Cell Biology, University of Basel, Switzerland  
Invited speaker. Fribourg, Switzerland

1999 - Invited speaker, University of Pennsylvania, Philadelphia  
Invited speaker, British Society for Developmental Biology, Manchester, England  
Invited speaker, University of Wisconsin, Developmental Toxicology  
Invited speaker, Duke University, Durham, NC  
Invited speaker, International *C.elegans* Meeting, Madison, WI

2000 -Invited speaker, Northwestern University, IL  
Invited speaker, American Society for Cell Biology Annual Meeting, San Francisco, CA  
Invited speaker, University of Virginia, Charlottesville, VA  
Invited Speaker, Anatomy Dept., UW-Madison

2001- Invited speaker, Society for Developmental Biology Annual Meeting, University of Washington, Seattle, WA; Invited speaker, British Society for Cell/Developmental Biology Annual Meeting, Sussex University, UK; Invited speaker, Cell contact and adhesion Gordon Conference; Invited speaker, University of Minnesota, Dept. of Cell, Molecular, and Development Biology; Invited speaker, University of North Carolina, Dept. of Biology; Invited speaker, MAGUK special interest subgroup meeting, Amer. Soc. Cell Biology Annual Meeting, Washington, DC

2002 – Invited speaker, Department of Biology, University of Toronto; Invited speaker, Symposium on "Epithelia in Development and Disease" (University of Duesseldorf)

2003 - Invited Speaker, Developmental Biology Symposium, UCSF; Cell Contact and Cell Adhesion Gordon Conference; Department of Biology, Northwestern University, p120 Special Interest Subgroup meeting, Amer. Soc. Cell Biology, San Francisco

2004 - Invited speaker, Molecular and Cellular Pharmacology Program, UW-Madison; Biological Imaging Symposium, UW-Madison

2005 - Invited speaker, Department of Anatomy and Cell Biology, Univ. of Kansas Medical School  
Invited speaker, Department of Biology, Kansas State Univ; Invited Speaker, Cell Contact & Adhesion Gordon Conference

2006 - Plenary speaker, Northwest Regional Developmental Biology Meetings, Friday Harbor, WA; Plenary speaker, 2006 C. elegans Topics Meeting, Madison, WI

2007 – Plenary Speaker, International Wound Healing Symposium, Madrid Spain;  
Invited speaker, minisymposium on cell motility, American Society for Cell Biology, Washington, DC

2008 –Invited speaker, Department of Molecular Genetics, University of Toronto

2009 – Invited speaker, Department of Biology, Simon Fraser Univ.; invited speaker, Department of Biology, Trinity Western University; invited speaker, Education session speaker, Midwest Regional Developmental Biology Meetings, Iowa City, IA; invited speaker, Cell Contact and Cell Adhesion Gordon Conference; invited speaker, Department of Molecular Genetics and Cell Biology, University of Chicago

2010 –Invited speaker, Department of Anatomy and Cell Biology, Medical College of Wisconsin; Invited speaker, Education session speaker, Northwest Regional Developmental Biology Meetings, Friday Harbor, WA; Invited Speaker, Brisbane Cell and Developmental Biology day, Brisbane, Australia

2011 – Invited speaker, Cell Contact and Cell Adhesion Gordon Conference; invited speaker, Annual Developmental Biology Symposium, University of Minnesota; invited speaker (Pew Scholar), Union University, Jackson, TN

2012 – Invited speaker, Developmental and Stem Cell Biology program, Duke University; invited speaker, NYU Medical School; invited speaker, Cell and Developmental Biology program, Vanderbilt Univ.

2013 - Invited speaker, Cell Contact and Cell Adhesion Gordon Conference

## Publications

### *Peer-reviewed publications*

1. Hardin, J.D. and Cheng, L.Y. (1986). The mechanisms and mechanics of archenteron elongation during sea urchin gastrulation. *Dev. Biol.* **115**, 490-501.
2. Stephens, L., Hardin, J., Keller, R., and Wilt, F. (1986). The effects of aphidicolin on differentiation and morphogenesis in the sea urchin embryo. *Dev. Biol.* **118**, 64-69.
3. Hardin, J.D. (1987). Archenteron elongation in the sea urchin embryo is a microtubule-independent process. *Dev. Biol.* **121**, 253-262.

