

## Kathryn W. Tosney, BIOSKETCH

### Professional Preparation

INSTITUTION AND LOCATION	DEGREE	YEARS
University of Oregon	BS, honors	1975
Stanford University, Palo Alto, CA	Ph.D.	1980
Yale University	-	1980-1982
University of Connecticut, Storrs, CT	-	1982-1984

### Appointments

Director of SEEDS (Scientists and Engineers Expanding Diversity and Success) U. Miami 2008-present; Chair and Professor of Biology 2006-present U. Miami, Professor 1995-2005, U. Michigan. Gayle Morris Sweetland Fellow U. Michigan 1999, Associate Chair Biology 1991-1995, Associate Director NSF Developmental Neuroscience Training Program 1990-2000, Associate Professor 1989-1995, Assistant Professor 1984-1989, MDA Postdoctoral Fellow Yale and U Connecticut 1980-1984, Grad student Stanford 1975-1979, NSF Pre-doctoral Fellow 1975-1978.

### Publications (selected from a list of 58)

#### **5 selected publications**

- 1) Tosney, K. W. , A. Wagnitz, D. Dehnbostel, and K. J. Balazovich (2009). Evidence that growth cones exert mechanical force as they exit the spinal cord. *Dev. Dynamics, In press with revision.*
- 2) Tosney, K.W. (2004) A long-distance cue from emerging dermis stimulates neural crest melanoblast migration. *Dev. Dynamics.* 229: 99-108
- 3) Steketee and Tosney (2002) Three functionally distinct adhesions in filopodia: Shaft adhesions control lamellar extension. *J. Neurosci.* 22:8071-8083.
- 4) Steketee, Balazovich and Tosney (2001). Filopodial initiation and a novel filament organizing center, the focal ring. *Molec. Biol. Cell.* 12: 2378-2395.
- 5) Polinsky, Balazovich and Tosney (2000). Identification of an invariant response: Contact with Schwann cells induces veil extension in growth cones. *J. Neurosci.* 20: 1044-10552)

#### **5 other significant publications** chosen to show the broad range of our work.

- 1) Johann Eberhart, Jason Barr, Sinead O'Connell, Mary E. Swartz, Alleda Flagg, Karina S. Cramer, Kathryn W. Tosney, Elena B. Pasquale, Catherine E. Krull (2004). Ephrin-A5 exerts positive or inhibitory effects on distinct subsets of EphA4-positive motor neurons. *J. Neuro.* 24: 1070-1078
- 2) Steketee and Tosney (1999). Contact with isolated sclerotome cells steers sensory growth cones by altering distinct elements of extension. *J. Neurosci.* 19: 3495-3506
- 3) Hotary, K.B. and K.W. Tosney (1996). Cellular interactions that guide sensory and motor axons identified in an embryonic slice preparation. *Dev. Biol.* 176: 22-35
- 4) Tosney, Dehnbostel and Erickson (1994). Neural crest cells prefer the myotome's basal lamina over the sclerotome as a substratum. *Dev. Biol.* 163: 389-406.
- 5) As a publication that shows relevance to an NSF Math-Bio initiative, our research was a major data source for mathematical modeling in S. M. Maskery, H. M. Buettner and T Shinbrot (2004). Growth cone pathfinding: a competition between deterministic and stochastic events. *BMC Neurosci.* 5:22-26

### Synergistic Activities. EXAMPLES THAT DEMONSTRATE A BROADER IMPACT

#### **1) Innovations in teaching and training (e.g., development of curricular materials and pedagogical methods)**

A] In an Embryology course at the University of Michigan, I developed new pedagogical approaches that increase learning, several of which have been adopted elsewhere. For instance:

- In embryology, student groups each use a different morphogenetic mechanism to produce a 3 legged, 2 headed alien with odd anatomical specializations and three genders. To do so successfully, they must understand developmental mechanisms fully.
- I developed a strategy that actually causes the students to change their study habits. Students don't believe professorial advice, but they do believe results of a survey on study habits that I append to the first midterm exam, and correlate with grades. When students realize that a huge predictor of a lower grade is missing classes, attendance rises! Many students thereafter alter various studying habits and improve.
- I developed an "origami embryo" in which students fold their own embryo using colored paper. Thereafter, the students never forget how the embryo changes form and develops. This technique was

shared with the outside community in an invited seminar at a National Developmental Biology Society meeting, is posted on the web <http://www.bio.miami.edu/ktosney/file/Origami.html>.

