

KRISTINA STAFFORD MEAD

CONTACT INFORMATION:

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EDUCATION:

University of California 1996-2002. Postdoctoral fellow in Integrative Biology in Dr. M.A.R. Koehl's lab, stomatopod olfaction.

Stanford University 1990-1996. Ph.D. in Biological Sciences.

Thesis Topic: Sex in the surf zone: the effects of hydrodynamic shear stress on the fertilization and early development of common intertidal invertebrates.

Advisor: Dr. Mark W. Denny, Professor, Department of Biological Sciences

University of Washington 1991-1994. Courses in zoology, phycology, embryology, evolution of developmental patterns, and molecular population biology.

Harvard University 1989. Course in physiology.

Boston University 1988-1989. Courses in organic chemistry.

Uppsala University, SWEDEN 1984-85, 1986-88. Certificate in Physical Biology.

Williams College 1982-1986. B.A. in Physics, with honors.

Thesis Topic: Radiation damping in an atomic hydrogen maser.

Advisor: Dr. Stuart Crampton, Professor, Department of Physics.

ACADEMIC AWARDS AND FELLOWSHIPS:

Project AWARE Foundation. 2001.

ONR grant (with Mimi Koehl as P.I.) in Chemical Plume Tracing. 1998-2001.

Grass Fellowship at the Marine Biological Laboratory in Woods Hole. 1998.

NSF grant (with Mark Denny as P.I.) in Biological Oceanography. 1994-1997.

Miller Scholar. 1994.

Myers Oceanographic and Marine Biology Trust. 1992, 1993.

Summer scholarships from University of Washington. 1991, 1992, 1993.

Stanford teaching award. 1991.

University Fellowship (Stanford). 1990-1994.

GRANTS SINCE ARRIVAL AT DENISON:

Denison University Research Foundation grant.

- 2003-2004: Does flow environment affect the shape of crayfish chemical sensors?
- 2004-2005: An examination of odor plume navigation strategies used by crayfish in natural habitats
- 2005-2006: The use of a new non-destructive sampling method to study antennule regeneration in different-sized animals.

Great Lakes College Association Grant 2005 to fund one day conference on neuroscience (with Susan Kennedy and Nestor Matthews)

Mellon Grant. 2005. Networking with neuroscience. Funds three visiting interdisciplinary speakers in 2006-2007 and a summer research cell in 2007.

PUBLISHED PAPERS:

- Mead, K. 2007.** The mechanics of fertilization. Peer reviewed, invited submission to *The Encyclopedia of the Rocky Intertidal*, eds M. Denny and S. Gaines. To be published by University of California Press Spring 2007. *Accepted; in press June 2006.*
- Mead, K. 2005.** An investigative laboratory exercise examining the endocrine and regulatory properties of neurons in the regenerating forelimbs of the axolotl *Ambystoma mexicanum*. *J. Undergrad. Neurosci. Educ.* **4**: A17-A21.
- Mead, K. S. 2005.** Reception before perception: how fluid flow affects odor signal encounter by olfactory sensors. *Marine Ecology Progress Series* **287**: 285-289.
- Mead, K., M. Wiley, M. A. R. Koehl, and J. R. Koseff. 2003.** Fine-scale patterns of odor encounter by the antennules of mantis shrimp tracking turbulent plumes in wave-affected and unidirectional flow. *J. Exp. Biol.* **206**: 195-207.
- Stacey, M. T., K. S. Mead, and M. A. R. Koehl. 2002.** Molecular capture by olfactory antennules: mantis shrimp. *J. Math. Biol.* **44**:1-30.
- Mead, K. and T. Weatherby. 2002.** Morphology of stomatopod chemosensory sensilla facilitates fluid sampling. *Inv. Biol.* **121**: 148-157.
- Mead, K. S. 2002.** From odor molecules to plume tracking: an interdisciplinary, multilevel approach to olfaction in stomatopods. *Integ. and Comp. Biol.* **42**: 258-264
- Mead, K. S. 2002.** Using lobster noses to inspire sensor design. *Trends in Biotech.* **20**:276-277.
- Denny, M. W., E. K. Nelson, and K. S. Mead. 2002.** Revised estimates of the effects of turbulence on fertilization in the purple sea urchin, *Strongylocentrotus purpuratus*. *Biol. Bull.* **203**: 275-277.
- Mead, K. and M. A. R. Koehl. 2000.** Stomatopod antennule design: the asymmetry, sampling efficiency, and ontogeny of olfactory flicking. *J. Exp. Biol.* **203**: 3795-3808.
- Mead, K., M. A. R. Koehl, and M. O'Donnell. 1999.** Stomatopod sniffing: the scaling of chemosensory sensilla and flicking behavior with body size. *J. Exp. Mar. Biol. Ecol.* **241**: 235-261.
- Mead, K. 1998.** Flow around aesthetascs during odor sampling in the Grass shrimp, *Palaemonetes vulgaris*. *Biol. Bull.* **195**: 184-185.