4. Hardin, J.D. (1987). Disruption of collagen crosslinking during sea urchin morphogenesis. In *Proc. 45th Ann. Meet. Electr. Microsc. Soc. Amer.* (G.W. Bailey, ed.), pp. 786-787. San Francisco, San Francisco Press, Inc.
5. Butler, E., Hardin, J., and Benson, S. (1987). The role of lysyl oxidase and collagen crosslinking during sea urchin development. *Exp. Cell Res.* **173**, 174-182.
6. Hardin, J. and Keller, R. (1988). The behavior and function of bottle cells in gastrulation of *Xenopus laevis*. *Development* **103**, 211-230.
7. Hardin, J. (1988). The role of secondary mesenchyme cells during sea urchin gastrulation studied by laser ablation. *Development* **103**, 317-324.
8. Hardin, J. (1989). Local changes in position and polarized protrusive activity drive cell rearrangement during sea urchin gastrulation. *Dev. Biol.* **136**, 430-445.
9. Hardin, J., and McClay, D. (1990). Target recognition by the archenteron during sea urchin gastrulation. *Dev. Biol.* **142**, 86-102.
10. Hardin, J., Black, S., Coffman, J., and McClay, D. (1992). Commitment along the dorsoventral axis of the sea urchin embryo is altered in response to NiCl<sub>2</sub>. *Development*. **116**, 671-685.
11. Armstrong, N., Hardin, J., and McClay, D. (1993). Cell-cell interactions regulate skeleton formation in the sea urchin embryo. *Development* **119**, 833-840.
12. Draper, B.W., Mello, C.C., Bowerman, B., Hardin, J., and Priess, J. (1996). MEX-3 is a KH domain protein that regulates blastomere identity in early *C. elegans* embryos. *Cell* **87**, 205-216.
13. Hardin, J. and Armstrong, N. (1997). Short range cell-cell signals control ectodermal patterning in the oral region of the sea urchin embryo. *Dev. Biol.* **182**, 132-149.
14. Williams-Masson, E., Malik, A., and Hardin, J. (1997). An actin-mediated, two-step mechanism is required for ventral enclosure of the *C. elegans* hypodermis. *Development* **124**, 2889-2901.
15. Benink, H., Wray, G., and Hardin, J. (1997). Archenteron precursors can organize secondary axial structures in the sea urchin embryo. *Development*. **124**, 3461-3470.
16. George, S.E., Simokat, K., Hardin, J., and Chisholm, A.D. (1998) The VAB-1 Eph Receptor Protein Tyrosine Kinase Functions in Epithelial Morphogenesis in *C.elegans*. *Cell* **92**, 633-643.
17. Costa, M., Raich, W., Agbunag, C., Hardin, J. and Priess, J. (1998). A putative catenin-cadherin system mediates morphogenesis of the *C. elegans* embryo. *J. Cell Biol.* **141**, 297-308.
18. Raich, W.B., Moran, A.N., Rothman, J.H., Hardin, J. (1998) Cytokinesis and midzone microtubule organization in *Caenorhabditis elegans* require the kinesin-like protein ZEN-4. *Molec.Biol.Cell* **9**, 2037-2049.
19. Mohler, W.A., Simske, J.S., Williams-Masson, E.M., Hardin, J.D. and White, J.G. (1998). Dynamic and ultrastructure of developmental cell fusion in the *Caenorhabditis elegans* hypodermis. *Curr. Biol.* **8**, 1087-1090.
20. Williams-Masson, E., Heid, P., Lavin, C.A. and Hardin, J. (1998). The cellular mechanism of epithelial rearrangement during morphogenesis of the *C. elegans* dorsal hypodermis. *Dev. Biol.* **204**, 263-276.
21. Kimberly, E.L. and Hardin, J. (1998) Bottle cells are required for the initiation of primary invagination in the sea urchin embryo. *Dev. Biol.* **204**, 235-250.

22. Raich, W.B., Agbunag, C. and Hardin, J.D. (1999) Rapid epithelial-sheet sealing in the *Caenorhabditis elegans* embryo requires cadherin-dependent filopodial priming. *Current Biol.* **9**, 1139-1146.
23. Heid, P.J. and Hardin, J. (1999) Cell Line Analysis: Videomicroscopy Techniques. In: *Methods in Molecular Biology*, Vol 135. pp.323-330. Totowa, NJ, Humana Press, Inc.
24. Heid, P.J., Raich, W.B., Smith, R., Mohler, W.A., Gendreau, S.B., Rothman, J.H., and Hardin, J. (2001). The zinc finger protein DIE-1 is required for late events during epithelial cell rearrangement in *C. elegans*. *Dev. Biol.* **236**,165-180
25. Koeppen, M., Simske, J.S., Sims, P.A., Firestein, B.L., Hall, D.H., Radice, A.D., Rongo, C. and Hardin, J.D. (2001) AJM-1 is required for the integrity of *C. elegans* adherens junctions and is cooperatively regulated by LET-413 and DLG-1. *Nature Cell Biol.* **3**:983-991.
26. Simske, J.S., Köppen, M., Sims, P.A., Hodgkin, J., and Hardin, J.D. (2003). The cell junction protein VAB-9 regulates adhesion and epidermal morphology in *C. elegans*. *Nature Cell Biol.* **5**:619-625.
27. Pettitt, J., Cox, E.A., Broadbent, I.D., Fleet, A. and Hardin, J. (2003) The *C. elegans* p120 catenin homologue, JAC-1, modulates cadherin-catenin function during epidermal morphogenesis. *J. Cell Biol.* **162**,15-22.
28. Walston, T., Tuskey, C., Edgar, L., Hawkins, N., Ellis, G., Bowerman, B., Wood, W., and Hardin, J. (2004). Multiple Wnt signaling pathways converge to orient the mitotic spindle in early *C. elegans* embryos. *Dev Cell* **7**, 831-841.
29. Thomas-Virnig, C.L., Sims, P.A., Simske, J.S., and Hardin, J. (2004). The inositol 1,4,5-trisphosphate receptor regulates epidermal cell migration in *Caenorhabditis elegans*. *Curr Biol.* **14**,1882-7.
30. Sims, P.A., Lockwood, C.A., and Hardin, J (2005). Integrating light and TEM information with F-TEM images. *Micr. Today* **13**, 16-18.
31. Walston, T., Guo, C., Proenca, R., Wu, M., Herman, M., Hardin, J., and Hedgecock, E. (2006). mig-5/Dsh controls cell fate determination and cell migration in *C. elegans*. *Dev Biol* **298**, 485-97.
32. Lee, J. Y., Marston, D. J., Walston, T., Hardin, J., Halberstadt, A., and Goldstein, B. (2006). Wnt/Frizzled signaling controls *C. elegans* gastrulation by activating actomyosin contractility. *Curr Biol* **16**, 1986-97.
33. Hardin, J., and Illingworth, C. A. (2006). A homologue of *snail* is expressed transiently in subsets of mesenchyme cells in the sea urchin embryo and is down-regulated in axis-deficient embryos. *Dev Dyn* **235**, 3121-31.
34. Phillips, B. T., Kidd, A. R., 3rd, King, R., Hardin, J. and Kimble, J. (2007). Reciprocal asymmetry of SYS-1/b-catenin and POP-1/TCF controls asymmetric divisions in *Caenorhabditis elegans*. *Proc Natl Acad Sci U S A.* **104**, 3231-3236.
35. Sims, P. A., and Hardin, J. D. (2007). Fluorescence-integrated transmission electron microscopy images: integrating fluorescence microscopy with transmission electron microscopy. *Methods Mol Biol* **369**, 291-308.
36. Batchelder EL, Thomas-Virnig CL, Hardin JD, White JG. (2007). Cytokinesis is not controlled by calmodulin or myosin light chain kinase in the *Caenorhabditis elegans* early embryo. *FEBS Letters* **581**, 4337-41.
37. Qadota H, Inoue M, Hikita T, Köppen M, Hardin JD, Amano M, Moerman DG, Kaibuchi K. (2007). Establishment of a tissue-specific RNAi system in *C. elegans*.

