

Curriculum Vitae: SARA M. LINDSAY

Assistant Professor
School of Marine Sciences, 5751 Murray Hall
University of Maine, Orono, ME 04469

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EDUCATION

Marine Biological Laboratory, Woods Hole, MA, Analytical & Quantitative Light Microscopy (2003)
University of South Carolina, Ecology, Ph.D. (1994)
University of Washington, Biology of Polychaetes (1989)
Smith College, Biology, A.B. *Cum laude* (1988)

HONORS & AWARDS

Winner, Color Photomicrograph, Ralph and Mildred Buchsbaum Prize for Excellence in Photomicrography , sponsored by the American Microscopical Society (Jan, 2006)
Honorable Mention, 2005 Olympus BioScapes International Digital Imaging Competition (Oct, 2005)
Runner-Up, Color Photomicrograph, Ralph and Mildred Buchsbaum Prize for Excellence in Photomicrography , sponsored by the American Microscopical Society (Jan, 2005)
Promoted to full membership, Sigma Xi (2004)
NIH Individual National Research Service Award (1995-96)
Vernberg Award for Outstanding Graduate Student in Biological Sciences, Univ. South Carolina (1994)
Univ. South Carolina Outstanding Graduate Student Award (1994)
Best Student Paper, Division of Invertebrate Zoology, American Society of Zoologists (1992)
NSF Graduate Research Fellowship (1989-1993)
Election to Sigma Xi (1988)
Woods Hole Oceanographic Institution Summer Student Fellowship (1987)

PROFESSIONAL APPOINTMENTS

Sept. 2004 – Present, Assistant Professor of Marine Sciences, tenure-track, Univ. of Maine
1998 - 2004, Assistant Research Professor of Marine Sciences, University of Maine
2001 - 2003, Undergraduate Coordinator, School of Marine Sciences, Univ. Maine (50% time)
1999 - 2001, Education Coordinator, Maine Sea Grant Program, University of Maine (50% time)
1996 -1998, Postgraduate Research Biologist, Scripps Institution of Oceanography
Visual Coordination of Bioluminescence
1994- 1996, NIH Postdoctoral Fellow (NRSA Award), University of South Carolina
Molecular Ontogeny of Chemoreception in Zebrafish

PEER-REVIEWED JOURNAL PUBLICATIONS

*undergraduate coauthor, †graduate student coauthor

Lindsay, S.M. Submitted. Ecology & Biology of Chemoreception in Polychaetes. *Zoosymposia*

Tsie[†], M.S., P.D. Rawson & **S.M. Lindsay**. 2008. Immunolocalization of a Gαq protein to the chemosensory organs of *Dipolydora quadrilobata* (Polychaeta: Spionidae). *Cell & Tissue Research* 333:469-480, DOI 10.1007/s00441-008-0660-2

Forest[†], DL. and **S.M. Lindsay**. 2008. Observations of serotonin and FMRFamide-like immunoreactivity in palp sensory structures and the anterior nervous system of spionid polychaetes. *Journal of Morphology* 269:544-551, DOI: 10.1002/jmor.10605

Lindsay, S.M., J.L. Jackson*, and D.L. Forest[†]. 2008. Morphology of anterior regeneration in two spionid polychaete species: implications for feeding efficiency. *Invertebrate Biology*. 127: 65-79. DOI:10.1111/j.1744-7410.2007.00114.x

Rawson, P.D., P. Yund and **S.M. Lindsay**. 2007. Comment on Divergent induced responses to an invasive predator in marine mussel populations. *Science* 316:53b DOI 10.1126/science.1135099

Lindsay, S.M., J.L. Jackson*, and S.Q. He*. 2007. Anterior Regeneration in the spionid polychaetes *Dipolydora quadrilobata* and *Pygospio elegans*. *Marine Biology* 150:1161-1172. (Published online Aug. 2006) DOI 10.1007/s00227-006-0431-0

Lindsay, S.M. and R.G. Vogt. 2004. Behavioral Responses of newly hatched zebrafish (*Danio rerio*) to Amino Acid Chemostimulants. *Chemical Senses* 29: 93-100

Lindsay, S.M., T.J. Riordan[†], Jr, and D. Forest[†]. 2004. Identification and activity-dependent labeling of peripheral sensory structures of a spionid polychaete. *Biological Bulletin* 206:65-77.

[†]Riordan, Jr., T.J. and **S.M. Lindsay**. 2002. Feeding Responses to particle-bound cues by a deposit-feeding spionid polychaete, *Dipolydora quadrilobata* (Jacobi 1883). *Journal of Experimental Marine Biology and Ecology* 277:79-95

Wetthey, D. S. , **S. M. Lindsay**, S.A. Woodin, and R. L. Marinelli. 2001. Population Consequences of Intermediate Disturbance: Recruitment, Browsing Predation, and Geochemistry. p. 141-157. In Aller, Josephine Y., Sarah A. Woodin, and Robert C. Aller (eds.), *Organism-Sediment Interactions*. The Belle W. Baruch Library in Marine Science Number 21, University of South Carolina Press, Columbia, SC.