**B]** My graduate course, "Professional Writing in Biology" focuses on constructing effective arguments, using a new strategy for writing clearly that goes beyond grammar to utilize "reader-oriented prose" as described in Gopen and Swan, 1990, *American Scientist* 78: 550. Students submit extramural grants from this course.

**C]** In an outreach course in Michigan, high school students learned embryology with a focus on teratogens and how and why they cause birth defects. They then experimentally tested if vitamins and herbals are teratogens and published their results on the web: e.g., <http://www-personal.umich.edu/~tonyasw/LaTonya.html>

**D]** I authored a textbook, "aCross Development" Sinauer 2001, which is a study aid for developmental biology. It uses crossword puzzles that exercise students' abilities to actually recall terminology and to recognize concepts even when they are stated in new guises. See <http://tinyurl.com/2rqo6g/>

**E]** I direct an NSF ADVANCE for Women in Science program called SEEDS (Scientists and Engineers Expanding Diversity and Success) that covers three campuses and four science schools at U. Miami.

## **2) Contributions to the science of learning**

- I developed a web site for developing effective posters, and I give workshops nationally. See: <http://www.bio.miami.edu/ktosney/file/PosterHome.html>
- I developed the Society for Developmental Biology's Education Website.
- Published a guide to effective posters: Hess GR, Tosney KW, Liegel LH. 2009, Creating effective poster presentations: AMEE Guide no. 40. *Med Teach.* Apr31(4):319-21.

## **3) Development and/or refinement of research tools:** Published tools for assessing developmental mechanisms:

- a) Krull, C and K.W. Tosney (2007) Embryo Slices and Strips: Guidance and Adhesion Assays in the Avian Embryo. In *Methods in Avian Embryology, second edition* M. Bronner-Fraser, in press.
- b) Hotary, K.B., L.T. Landmesser and K.W. Tosney (1996). Embryo slices. In *Methods in Cell Biology: Methods in Avian Embryology*. 51: 109-124. ed: M. Bronner-Fraser.
- c) Tosney, K.W., R.Oakley, M.Champion, L.Bodley, R.Sexton and K.Hotary (1996) Somite strips: An embryo fillet preparation. In *Methods in Cell Biology: Methods in Avian Embryology*. 51:93-108 ed: M. Bronner-Fraser.
- d) Tosney, K.W. and L.T. Landmesser (1986). Neurites and growth cones in the chick embryo: enhanced tissue preservation and visualization of HRP-labeled subpopulations in serial 25µm plastic sections cut on a rotary microtome. *J.Histochem.Cytochem.* 34:953-957.

## **4) Broadening the participation of underrepresented groups**

I have directly trained 34 undergrads in research, including 25 women and 7 people of color. Eight (all women) are co-authors on journal articles. One of my current graduate students, Albert Hayward, is African-American. I am currently the Director of SEEDS (Scientist and Engineers Expanding Diversity and Success), a diversity program funded by NSF ADVANCE for Women in Science.

## **5) Service to the scientific and engineering community outside of my immediate organization.**

- I developed a talk on career survival issues, which I have given at many Universities and meeting venues.
- Associate Editor, *J. Morph.*, 1985-1990; *Exp. Neurol.*, 1998-2005; *Cell Tissue Res.*, 1999-present, *Developmental Dynamics*, 2003-present.
- Governmental study panels: Neuro B2 NIH panel regular member, 1988-1992; ad hoc NIH panels: Neuro B2, 1993-1997; VISC 1998; NSF Developmental Neurobiology panel, 2002; Minority Postdoc Panel 2003-2006
- Society for Developmental Biology Board of Trustees (1996-1999), Treasurer (1999-2002), Education Website Director, 2004-2006
- FASEB Finance Committee, 2003-2006, 2008-2011; Department reviews, Utah, 1997, Wesleyan, 2009.

## **Collaborators & Other Affiliations**

(a) Collaborators in the last 48 months: Catherine Krull, University of Michigan; Herbert Geller, NIH

(ii) Graduate advisor, Norman Wessells, Postdoctoral advisor, Lynn Landmesser

(iii) Thesis Advisor and Postgraduate-Scholar Sponsor for: postgraduate: Ken Balazovich, Lisa Foa, Michel Polinsky, Kevin Hotary Graduate: Robert Oakley, Michael Stekettee, Renee Pierce, Ron Rozar, Dante Fenolio, Albert Hayward, John Constantinide. Total direct advising: 4 postdoc, 8 PhD, 4 Masters

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