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Objective: Develop software for biological research.

Skilled in: programming in assembly language, C/C++, Java, C#, Fortran; on Windows, Unix, and Mac platforms; using Visual Studio, Netbeans, and Xcode IDEs.

Education

University of California, Berkeley Ph.D. Molecular and Cell Biology, May 1995
Stanford University B.S. Biological Sciences, 1982

Professional Experience

Research

- 2004-2006 Postdoctoral Fellow, Konrad Lorenz Institute for Evolution and Cognition Research, Altenberg, Austria
- A computational cell model for the evolution of multicellularity and development. See <http://www.sharonminsuk.com/> for demo.
- 1997-2003 Postdoctoral Fellow, Dept. of Biology, Indiana University (and Visiting Scholar, School of Biological Sciences, University of Sydney, Australia)
- Evolution of body plan development in larval and adult echinoderms. (Postdoctoral fellowship sponsor: Rudolf Raff)
- 1989-1997 University of California, Berkeley, Dept. of Molecular and Cell Biology (Graduate Student, 1989-1995; and Visiting Scholar, Jun 1996 – Feb 1997)
- Computer simulation of biomechanical cell interactions during notochord development. (Project advisor: George Oster)
 - Gastrulation mechanisms and evolution in Pipid frogs (*Xenopus* and *Hymenochirus*). (PhD thesis advisor: Ray Keller.)

Other software development

- 2008-2009 Recent Projects
- Device control module for open source image acquisition software (C++, Windows)
 - Self-taught C++
 - Java and C# programming courses (aced)
- 1985-1989 Areca Science Corporation, Palo Alto, CA
- Designed and implemented clinical diagnostics software for polygraph data collection and analysis in sleep disorders clinics.
- 1982-1984 Teaching Tools Software, Inc., Mountain View, CA
- Designed and implemented award-winning (see below) educational software for pre-school and K-6 children.

- 1982 Stanford University Mathematics Dept., Stanford, CA
• Designed and implemented dynamic graphics software for teaching calculus concepts to college students.
- 1981 Indianapolis Children's Museum, Indianapolis, IN
• Designed and implemented interactive games for teaching concepts of vectors, velocity, and gravity to elementary and junior high school students.
- 1980 Beckman Instruments, Bioproducts Dept., Palo Alto, CA
• Designed and implemented database application for experimental results of pharmaceutical research.

Teaching

- 2008 Adjunct Professor, Merritt College, Oakland, CA
• Microscopy practicum, as part of the Merritt Microscopy Program
- 2007-2008 Adjunct Professor, Saint Mary's College, Moraga, CA
• intro cell/molecular/genetics (lab) • intro organisms and evolution (lab) • upper division molecular biology (lecture and lab) • biology of women (lab)
- 2002 Adjunct Professor, Indiana University, Bloomington
• Biological Mechanisms (large introductory cell/molecular/genetics course; 250 students; supervised 10 undergraduate and 2 graduate teaching assistants).
- 1990-1991 Graduate Teaching Assistant / Lab Instructor, University of California, Berkeley
• Introductory Biology • Developmental Biology.
- 1980-1982 Undergraduate Teaching Assistant / Lab Instructor, Stanford University
• Evolutionary Biology • Experimental Biology.

Awards and Honors

Grants

- Postdoctoral Fellowship, Konrad Lorenz Institute for Evolution and Cognition Research, Altenberg, Austria, 2004-2006 (55,900 euros [~\$67,000] over 2 years, plus travel support).
NIH, NRSA Postdoctoral Fellowship, 1997-2000 (\$90,228 over 3 years).
University of California Regents Fellowship, 1990 (full coverage of 1 year stipend and tuition).

Other honors

- Reviewed research grant applications (undergraduate institutions) for the Murdock Trust and have received reviewing inquiries from *Development* and Wadsworth (textbook publisher).
Best Student Paper Award, American Society of Zoologists, 1994, for platform presentation at annual meeting (see below).
Hughes Foundation Predoctoral Fellowship, honorable mention, 1990.
NSF Predoctoral Fellowship, honorable mention, 1989, 1990.
Outstanding Software of the Year Award, *Learning Magazine*, 1983 (for "Square Pairs", a memory game I developed while at Teaching Tools Software).