Mead, K. and M. Denny. 1995. Effects of hydrodynamic shear stress on the fertilization and early development of the purple sea urchin, *Strongylocentrotus purpuratus*. *Biol. Bull.* **188**: 46-56.

Mead, K. and D. Epel. 1995. Beakers versus breakers: how fertilisation in the lab differs from fertilisation in nature. *Zygote* **3**: 95-99.

SUBMITTED MANUSCRIPTS:

Wiley, M. B., Mead, K. S., Koseff, J. R., and Koehl, M. A. R. How do freely moving mantis shrimp use fine-scale odor information encountered by their antennules to track turbulent odor plumes in wave-affected and unidirectional flow? *Submitted to JEB November 2005.*

MANUSCRIPTS IN PREPARATION OR REVISION:

McCall, J. and Mead, K. Structural and functional changes in regenerating antennules in the crayfish *orconectes sanbornii* studied using a new, non-destructive method. *To be submitted to Biol. Bull. Summer 2006*

Mead, K. The effects of ambient flow on stomatopod odor sampling. *To be submitted to JEMBE Summer 2006.*

Mead, K., Hufnagle, J., and McCloskey, J. What happens to antennule structure and odor sampling behavior in *Orconectes immunis* as they grow? *To be submitted to Functional Ecology Summer 2006.*

Mead, K. The influences of surf-zone turbulence on the fertilization and early development of sixteen free-spawning invertebrates. *To be resubmitted to Biol. Bull.*

Mead, K. Hydrodynamic and biological mechanisms behind the effects of turbulence on fertilization and development. *To be resubmitted to Biol. Bull.*

Mead, K., and S. Palumbi. Surge channels as reproductive refuges for *Strongylocentrotus purpuratus* and other free-spawning invertebrates. *To be submitted to Biol. Bull.*

PUBLISHED ABSTRACTS:

Mead, K. 2006. Does antennule morphology of the crayfish *Orconectes virilis* correlate with the hydrodynamics of the flow environment? *The Ohio Journal of Science April Program Abstracts* 106: A55

Laughlin, M. '06 and Mead, K. 2006 Does field odor tracking performance in the crayfish *Cambarus robustus* vary with time of day? *The Ohio Journal of Science April Program Abstracts* 106: A35

McCall, J. '06 and Mead, K. 2006 Structural and functional features of antennule regeneration in the crayfish *Orconectes sanbornii*. *The Ohio Journal of Science April Program Abstracts* 106: A35

Sodagar, M. and Mead, K. 2006 Does antennule morphology vary between two populations of the crayfish *Cambarus cavatus*? *The Ohio Journal of Science April Program Abstracts* 106: A34

McCall, J. and Mead, K. 2005. Regeneration in crayfish antennules. *The Ohio Journal of Science April Program Abstracts* 105: A18