- Gene* **400**,166-73.
38. Sheffield, M., Loveless, T., Hardin, J., and Pettitt, J. (2007). *C. elegans* Enabled exhibits novel interactions with N-WASP, Abl, and cell-cell junctions during morphogenesis. *Curr. Biol.* **17**, 1791–1796.
  39. Stevenson, T.O., Mercer, K., Cox, E.A., Szewczyk, N.J., Conley, C.A., Hardin, J.D., and Benian, G.M. (2007). *unc-94* encodes a tropomodulin in *C. elegans*. *J. Mol. Biol.* **374**, 936-50.
  40. Hardin, J., King, R., Thomas-Virnig, C., and Raich, W.B. (2008). Zygotic loss of ZEN-4/MKLP1 results in disruption of epidermal morphogenesis in the *C. elegans* embryo. *Dev. Dyn.* **237**, 830-6.
  41. Lockwood, C., Lynch, A., and Hardin, J. (2008). Dynamic analysis identifies novel roles for DLG-1 subdomains in AJM-1 recruitment and LET-413 dependent apical focusing. *J. Cell Sci.* **121**,1477-1487.
  42. Ding, M., King, R.S., Berry, E.C., Wang, Y., Hardin, J., and Chisholm, A.D. (2008). The cell signaling adaptor protein EPS-8 is essential for *C. elegans* epidermal elongation and interacts with the ankyrin repeat protein VAB-19. *PLoS ONE* **3**:e3346.
  43. Lockwood, C., Zaidel-Bar, R., and Hardin, J. (2008). The *C. elegans* Zonula Occludens ortholog ZOO-1 cooperates with the cadherin-catenin complex to recruit actin during epidermal morphogenesis. *Curr. Biol.* **18**:1333-7.
  44. Yamashiro, S., Cox, E.A., Ballie, D.L., Hardin, J. and Ono, S. (2008). Sarcomeric actin organization is synergistically promoted by tropomodulin, ADF/cofilin, AIP1, and profilin in *C. elegans* body wall muscle. *J. Cell Sci* **121**:3867-77
  45. King, R.S., Maiden, S.L., Hawkins, N.C., Kidd, A.R., Kimble, J., Hardin, J., and Walston, T.D. (2009). POP-1 asymmetry and morphogenesis defects in *dsh-2* mutant embryos can be rescued by either the DIX or DEP domain of DSH-2. *Dev. Biol.* **328**, 234-44.
  46. Hingwing, K., Lee, S., Nykilchuk, L., Walston, T., Hardin, J., and Hawkins, N. (2009). CWN-1 functions with DSH-2 to regulate *C. elegans* asymmetric neuroblast division in a b-catenin independent Wnt pathway. *Dev. Biol.* **328**, 245–25.
  47. Giuliani, C., Troglio, F., T., Zucconi, A., Bai, Z., Patel, F.B., Zucconi, A., Malabarba, M.G., Disanza, A., Stradal, T., Cassata, G., Confalonieri, S., Hardin, J., Soto, M., Grant, B., and Scita, G. (2009). Requirements for F-BAR proteins TOCA-1 and TOCA-2 in actin dynamics and membrane trafficking during *C. elegans* oocyte growth and embryonic epidermal morphogenesis. *PLoS Genetics*, **5(10)**: e1000675.
  48. Grana, T.M., Cox, E.A., Lynch, A.M., and Hardin, J. (2010). SAX-7/L1CAM and HMR-1/cadherin function redundantly in blastomere compaction and non-muscle myosin accumulation. *Dev. Biol.* **344**:731–744.
  49. Kwiatkowski, A.V., Maiden, S.L., Pokutta, S., Choi, H.-J., Benjamin, J.M., Lynch, A.M., Nelson, W.J., Weis, W.I., and Hardin, J. (2010). In vitro and in vivo reconstitution of the cadherin-catenin-actin complex from *Caenorhabditis elegans*. *PNAS* **107**:14591-14596.
  50. Zaidel-Bar, R., Joyce, M.J., Lynch, A.M., Witte, K., Audhya, A., and Hardin, J. (2010). The F-BAR domain of SRGP-1 facilitates cell-cell adhesion during *C. elegans* morphogenesis. *J. Cell Biol.* **191**, 761-9.
  51. Neukomm, L.J., Frei, A.P., Cabello, J., Kinchen, J.M., Zaidel-Bar, R., Ma, Z., Haney, L.B., Hardin, J., Ravichandran, K.S., Moreno, S., and Hengartner, M.O.

- (2011). Loss of the RhoGAP SRGP1 promotes the clearance of dead and injured cells in *Caenorhabditis elegans*. *Nature Cell Biol.* **13**,79-86.
52. Ikegami, R., Simokat, K., Zheng, H., Dixon, L., Garriga, G., Hardin, J. and Culotti, J. (2012). Semaphorin and Eph receptor signaling guide a series of cell movements for ventral enclosure in *C. elegans*. *Curr. Biol.* **22**:1–11.
53. Cox-Paulson, E., Walck-Shannon, E., Lynch, A., Yamashiro, S., Zaidel-Bar, R., Celeste C. Eno, C., Ono, S., and Hardin, J. (2012). Tropomodulin protects  $\alpha$ -catenin-dependent junctional actin networks under stress during epithelial morphogenesis. *Curr. Biol* **22**:1500-1505.
54. Lynch, A.M., Grana, T., Cox-Paulson, E., Annabelle Couthier, A., Cameron, M., Chin-Sang, I., Pettitt, J., and Hardin, J. (2012). A genome-wide functional screen identifies MAGI-1 as an L1CAM-dependent stabilizer of apical junctions in *C. elegans*. *Curr. Biol.* **22**, 1891–1899.