Publications

- Minsuk, S. B., F. R. Turner, E. C. Raff, and R. A. Raff. Restoration of ancestral cell signaling pathways in chimaeric larvae. (In preparation.)
Minsuk, S. B., F. R. Turner, M. E. Andrews, and R. A. Raff. (2009). Axial patterning of the pentaradial adult echinoderm body plan. *Dev. Genes Evol.* 219:89-101.

- Minsuk, S. B. (2005). Toward an open-ended and mechanically realistic model of biological cells. In: The 8th European Conference on Artificial Life (ECAL) Workshop Proceedings. Mathieu Capcarrere (ed). http://www.sharonminsuk.com/Software/Minsuk_05_ECAL.pdf.
- Minsuk, S. B., M. E. Andrews, and R. A. Raff (2005). From larval bodies to adult body plans: patterning the development of the presumptive adult ectoderm in the sea urchin larva. *Dev. Genes Evol.* 215:383-392.
- Minsuk, S. B. and R. A. Raff (2005). Co-option of an oral-aboral patterning mechanism to control left-right differentiation: the direct-developing sea urchin *Heliocidaris erythrogramma* is sinistralized, not ventralized, by NiCl₂. *Evol. Dev.* 7:289-300.
- Nielsen, M. G., E. Popodi, S. Minsuk, and R. A. Raff (2003). Evolutionary convergence in *Otx* expression in the pentamerous adult rudiment in direct-developing sea urchins. *Dev. Genes Evol.* 213:73-82.
- Minsuk, S. B. and R. A. Raff (2002). Pattern formation in a pentamerous animal: induction of early adult rudiment development in sea urchins. *Dev. Biol.* 247:335-350.
- Minsuk, S. B. and R. E. Keller (1997). Surface mesoderm in *Xenopus*: a revision of the stage 10 fate map. *Dev. Genes Evol.* 207:389-401.
- Poznanski, A., S. Minsuk, D. Stathopoulos, and R. Keller (1997). Epithelial cell wedging and neural trough formation are induced planarly in *Xenopus*, without persistent vertical interactions with mesoderm. *Dev. Biol.* 189:256-269.
- Minsuk, S. B. and R. E. Keller (1996). Dorsal mesoderm has a dual origin and forms by a novel mechanism in *Hymenochirus*, a relative of *Xenopus*. *Dev. Biol.* 174:92-103. [cover article]
- Minsuk, S. B. (1995). A Comparative Study of Gastrulation and Mesoderm Formation in Pipid Frogs. Ph.D. thesis, University of California, Berkeley.
- Weliky, M., S. Minsuk, R. Keller and G. Oster (1991). Notochord morphogenesis in *Xenopus laevis*: simulation of cell behavior underlying tissue convergence and extension. *Development* 113:1231-1244.
- Oster, G., M. Weliky, and S. Minsuk (1990). Morphogenesis by cell intercalation. In: 1989 Lectures in Complex Systems. Santa Fe Institute Studies in the Sciences of Complexity Series, Lect. Vol. II. 501-512. Erica Jen (ed). Reading, MA: Addison-Wesley.

Professional Presentations and Abstracts

Talks (* invited)

- * Biology 101 (informal discussion of biology, mostly cell and molecular, for a diverse computer-tech-oriented audience). Grey Thumb Silicon Valley, Menlo Park, CA, October 2008
- * Simulating cell behavior: towards modeling the evolution of development. Grey Thumb Silicon Valley, San Francisco, CA, June 2008.
- * Simulating cell behavior: towards modeling the evolution of development. Old Dominion University, Norfolk, VA, April 2006.
- Toward an open-ended and mechanically realistic model of biological cells. The 8th European Conference on Artificial Life (ECAL), Sep. 2005. (Minsuk, S. B. (2005). In: Capcarrere, M. (ed.): The 8th European Conference on Artificial Life (ECAL) Workshop Proceedings.)
- Patterning the pentaradial adult sea urchin body plan. Society for Integrative and Comparative Biology, Jan. 2005. (Minsuk, S. B. and R. A. Raff (2004). *Integr. Comp. Biol.* 44(6):607.)
- Hen's teeth and sea urchin's toes. Society for Integrative and Comparative Biology, Jan. 2004. (Minsuk, S. B., E. C. Raff, and R. A. Raff (2003). *Integr. Comp. Biol.* 43(6):835.)
- * Simulating the evolution of multicellularity and development. Santa Fe Institute, Santa Fe, NM, Mar. 2003.
- * Simulating the evolution of multicellularity and development. Konrad Lorenz Institute for Evolution and Cognition Research, Vienna, Austria, Feb. 2003.