- Laughlin, M. and Mead, K. 2005.** Crayfish aesthetasc morphology in two northern species of *Orconectes virilis*. *The Ohio Journal of Science April Program Abstracts* 105: A22
- Mead, K. 2005.** How does ambient flow affect odor sampling in mantis shrimp? *The Ohio Journal of Science April Program Abstracts* 105: A38
- Mead, K. 2004** Physical tuning: Does antennule morphology correlate with the hydrodynamics of the flow environment in the crayfish *Orconectes virilis*? *Integ. and Comp. Biol.* 44(6):602
- Mead, K. 2004** How do you make peer review safe and effective in an undergraduate science classroom? *Integ. and Comp. Biol.* 44(6):728
- Mead, K. and Bruestle, A. E. 2004.** Crayfish aesthetasc structure is correlated with flow environment and position on the antennule. *The Ohio Journal of Science April Program Abstracts* 104: A33
- Hufnagle, J. and Mead, K. S. 2004.** How does odor sampling change as crayfish grow: High speed video studies of *Orconectes immunis*. *The Ohio Journal of Science April Program Abstracts* 104: A13
- McCloskey, J. and Mead, K. S. 2004.** How do the shape and arrangement of crayfish aesthetascs vary with body size and sex? *The Ohio Journal of Science April Program Abstracts* 104: A33
- Mead, K. S. and Bruestle, A. E. 2003.** Do Crayfish From Different Flow Environments Have Different Arrangements Of Chemosensors On Their Antennules? *Integ. and Comp. Biol.* **43(6)**: 1017.
- Mead, K. S. 2003.** Blood Sugar And Exercise: Inquiry-Based Laboratory Exercises About Homeostasis. *Integ. and Comp. Biol.* **43(6)**: 1029.
- McCloskey, J. and Mead, K. S. 2003.** How do the shape and arrangement of crayfish aesthetascs vary with body size and sex? *Integ. and Comp. Biol.* **43(6)**: 952.
- Mead, K. S. 2002.** Odor sampling in wavy environments: how does ambient flow affect olfactory flicking in stomatopods? *Integ. and Comp. Biol.* **42(6)**:1278.
- Mead, K. S. and Bruestle, A. E. 2002.** Do crayfish from different flow environments have different chemosensor arrangements on their antennules? *Integ. and Comp. Biol.* **42(6)**:1278.
- Mead, K. S. and Wiley, M. B. 2001.** How do benthic crustaceans trace odor plumes in waves? Integrating fine-scale odor structure with animal behavior. *Integ. and Comp. Biol.* **41(6)**: 1523
- Mead, K. S. 2001.** Can surge channels act as reproductive refuges for free-spawning invertebrates? *Integ. and Comp. Biol.* **41(6)**:1523
- Mead, K. S. 2000.** An interdisciplinary, multilevel approach to olfaction in stomatopods. *Am. Zool.* **40(6)**: 1127.
- Mead, K. S. 2000.** The mechanisms of turbulent action: how does hydrodynamic shear stress affect fertilization and development in sea urchins? *Am. Zool.* **40(6)**: 1127.
- Mead, K. 1998.** Size, speed, and stink: how the boundary layer surrounding stomatopod chemosensory setae during olfactory flicking changes as the animals grow. *Am. Zool.* **38(5)**: 82A.

- Mead, K. S. and M. A. R. Koehl. 1997.** Stomatopod olfactory performance scales with body size. *Am. Zool.* **37(5)**:129A.
- Mead, K. S. 1996.** The effects of hydrodynamic shear stress on the fertilization and early development of free-spawning marine invertebrates. *Am. Zool.* **36(5)**:6A.
- Mead, K. S. 1995.** The effect of short term and long-term exposure to turbulence on the fertilization and early development of the purple sea urchin. *Keystone Symposium on Molecular Ecology. J. Cell. Biol. Supp.* **19B**: 340.

CONFERENCE PRESENTATIONS

- Mead, K. 2006.** Does antennule morphology of the crayfish *Orconectes virilis* correlate with the hydrodynamics of the flow environment? *Ohio Academy of Science* April 22, 2006
- Laughlin, M. '06 and Mead, K. 2006** Does field odor tracking performance in the crayfish *Cambarus robustus* vary with time of day? *Ohio Academy of Science* April 22, 2006
- McCall, J. '06 and Mead, K. 2006** Structural and functional features of antennule regeneration in the crayfish *Orconectes sanbornii*. *Ohio Academy of Science* April 22, 2006
- Sodagar, M. and Mead, K. 2006** Does antennule morphology vary between two populations of the crayfish *Cambarus cavatus*? *Ohio Academy of Science* April 22, 2006
- Mead, K. 2005.** Does crayfish antennule morphology correlate with the hydrodynamics of the flow environment? Jacques-Monod conference, Roscoff, France
- Laughlin, M. '06 and Mead, K. 2005** Crayfish aesthetasc morphology in two northern populations of *Orconectes virilis* *Ohio Academy of Science* April 2, 2005
- McCall, J. '06 and Mead, K. 2005** Regeneration in crayfish antennules *Ohio Academy of Science* April 2, 2005
- Mead, K. 2005** How does ambient flow affect odor sampling in mantis shrimp? *Ohio Academy of Science* April 2005
- Mead, K. 2005*** How do you make peer review safe and effective in an undergraduate science classroom? *Society for Integrative and Comparative Biology.* January, 2005
- Mead, K. 2005** Physical tuning: Does antennule morphology correlate with the hydrodynamics of the flow environment in the crayfish *Orconectes virilis*?
- Mead, K. 2004.** From odor plume to antennule: do crayfish antennules vary with flow habitat as predicted to maximize odor molecule capture? *Association of Chemical Senses* Sarasota, FL April 24, 2004
- Mead, K. and Bruestle, A. E. 2004.** Crayfish aesthetasc structure is correlated with flow environment and position on the antennule. *Ohio Academy of Science* Youngstown, OH April 17, 2004
- Hufnagle, J. and Mead, K. S. 2004.** How does odor sampling change as crayfish grow: High speed video studies of *Orconectes immunis*. *Ohio Academy of Science* Youngstown, OH April 17, 2004