### Reviews

1. Keller, R. and Hardin, J. (1987). Cell behaviour during active cell rearrangement: evidence and speculations. In *J. Cell Sci. Supp. 8, Cell Behaviour: Shape, Adhesion, and Motility* (J. Heaysman, A. Middleton, and F. Watt, eds.), pp. 369-393. London, Company of Biologists Limited.
2. Hardin, J. (1990). Context-sensitive cell behaviors during gastrulation. *Sem. Dev. Biol.* **1**, 335-345.
3. McClay, D.R., Armstrong, N.A., and Hardin, J. (1992). Cell interactions regulating pattern formation in the sea urchin embryo. *Development* **1992 Suppl.**, 33-41.
4. Hardin, J. (1994). Local cell-cell interactions and the regulation of gastrulation. *Sem. Dev. Biol.* **5**, 77-84.
5. Hardin, J. (1995). Target recognition by mesenchyme cells in the sea urchin embryo. *Amer. Zool.* **35**, 358-371.
6. Hardin, J. (1996). The cellular basis of sea urchin gastrulation. *Curr. Top. Dev. Biol.* **33**, 159-262.
7. Thomas, C., DeVries, P., Hardin, J., and White, J. (1996). Four-dimensional imaging: computer visualization of 3D movements in living specimens. *Science* **273**, 603-607.
8. Hardin, J. (2000) A degrading way to make an organ. *Science* **288**, 2142-2143.
9. Simske, J.S., and Hardin, J. (2001). Getting into shape: epidermal morphogenesis in *Caenorhabditis elegans* embryos. *Bioessays*, **23**: 12-23.
10. Cox, E.A. and Hardin, J. (2004) Sticky worms: adhesion complexes in *C. elegans*. *J. Cell Sci.* **117**,1885-97.
11. Cox, E.A., Tuskey, C. and Hardin, J. (2004) Cell adhesion receptors in *C. elegans*. *J. Cell Sci.* **117**,1867-70.
12. Hardin, J. and Walston, T. (2004). Models of morphogenesis: the mechanisms and mechanics of cell rearrangement. *Curr. Opin. Genetics & Dev.* **14**, 399-406.
13. Hardin, J. and Lockwood, C. (2004) Skin tight: cell adhesion in the epidermis of *Caenorhabditis elegans*. *Curr. Opin. Cell Biol.* **16**, 486-492.
14. Chisholm, A. and Hardin, J. (2005). Epidermal morphogenesis. In *WormBook*, ed. The *C. elegans* Research Community, <http://www.wormbook.org>
15. Walston, T. D., and Hardin, J. (2006). Wnt-dependent spindle polarization in the early

- C. elegans embryo. *Semin Cell Dev Biol* **17**, 204-13.
16. Yap, A., Crampton, M.S., and Hardin, J. (2007). Making and breaking contacts: the cellular biology of cadherin regulation. *Curr. Opin. Cell Biol.* **19**,1-7.
  17. Hardin, J. (2008). To thine own self be true: self-fusion in single-celled tubes. *Dev Cell.* **14**, 465-6.
  18. Hardin J, King RS. (2008). The long and the short of Wnt signaling in C. elegans. *Curr Opin Genet Dev.* **18**:362-7.
  19. Lynch, A. and Hardin, J. (2009). The assembly of epithelial junctions in C. elegans. *Frontiers Biosci.* **14**, 1414-1432.
  20. Hardin, J. (2011). Mechanotransduction: Getting morphogenesis down Pat. *Curr. Biol.* **21**:R309-11.
  21. Schramp, M. and Hardin, J (2011). Basement remodeling: making way for cellular invaders. *Curr. Biol.* **21**:R585-587..
  22. Maiden, S.L. and Hardin, J. (2011). The secret life of  $\alpha$ -catenin: moonlighting in morphogenesis. *J. Cell Biol.* **195**:543–552.
  23. Loveless, T. and Hardin, J. (2012). Cadherin complexity: recent insights into cadherin superfamily function in C. elegans. *Curr Opinion Cell Biol.* **24**:695-701.
  24. Hardin, J. (2012). An MBoC Favorite: "Cytokinesis and midzone microtubule organization in Caenorhabditis elegans require the kinesin-like protein ZEN-4". *Mol. Biol. Cell* **23**:3025.

#### Book chapters

1. McClay, D.R., Alliegro, M.C., and Hardin, J.D. (1989). Cell interactions as epigenetic signals in morphogenesis of the sea urchin embryo. In "The Cellular and Molecular Biology of Pattern Formation" (ed. D. Stocum). Oxford, Oxford University Press, pp70-87.
2. McClay, D.R., Coffman, J.C., and Hardin, J.D. (1989). Epigenetic signals at gastrulation in the sea urchin. *U.C.L.A. Symp. Mol. Cell. Biol.* **New Series, Vol. 25** (eds. E. Davidson, J. Ruderman, and J. Posakony). New York, Alan R. Liss, pp. 251-255.
3. McClay, D.R., Morrill, J., and Hardin, J. (1991). Archenteron morphogenesis in the sea urchin. In "Cell-Cell Interactions in Early Development" (J. Gerhart, ed.), New York, Alan R. Liss, pp. 15-29.
4. Hardin, J. (1994). The sea urchin embryo. In "Embryos: Color Atlas of Development" (J. Bard, ed.), pp. 37-53. London, Wolfe Publishing.
5. Weng, W., Cheetham, J., Hardin, J., and Venuti, J.M. (2000) A *twist* in sea urchin gastrulation and mesoderm specification. In: "Regulatory Processes in Development" (C.-O. Jacobson, L. Olson, eds) Wenner-Gren International Series, Vol. 76, pp. 153-158. Portland Press, London.
6. Hardin, J., Raich, W.B. and Simske, J.S. (2000) Morphogenesis at single-cell resolution: studying changes in the shape of the embryo in the tradition of Hörstadius. In: "Regulatory Processes in Development" (C.-O. Jacobson, L. Olson, eds) Wenner-Gren International Series, Vol. 76. Portland Press, London.
7. Hardin, J. (2006). Confocal and Multi-Photon Imaging of Living Embryos. In *Handbook of Biological Confocal Microscopy*, 3e (J. Pawley, ed.). New York: Plenum, pp. 746-768.
8. Sims, P., Albrecht, R., Pawley, J.B., Centonze, V., Deerink, T., and Hardin, J. (2006). When Light Microscope Resolution Is Not Enough: Correlational Light Microscope and Electron Microscope. In *Handbook of Biological Confocal Microscopy*, pp. 846-860.