- A new angle on axial patterning: co-option of a dorsal-ventral patterning mechanism to control left-right differentiation in a direct-developing sea urchin. Society for Integrative and Comparative Biology, Jan. 2003. (Minsuk, S. B. and R. A. Raff (2002). *Integr. Comp. Biol.* 42(6):1280.)
- Inductive signals initiating adult body plan development in echinoderms. Society for Integrative and Comparative Biology, Jan. 2002. (Minsuk, S. B. and R. A. Raff (2001). *Am. Zool.* 41(6):1528.)
- Inductive signals in rudiment development in the direct-developing sea urchin *Heliocidaris erythrogramma*. Fourth North American Echinoderm Conference, Aug. 2001. (Minsuk, S. B. and R. A. Raff (2001). *Gulf of Mexico Science* 19(2):179.)
- Mechanisms of early adult development in a pentamerous animal. Evolution 2000 (Society for the Study of Evolution).
- Induction and fate specification during early development of the adult sea urchin. Developmental Biology of the Sea Urchin XII, May 1999.
- "Surface mesoderm" in Pipid frogs. — Winner of Best Student Paper Award. American Society of Zoologists. (Minsuk, S. B. and R. E. Keller (1994). *Am. Zool.* 34(5):49A)

Posters

- First steps toward a generalized model cell for evo-devo computer simulations. Society for Integrative and Comparative Biology, Jan. 2005. (Minsuk, S. B. (2004). *Integr. Comp. Biol.* 44(6):729.) (View entire poster, with QuickTime movies of simulations, at <http://www.kli.ac.at/personal/minsuk/sicbposter.html>.)
- A proposal for an artificial life simulation of evolving multicellular ontogeny. Artificial Life VIII (8th International Conference on the Simulation and Synthesis of Living Systems), Dec. 2002. (Abstract: <http://www.alife.org/alife8/abstracts/minsuk/>)
- Inductive signals initiating adult body plan development in echinoderms. Developmental Basis for Evolutionary Change (U. Chicago special symposium, 2001).
- Inductive interactions during development of the sea urchin adult pentamerous body plan. Society for Developmental Biology. (Minsuk, S. and R. Raff (1998). *Dev. Biol.* 198:199.)
- Xenopus* retains a latent ancestral program of mesoderm morphogenesis still expressed during normal development in its close relative *Hymenochirus*. Bodega Marine Lab, Bodega Bay, CA, "Evolution of Development: Molecules, Mechanisms, Phylogenetics," 1995.
- Epithelial participation in mesoderm formation in a relative of *Xenopus laevis*, by a novel morphogenetic mechanism. American Society for Cell Biology. (Minsuk, S. B. and R. E. Keller (1994). *Molecular Biology of the Cell* 5:100a.)
- Gastrulation in the frog *Hymenochirus*. American Society of Zoologists, 1992. (Minsuk, S. B. (1992). *Am. Zool.* 32(5):84A.)
- A computer simulation of notochord formation in *Xenopus laevis*: testing proposed rules of morphogenesis. Society for Developmental Biology, 1990.

Memberships

- International Society for Artificial Life. 2002-present.
- Society for Integrative and Comparative Biology (formerly American Society of Zoologists). 1992-present.
- Society for Developmental Biology. 1990-present.
- Affiliate of NSF Integrative Graduate Education and Research Traineeship (IGERT) Program in Evolution, Development, and Genomics, at Indiana University. 2001-2003.
- American Society for Cell Biology. 1994-1995.