- McCloskey, J. and Mead, K. S. 2004.** How do the shape and arrangement of crayfish aesthetascs vary with body size and sex? *Ohio Academy of Science* Youngstown, OH April 17, 2004
- Mead, K. S. and Bruestle, A. E. 2004.** Do crayfish from different flow environments have different arrangements of chemosensors on their antennules? *Society for Interative and Comparative Biology* New Orleans, LA January 2004
- Mead, K. S. 2004.** Blood sugar and exercise: inquiry-based laboratory exercises about homeostasis. *Society for Interative and Comparative Biology* New Orleans, LA January 2004
- McCloskey, J. and Mead, K. S. 2004.** How do the shape and arrangement of crayfish aesthetascs vary with body size and sex? *Society for Interative and Comparative Biology* New Orleans, LA January 2004
- Mead, K. S. 2003.** Odor sampling in wavy environments: how does ambient flow affect olfactory flicking in stomatopods? *Society for Interative and Comparative Biology* Toronto, CA January 2003
- Mead, K. S. and Bruestle, A. E. 2003.** Do crayfish from different flow environments have different chemosensor arrangements on their antennules? *Society for Interative and Comparative Biology* Toronto, CA January 2003
- Mead, K. S. and Wiley, M. B. 2001.** How do benthic crustaceans trace odor plumes in waves? Integrating fine-scale odor structure with animal behavior. *Integ. and Comp. Biol.* **41(6)**: 1523
- Mead, K. S. 2001.** Can surge channels act as reproductive refuges for free-spawning invertebrates? *Integ. and Comp. Biol.* **41(6)**:1523
- Mead, K. S. 2000.** An interdisciplinary, multilevel approach to olfaction in stomatopods. *Am. Zool.* **40(6)**: 1127.
- Mead, K. S. 2000.** The mechanisms of turbulent action: how does hydrodynamic shear stress affect fertilization and development in sea urchins? *Am. Zool.* **40(6)**: 1127.
- Mead, K. 1998.** Size, speed, and stink: how the boundary layer surrounding stomatopod chemosensory setae during olfactory flicking changes as the animals grow. *Am. Zool.* **38(5)**: 82A.
- Mead, K. S. and M. A. R. Koehl. 1997.** Stomatopod olfactory performance scales with body size. *Am. Zool.* **37(5)**:129A.
- Mead, K. S. 1996.** The effects of hydrodynamic shear stress on the fertilization and early development of free-spawning marine invertebrates. *Am. Zool.* **36(5)**:6A.

TEACHING EXPERIENCE:

Denison University: Since Fall 2002. Assistant Professor in Animal Physiology. I currently teach Introduction to the Science of Biology, Comparative Animal Physiology, and Neurophysiology, all of which are 4 unit classes with labs. I have also taught General Zoology (Fall 2002, Fall 2003, Spring 2004) and have lectured in a team-taught Introduction to Neuroscience class Fall 2003. Mentored eight undergraduate research projects.

University of California, Berkeley: Spring 2001. Lecturer in Introductory Biology. Lectured and supervised laboratories in 4 unit class for nonmajors using Starr's *Biology: concepts and applications*.

Holy Names College: Fall 2001. Lecturer in Human Physiology. Lectured and ran laboratories in 3 unit class for nonmajors using Benjamin *et al.*'s *Human Biology*.

College of Alameda: Summer 2001. Lecturer in Human Physiology. Lectured and ran laboratories in intensive 4 unit class for majors (transfer credit to UC system) using Fox's *Human Physiology*.

University of California, Berkeley: 1996-2002. Research supervisor: directed six undergraduate students in numerous research projects. Lectured in research seminars.

Various Institutions: 1996-present. Guest lectures in physiology, marine ecology, and invertebrate zoology.