9. Walston, T., and Hardin, J. (2011). Visualizing cell contacts and cell polarity in *Caenorhabditis elegans* embryos. In *Imaging in Developmental Biology: A Laboratory Manual* (J. Sharpe and R.O. Wong, eds). Cold Spring Harbor, NY: Cold Spring Harbor Press, pp. 229-244.
10. Simske, J.S. and Hardin, J. (2011). Claudins in *C. elegans*. *Methods Mol. Biol.* **762**:147-69.
11. Hardin, J. (2011). Imaging embryonic morphogenesis in *C. elegans*. In: Joel H. Rothman and Andrew Singson, editors: *Methods In Cell Biology*, Vol 106, Oxford: Academic Press; 2011, p. 377-412.
12. Hardin, J., Lynch, A., Loveless, T., and Pettitt, J. (2013). Cadherins and their partners in the nematode worm *Caenorhabditis elegans*. In "The Molecular Biology of Cadherins" (ed. F. van Roy). Elsevier, in press.

### *Protocols*

1. Walston, T., Hardin, J., 2010. Laser killing of blastomeres in *Caenorhabditis elegans*. *Cold Spring Harb Protoc* 2010, pdb prot5543.
2. Walston, T., Hardin, J., 2010. Analysis of 4D DIC microscopic data to determine cell contacts in *Caenorhabditis elegans* embryos. *Cold Spring Harb Protoc* 2010, pdb prot5542.
3. Walston, T., Hardin, J., 2010. Acquisition of 4D DIC microscopic data to determine cell contacts in *Caenorhabditis elegans* embryos. *Cold Spring Harb Protoc* 2010, pdb prot5541.
4. Walston, T., Hardin, J., 2010. An agar mount for observation of *Caenorhabditis elegans* embryos. *Cold Spring Harb Protoc* 2010, pdb prot5540.

### Funding History

#### *Current Support*

#### **NIH**

#R21 HD072769-01

Project Title: Structure and regulation of beta-catenin during cell-cell adhesion

Dates: 4/01/12-3/31/14

Total costs: \$405,795

#R01 GM58038

Project Title: Mechanisms of Junctional Actin Recruitment in *C. elegans*.

Dates: 4/01/08-3/31/13

Total costs: \$1,438,440

#### **NSF**

#IOB 0518081

Project Title: Role of Tropomodulin during Epithelial Morphogenesis in *C. elegans*

Dates: 9/1/09-8/31/12

Total costs: \$350,000

### *Pending Support*

#### **NIH**

# R01 GM58038

Project Title: srGAP and the cadherin complex during morphogenesis in *C. elegans*

Dates: 3/1/13-2/28/17

Total costs requested: \$1,456,500

**NSF**

# IOS 1258875

Project Title: Cell intercalation - molecular mechanisms and modeling in *C. elegans*

Dates: 3/1/13-2/28/16

Total costs requested: \$421,000

*Previous Support*

**NIH**

ARRA supplement to #R01 GM58038

Project Title: Mechanisms of Junctional Actin Recruitment in *C. elegans*.

Dates: 9/30/09-8/31/10

Total costs: \$50,240.00

**NSF**

Project Title: Wnt-dependent Polarization during Cell Rearrangement in the *C. elegans* Embryo

Assignment number: #IOB 0518081

Dates: 9/1/04-8/31/09

Total costs: \$ 390,000

**NIH**

Supplement to NIH grant #GM58038

Project Title: Development of 4D Imaging Software for Developmental Biologists

Dates: 4/1/05-3/31/07

Total direct costs: \$100,000

**NIH**

#GM58038

Project Title: Regulation of Epithelial Junctions in *C. elegans*

Dates: 4/1/04-3/31/08

Total costs: \$1,143,153

**NSF**

Project Title: Maternal Control of Epithelial Motility in the *C. elegans* Embryo

Assignment number: #IBN 0112803

Dates: 9/1/01-8/31/05

Total costs: \$ 390,000

**NIH**

Assignment number: R01 GM58038

Dates: 8/1/98-7/31/03

Total costs: \$560,000

**NIH**

Project Title: The Control of Epithelial Sheet Movement in *C. elegans*

Assignment number: R01 GM58038

Dates: 8/1/98-7/31/02

Total costs: \$560,000

**NSF**

Project Title: Genetic Convergent Extensions in *C. elegans*

Assignment number: #IBN 98-08475

Dates: 7/1/98-6/30/01

Total costs: \$ 360,000

**NIH**

Project Title: Mechanisms of Epithelial Cell Rearrangement

Assignment number: R01GM53739

Dates: 5/1/96-4/30/00

Total costs: \$269,999

**NSF**

Project Title: High Quantum Efficiency Confocal Microscope Detector for Reviewing Living Cells  
(J. Pawley, PI)

Assignment number: #DBI 97-24515

Dates: 12/1/97-11/30/00

Total costs: \$ 23,496

**NSF**

Project Title: Molecular Events During Target Recognition

Assignment number: #IBN 95-07151

Dates: 9/1/95-8/31/99

Total costs: \$ 270,000

**NSF**

Young Investigator Award

Project Title: Cell Rearrangement during Gastrulation

Assignment Number: IBN-9357246

Dates: 9/1/93-8/31/99

Total costs: \$250,000

**NSF**

Project Title: Target Recognition during Gastrulation

Assignment number: #DCB 92-06872

Dates: 8/1/92-7/31/96

Total costs: \$270,000

**Lucille P. Markey Scholar Award in the Biomedical Sciences**

Project title: Molecular mechanisms of epithelial morphogenesis in *C. elegans*

Dates: 7/1/90-6/30/97

Total direct costs (FY 1996-97) \$75500

American Cancer Society Institutional Award, 1992

Training*Previous Pre and Postdoctoral Trainees*

<b>Tranees</b>	<b>Dates</b>	<b>Previous position/degree</b>	<b>Position/ Degree obtained</b>	<b>Title of project</b>	<b>Subsequent position(s)</b>
Cheetham, Jan	1992-1994	Ph.D., UW-Madison	postdoc	Molecular mechanisms of mesenchyme specification in the sea urchin embryo	Information Consultant Center for Biology Education UW-Madison
Malik, Amy	1994-1995	B.S., Univ. of Michigan	MS (Zoology)	Cellular mechanisms of ventral enclosure in <i>C. elegans</i>	Physician
Williams-Masson, Ellen	1992-1996	B.S., North Carolina State Univ.	PhD (CMB)	Cellular mechanisms of dorsal intercalation and ventral enclosure in <i>C. elegans</i>	Assistant Scientist Dr. John White lab, UW-Madison
Raich, Bill	1993-1999	B.S., Swarthmore College	Ph.D. (CMB)	Molecular mechanisms of ventral enclosure in <i>C. elegans</i>	Postdoctoral fellow Columbia Univ.
Heid, Paul	1996-1999	B.S. Univ. of Iowa	PhD (Biochemistry)	Role of the transcription factor, DIE-1, in dorsal intercalation in the <i>C. elegans</i> embryo	Postdoctoral Fellow U. of Iowa; School of Pharmacy, Univ. of Iowa
Hirsch, Rebecca	1998-1999	PhD, UW-Madison	postdoc	Role of twist in sea urchin development	Postdoctoral Fellow Penn State U.
Kimberly, Elizabeth	1992-1999	B.S., Williams College	Ph.D. (CMB)	Mechanisms of archenteron morphogenesis in the sea urchin embryo	Postdoctoral Fellow U. of Colorado
Köppen, Matthias	1996-2001	B.S. (equivalent), Univ. of Bonn	Ph.D. (CMB)	Molecular investigation of the DLG-1/AJM-1 complex in the <i>C. elegans</i> embryo	Postdoctoral Fellow Max Planck Institute Dresden, Germany; Current – PI, Gulbenkian Institute, Portugal
Lindblom,	2000-		postdoc	Role of APR-	Associate Professor

Tim	2001			1/APC in the <i>C. elegans</i> embryo	Lyon College
Simske, Jeff	1996-2001	PhD, Stanford Univ.	postdoc	Molecular mechanisms of VAB-9 function in the <i>C. elegans</i> embryo	Assistant Professor Ramelkamp Center, Case Western U.
Thomas, Christina (Virnig)	1999-2003	B.S., North Carolina State Univ.	Ph.D. (Biomolecular Chem)	Role of the IP3 receptor, ITR-1, during morphogenesis in <i>C. elegans</i>	Postdoctoral Fellow Path & Lab Medicine UW - Madison
Simokat, Kristin	1997-2005	B.S., Wesleyan Univ.	PhD (CMB)	Cellular mechanisms underlying neuroblast organization in the <i>C. elegans</i> embryo	Lecturer, Univ. of Idaho
Cox, Elizabeth	2001-2006	PhD, Univ. of Illinois	postdoc	Using genomics to screen for interactions with the cadherin complex in <i>C. elegans</i>	Assistant Professor, SUNY Geneseo
Walson, Tim	2001-2006	M.S., Univ. of Wisconsin-Lacrosse	PhD (Genetics)	The role of Dishevelleds during morphogenesis in <i>C. elegans</i>	Assistant Professor, Truman State Univ.
Sheffield, Mark	1999-2007	B.S., Kansas State Univ.	PhD (Genetics)	The role of unc-34/Ena during morphogenesis in <i>C. elegans</i>	Scientist Covance, Inc.
Tuskey, Tina	2002-2007	B.S., Univ. of North Carolina	PhD (CMB)	The role of ZOO-1/ZO-1 during morphogenesis in <i>C. elegans</i>	Postdoctoral fellow, Clinical Chemistry, Washington Univ.
Lockwood, Chris	2001-2007	B.S., Western Washington Univ.	PhD (Genetics)	Molecular analysis of DLG-1 function in the <i>C. elegans</i> embryo	Postdoctoral fellow, Biology, Washington Univ.
Grana, Theresa	2004-2008	PhD, Univ. of North Carolina	postdoc	The role of AFD-1/AF-6 in the <i>C. elegans</i> embryo	Assistant Professor, Mary Washington Univ.
King, Ryan	2003-2008	B.S., UW-Madison	PhD (CMB)	The cellular and molecular mechanisms of pattern formation	Postdoc, Univ. of Illinois

				in the epidermis of <i>C. elegans</i>	
Ronen Zaidel-Bar	2006-2010	PhD, Weizmann Institute NIH fellowship	postdoc	Role of srGAP during morphogenesis in <i>C. elegans</i>	Assistant Professor, National University of Singapore
Erica Hall	Dec. 2008-2010	B.S., Univ. of Georgia	M.S. (Biophysics)	Structural evolution of $\beta$ -catenins in <i>C. elegans</i>	
Allison Lynch	2005-present	B.S., Univ. of Pittsburgh	PhD (Genetics)	The role of MAGI-1 in cadherin-based adhesion in <i>C. elegans</i>	Seeking postdocs
Maiden, Stephanie	2005-present	B.S., Univ. Of Missouri-Rolla	PhD (Mol. Cell. Pharm)	Structure-function analysis of a-catenin in the <i>C. elegans</i> embryo	Seeking postdocs

*Current pre- and postdoctoral trainees*

<b>Trainees</b>	<b>Training Period</b>	<b>Previous position/degree</b>	<b>Position/Degree sought</b>	<b>Title of project</b>	<b>Support</b>
Loveless, Tim	2006-present	B.S., Univ. of Montana	PhD (CMB)	Role of FRK-1/Frk in the <i>C. elegans</i> embryo	Previous: Molecular Biosciences Training Grant; current: PI's funding
Elise Walck-Shannon	2010-Present	Truman State University	PhD (Genetics)	Mechanisms of epidermal cell rearrangement in the <i>C. elegans</i> embryo	PI's funding
Bethany Lucas	2010-present	B.S., Univ. of Kansas	Ph.D. (Genetics)		PI's funding
Shao, Xianqiang	2011-present	M.S., Shanghai Institute for Biological Sciences	Ph.D. (Genetics)	Molecular mechanisms of $\alpha$ -catenin function	PI's funding

*Undergraduates supervised (last 5 years)*

<b>Trainees</b>	<b>Training Period</b>	<b>Title of project</b>	<b>Support</b>
Trevor Ho	2012-present	Spectrins and tropomodulin during morphogenesis	Independent study
Jack Keegan	2009-2011	Genetics interactions of the srgp-	Independent study