Monterey Bay Aquarium: 1990-1996. Volunteer in Education and Research Departments: interpreted exhibits, lectured on kelp forest ecology and on plankton, helped design new exhibits, trained volunteers and high school teachers.

Stanford University: 1990-1995. Senior Teaching Assistant in ecology, biology of the oceans, and invertebrate zoology: developed ecology curriculum, designed and monitored student field work and lab projects, lectured, organized weekend-long field- trips, prepared worksheets, collected material for labs, ran labs and review sessions, wrote exam questions, graded lab reports and exams.

Jasper Ridge Biological Preserve: 1990-1995. Gave tours of the preserve highlighting its wildflowers, geology, watersheds, birds, or anthropology.

Science-by-Mail: 1991-1994. Mentored groups of students completing Science-by-Mail projects (administered by The Science Museum, Cambridge, MA.)

Science Fair: 1992-1994. Judge 1992, Head Judge 1993, 1994.

Los Arboles Middle School, Seaside, CA: 1994. Ran workshops on Science Fair projects.

Monterey Lyceum: 1994. Ran workshops on how to do Science Fair projects.

New England Aquarium: 1988-1990. Volunteer in Education Department: interpreted exhibits, lectured on fish, coral reef ecology.

Uppsala University: 1986-1988. Tutored English

Williams College: 1985-1986. Teaching Assistant in Physics and Math.

OTHER PROFESSIONAL ACTIVITIES:

GLCA Neuroscience Conference April 1, 2006. Received GLCA funding (with S. Kennedy and N. Mathews) to run one-day conference for GLCA members on undergraduate neuroscience, treating such topics as neuroscience studies, moving from minor to major to department, low-budget neuroscience labs, etc.

Women in Science Day March 2005: Ran workshop on "Discovering your senses"

Invited talks at meetings (symposium speaker):

Society of Integrative and Comparative Biology 2001.

Dialog II symposium (American Society for Limnology and Oceanography) 1997

Developmental Biology of Sea Urchins 1996.
 Western Society of Naturalists 1994.
 Larval Ecology 1992.

Presentations:

American Association for Chemical Senses (2004)
 American Society of Limnology and Oceanography (1999, 2001).
 Bay Area Biomechanics (1993, 1994, 1997, 1998)
 Jacques-Monod Conference on the Physico-Chemical Ecology of Organisms
 (2005)
 MBL General Meetings (1998)
 Mechanics of Plants, Animals, and their Environments: Integrated Perspectives
 (1998)
 Ohio Academy of Science (2004, 2005, 2006)
 Society for Experimental Biology (2000)
 Society for Integrative and Comparative Biology (1996, 1998, 1999, 2001, 2002,
 2003, 2004)
 West Coast Regional Developmental Biology Conference (1996)
 Western Society of Naturalists (1992, 1994, 1995, 1997, 1999)

Reviewing:

Reviewed articles for *American Naturalist*, *Biological Bulletin*, *Invertebrate
 Reproduction and Development*, *Limnology and Oceanography*, *Journal of
 Phycology*, *Journal of Experimental Biology*, *Annales Zoologici Fennici*, and
Animal Behavior
 Reviewed grant proposals for NSF (Oceanography and Neuroscience sections).

Committee work:

Organizing Fall Faculty Conference on Faculty and student surveys 2006 (with
 J. Rettig and S. Davis).
 Organized Fall Faculty Conference on Quantitative Literacy 2005 (with J. Rettig
 and S. Davis).
 Faculty Development Committee, Denison, Spring 2004, Spring 2005-present
 Women's Studies Committee, Denison, Fall 2004-present
 Human Physiology Search Committee (Chair) 2006
 Cell Biologist Search Committee, Denison 2003
 Zoologist Search Committee, Denison 2003
 Developmental Biologist Search Committee, Denison 2002
 Diving Safety Board, University of California, Berkeley 1996-2000.

Other:

Chaired meeting sessions at Ohio Academy of Science 2005, 2006
 Chaired meeting sessions at WSN, SICB 2002, 2003
 Faculty Leader in Denison Outdoor Orientation Fall 2005
 Local representative for Duke University Marine Labs at Denison University
 2003-Present
 Local representative for Williams/Mystic Program at Denison University
 Judged presentations for student awards at WSN and SICB 2002-2005.
 IES familiarization trip to Australia 2004
 Ran admissions workshop for prospective students at Denison University, 2002

Diving:

Certified Scientific Diver.

Foreign Languages:

Swedish, French, Spanish.