		1/srGAP during <i>C. elegans</i> morphogenesis	
Brian Cain	2008-2010	Sequencing alleles of hmp-1/ $\alpha$ -catenin	PI's funding
Will Bothfeld	2008-2009	Role of Cdc42 in postembryonic morphogenesis in <i>C. elegans</i>	Hilldale award
Colin Kreple	2006-2008	Genetic enhancers of a weak $\alpha$ -catenin mutant	Honors College award
Jess Vera	2004-2008	Genetic analysis of Wnt signaling in <i>C. elegans</i>	

### Teaching Experience and Awards

#### *Courses taught*

2012 – Chemistry 872 – Biophysics seminar  
 2011 – present – Guest lecturer, Biomedical Engineering 619, Microscopy of Life  
 1992-present — Instructor, Zoology 470, Introduction to Animal Development, Zoology Department, University of Wisconsin-Madison  
 2002-present — Instructor, Biocore 303, Biology Core Curriculum, University of Wisconsin-Madison  
 2001 — Instructor, Zoology 965, Seminar in Developmental Biology, University of Wisconsin  
 1993-2001 — Instructor, Biocore 333, Biology Core Curriculum, University of Wisconsin-Madison  
 1994 -1996 — Instructor, ILS 150, Ways of Knowing, University of Wisconsin-Madison  
 1993-1998 — Instructor, Zoology 650, Advanced Developmental Biology  
 1992-1993 — Co-instructor, Developmental Biology Laboratory, University of Wisconsin  
 1990—Teaching assistant, Embryology Course, Marine Biological Laboratory, Woods Hole  
 1983-1986—Teaching assistant in general biology, Biology Department, University of California, Berkeley  
 1985—Teaching assistant in general chemistry, Chemistry Department, University of California, Berkeley

#### *Teaching Awards/Honors*

2011 – Chancellor's Distinguished Teaching Award, UW-Madison  
 2009 - University Housing Honored Instructor's Award  
 2007 – Favorite Instructor Award, UW-Madison Residence Halls  
 2006-present – DELTA program Teaching Fellows mentor (via Biocore)  
 2006 – Favorite Instructor Award, UW-Madison Panhellenic Council  
 2002–present — Faculty Director, Biology Core Curriculum  
 1998 — Presenter, Project Kaleidoscope symposium, UW-System Biology team  
 1997-present — Co-chair, University of Wisconsin System Worldwide Web Biology Initiative (ZooWeb)  
 1995-1997 — Co-chair, Instructional Technology Task Force, Teaching Academy, University of Wisconsin  
 1994-1997 — Executive Committee, Teaching Academy, University of Wisconsin  
 1994 — Founding Fellow, Teaching Academy, University of Wisconsin  
 1994-present — Honors Fellow, College of Letters and Science, University of Wisconsin-Madison  
 1993-1994 - Division of Instructional Technology “Eagle”, Teaching Academy Fellow

1993—Lilly Teaching Fellow, University of Wisconsin; National Science Foundation Young Investigator

1992-99 — NSF Young Investigator Award

*Teaching Service*

2008 – Guest editor, *CBE: Life Science Education*, special issue on developmental biology

2005-2008 - Chair, Institute for Cross-College Biology Education Steering Committee;

2004-2005 – Provost's Task Force on Cross-College Biology Education (Sussman Committee)

2002-present – Editorial Board, *CBE: Life Science Education*, 2002-present;

1999-2005 – Biology Major Steering Committee

1997-1999 — Steering Committee, Biology New Media Center

1997-1998 — Lilly Fellows selection committee

1995-1998 - University Instructional Technology Committee

1999-2000 - Biostar 4 (Cell, Developmental, Neurobiology Building) proposal committee

*Teaching Outreach/Presentations*

2010 –Invited speaker, Education session speaker, Northwest Regional Developmental Biology Meetings, Friday Harbor, WA; presentation on fluorescence microscopy in Physics 208 honors seminar

2009 – Interview on “Office Hours” (Big Ten Network television show), “Darwin at 200”; Invited speaker, Education session speaker, Midwest Regional Developmental Biology Meetings, Iowa City, IA

2008 – Presenter at "Evolution in the 21<sup>st</sup> Century" Symposium, Biopharmaceutical Technology Center, Promega Corp.

2007 – UW Center for Humanities panel discussion on Teaching and Evolution

2006 - Panelist, Darwin Day outreach, UW-Madison; UW-Isthmus Society event on Evolution, UW-Madison; Moderator, Isthmus Society event on stem cell research, UW-Madison

2005 – Workshop organizer, "Biology in the 21<sup>st</sup> Century", UW Teaching and Learning Symposium

*Teaching Materials Produced and Distributed*

1996 – present — Dynamics of Development web tutorials:

([http://worms.zoology.wisc.edu/embryo\\_main/embryology\\_main.html](http://worms.zoology.wisc.edu/embryo_main/embryology_main.html))

Version 2.0: (<http://worms.zoology.wisc.edu/dd2/>)

The Dynamics of Development materials have been used by educators around the world to teach fundamental dynamic concepts in developmental biology. The materials have been used in Eastern Europe, Southeast Asia, throughout North America and Western Europe.

2010 — Contributed figures to Scott Gilbert, *Developmental Biology, 9e* (Sinauer)

2007 — Contributed figures to Scott Gilbert, *Developmental Biology, 8e* (Sinauer)

2002 — Contributed figures to Fred Wilt, *Principles of Developmental Biology* (W.W. Norton & Company)

2002—Contributed movie to Alberts et al. *Essential Cell Biology Interactive*(Garland Publishing, forthcoming)

1999 — Contributed movie to Alberts et al. *Essential Cell Biology Interactive*(Garland Publishing)



2001 — Contributed figures to Klaus Kalthoff, *Analysis of Biological Development* (McGraw-Hill)  
 1997 — Contributed figures to Scott Gilbert, *Developmental Biology, 5e* (Sinauer)  
 1996 — Contributed figures to Klaus Kalthoff, *Analysis of Biological Development* (McGraw-Hill)  
 1995 — Contributed figures to Leland Johnson, *Patterns and Experiments in Developmental Biology, 2e* (Wm. C. Brown)

### *Teaching publications*

#### Articles

Savage, M.P., Fallon, J.F., and Hardin, J. (2003). Gilbert's seventh hits all the right notes: A synthesis for everyone. *Dev. Dyn.* 227, 615–616.

Savage, M.P., Fallon, J.F., and Hardin, J. (2003). Teaching the essential principles of development. *Bioessays* 25,301–302.

Hardin J. (2008). Focus: issues in developmental biology education. *CBE Life Sci Educ.* 7:1-2.

Hardin, J. (2008). The missing dimension in developmental biology education. *CBE Life Sci Educ.* 7:13-6.

#### Books

Hardin, J., Kleinsmith, L., and Bertoni, G. (2011). *Becker's World of the Cell*, 8<sup>th</sup> ed. San Francisco Benjamin-Cummings.

Becker, W., Kleinsmith, L., and Hardin, J (2009). *The World of the Cell*, 7<sup>th</sup> ed. San Francisco Benjamin-Cummings.

Becker, W., Kleinsmith, L., and Hardin, J (2006). *The World of the Cell*, 6<sup>th</sup> ed. San Francisco Benjamin-Cummings.

Becker, W., Kleinsmith, L., and Hardin, J (2003). *The World of the Cell*, 5<sup>th</sup> ed. San Francisco Benjamin-Cummings.

### *Teaching grants*

2007 – Engage Podcast Award, UW-Madison Division of Information Technology  
 2005 – Engage Adaptation Award (online quiz development), UW-Madison Division of Information Technology

### *Training of scientist/educators*

Trainees who are currently engaged in academic education

<b>Tranees</b>	<b>Dates</b>	<b>Previous position/degree</b>	<b>Position/ Degree obtained</b>	<b>Current position</b>
Cheetham, Jan	1992-1994	Ph.D., UW-Madison	postdoc	T4 program Division of Information Technology

				UW-Madison
Lindblom, Tim	2000-2001	Ph.D., Univ. of Georgia	postdoc	Associate Professor Lyon College
Simokat, Kristin	1997-2005	B.S., Wesleyan Univ.	PhD (CMB)	Lecturer, Univ. of Idaho
Cox, Elizabeth	2001-2006	PhD, Univ. of Illinois	postdoc	Assistant Professor, SUNY Geneseo
Walson, Tim	2001-2006	M.S., Univ. of Wisconsin-Lacrosse	PhD (Genetics)	Assistant Professor, Truman State Univ.
Grana, Theresa	2004-2008	PhD, Univ. of North Carolina	postdoc	Assistant Professor, Mary Washington Univ.

### Service Activities (selected recent)

#### *Departmental service*

1997 – present — Instructional Program Committee; Computer committee;  
 2001, 2005, 2007 — Associate Chair, Cell and Developmental Biology subgroup  
 2008-present – Chair

#### *Campus service*

Academic advisor, Biology, Molecular Biology, and Zoology majors  
 2010 – Introductory Biology Memorandum of Understanding task force  
 2009 – External reviewer, Dept. of Communicative Disorders review  
 2008 – Phi Beta Kappa selection committee  
 2006-present – College of Letters & Science Facilities Planning Committee  
 2005-2008 - Chair, Institute for Cross-College Biology Education Steering Committee;  
 2001-2005 - University Academic Planning Committee  
 2005 - Genetics Graduate Program Admission Committee  
 2004-2005 – Provost's Task Force on Cross-College Biology Education  
 1999-2005 – Biology Major Steering Committee  
 1997-2002 — Organizer, joint *C. elegans* group meetings, University of Wisconsin-Madison  
 2001 – 2004 — Chair, Developmental Biology focus group, Cellular & Molecular Biology program  
 1999-2000 - Biostar 4 (Cell, Developmental, Neurobiology Building) proposal committee  
 1997-1999 — Steering Committee, Biology New Media Center  
 1997-1998 — Lilly Fellows selection committee  
 1995-1998 - University Instructional Technology Committee

#### *National/International Service (recent)*

Reviewer for *Cell*, *Nature*, *Nature Cell Biology*, *Science*, *PNAS*, *Developmental Cell*,  
*Development*, *Developmental Biology*, *Current Biology*, *Developmental Dynamics*,  
*Mechanisms of Development*, *Trends in Genetics*, *Trends in Cell Biology*, *Journal of Cell Science*,  
*PLoS Genetics*, *Nature Reviews Molecular & Cellular Biology*  
 2007 - Invited co-chair, Amer. Soc. for Cell Bio. National meetings, minisymposium on cell migration;  
 2006 - Review committee, postdoctoral awards, Amer. Soc. for Cell Biology; Co-organizer, *C. elegans* Development & Evolution Meetings

2002 — Consultant, State of Kansas COBRE proposal (NIH)  
2002 — Local organizing committee, Society for Developmental Biology National Meeting, Madison, WI

*Grant Review Panels*

SEP, Developmental Biology R15 awards, NIH, Fall 2011; CB-P (55) study section, NIH, 2011; ICI Study section, NIH, 2007-2010; DEV-2 Study section, NIH, 2004-5; MDCN1 Study Section, NIH, 2003-05; CDF-5 Study Section, NIH, 2000; Biocomplexity Panel, NSF, 2000; Animal Developmental Mechanisms Panel, NSF, 1995-98, 2005 (ad hoc 1992-present); HED-2 Study Section, NIH, 1998

*Editorial Boards*

*Developmental Dynamics*, 2003-present; *CBE: Life Science Education*, 2002-present; *Organogenesis*, 2004-present

*Outreach*

2012 – Science Café presentation, Madison WI  
2009 – Interview on “Office Hours” (Big Ten Network television show), “Darwin at 200”  
2008 – Presenter at "Evolution in the 21<sup>st</sup> Century" Symposium, Biopharmaceutical Technology Center, Promega Corp.  
2007 – UW Center for Humanities panel discussion on Teaching and Evolution  
2006 - Panelist, Darwin Day outreach, UW-Madison; UW-Isthmus Society event on Evolution, UW-Madison; Moderator, Isthmus Society event on stem cell research, UW-Madison