Lindsay, S.M., T.M. Frank, J. Kent, J. Partridge, and M.I. Latz. 1999. Spectral sensitivity of vision and bioluminescence in the midwater shrimp, *Sergestes similis*. *Biol. Bull.* 197:348-360

Woodin, S.A., R.L. Marinelli and **S.M. Lindsay**. 1998. Process-specific cues for recruitment in sedimentary environments: Geochemical signals? *Journal of Marine Research*. 56: 535-558

Woodin, S.A., **S.M. Lindsay** and D.E. Lincoln. 1997. Biogenic bromphenols as negative recruitment cues. *Marine Ecology Progress Series*. 157: 303-306

Vogt, R.G., **S.M. Lindsay**, C.A. Byrd, and M. Sun. 1997. Spatial patterns of olfactory neurons expressing specific odor receptor genes in 48 hour old embryos of the zebrafish, *Danio rerio*. *Journal of Experimental Biology*. 200: 433-443.

Lindsay, S. M., D. S. Wetthey, and S. A. Woodin. 1996. Modeling browsing predation, infaunal activity, and recruitment in marine soft-sediment habitats. *American Naturalist*.148(4):684-699

Lindsay, S. M. and S. A. Woodin. 1996. Quantifying sediment disturbance by browsed spionid polychaetes: implications for competitive and adult-larval interactions. *Journal of Experimental Marine Biology & Ecology*. 196: 97-112.

Lindsay, S. M. and S. A. Woodin. 1995. Tissue loss induces switching of feeding mode in spionid polychaetes. *Marine Ecology Progress Series* 125:159-169.

Woodin, S. A., **S. M. Lindsay** and D. S. Wetthey. 1995. Process-specific recruitment cues in marine sedimentary systems. *Biological Bulletin* 189:49-58.

Lindsay, S. M. and S. A. Woodin. 1992. The effect of palp loss on feeding behavior of two spionid polychaetes: Changes in exposure. *Biological Bulletin* 183:440-447.

Weinberg, J.R., V.R. Starczak, C. Mueller, G.C. Pesch, and **S.M. Lindsay**. 1990. Divergence between populations of a monogamous polychaete with male parental care: premating isolation and chromosome variation. *Marine Biology* 107:205-213.

PEER REVIEWED EDUCATIONAL WEBSITE

Fegley, J.C. and **S.M. Lindsay**. 2006. WebQuest: Sensory Biology and the Plight of the Right Whales. URL: <http://www.marine.maine.edu/~slindsay/Whaleweb/whalehome.htm>. Published by *The Bridge: Ocean Sciences Education Center* ** (<http://www.vims.edu/bridge/>), Nov. 2006.

**All websites and materials posted or linked on *The Bridge* undergo a dual peer review by educators and scientists. The Bridge is highly selective and only publishes the best ocean education resources available online.

This marine sensory biology webquest was developed to fulfill the outreach component of NSF grant OCE 0221229 to S. M. Lindsay and P.D. Rawson.

OTHER PUBLICATIONS

Lindsay, S.M. 2004. Reading Mud: The language of an intertidal mudflat. *The Gulf Stream Newsletter*, Summer 2004, p. 3-6. Published by the Gulf of Maine Marine Education Association.

Lindsay, S.M. 1998. *Library of the Oceans, Vol. 8. The Shallow Seas*. Grolier Educational, Danbury CT. 64 pages.

PRESENTATIONS AT RECENT MEETINGS & PUBLISHED ABSTRACTS (LAST FIVE YEARS)

*undergraduate coauthor, †graduate student coauthor

Lindsay S, Chasse J, Butler RA, Morrill W, Van Beneden RJ. Stage-specific effects of acute exposure to pesticides on the sot-shell clam, *Mya arenaria*. North Atlantic Chapter-Society for Environmental Toxicology and Chemistry regional meeting, Bar Harbor ME June 2008 (Lindsay presented)

Lindsay SM. Histology meets Ecology: using methyl green staining to improve estimates of infaunal injury rates. Benthic Ecology Meeting, Providence RI, April 2008

Van Beneden RJ, **Lindsay S**, Chasse J, Butler RA, Morrill W, Gardner GR. Stage-specific effects of acute Exposure to Pesticides on the soft-shell clam, *Mya arenaria*. Aquatic Animal Models of Human Disease Conference, presented by VanBeneden January, 2008

Lindsay, S.M., Forest, D.L., Riordan, T, Tsie, M. Making sense of worm senses: an integrated approach to studying chemoreception in spionid polychaetes. Presented August, 2007 at the 9th International Polychaete Conference, Portland, ME.

Lindsay, S.M. Comparative chemoreception and the polychaete perspective: ecology and biology of chemoreception in marine worms. Presented June, 2007 at the Catalysis Meeting: Origins and Evolution of Chemoreception, sponsored by the National Evolutionary Synthesis Center, Durham, NC. **(Invited)**

Lindsay, S.M. Disturbance, Sublethal predation and infaunal injury in marine soft sediments: Do species-specific responses matter? Presented April, 2006 at the State of Marine Ecology in Maine Symposium, hosted by Bowdoin College, ME **(Invited)**

Lindsay, S.M. New integrative marine science courses at the University of Maine build skills through inquiry, writing and critical thinking. Presented June, 2006 at the National Summer Conference Integrating Science and Mathematics Education Research into Teaching, hosted by the University of Maine Center for Science and Mathematics Education Research. **(Invited)**

†Tsie, M.; **Lindsay, S.** Immuno-localization of a putative chemosensory G-protein alpha-subunit in a spionid polychaete. Society for Integrative and Comparative Biology Meeting, January 2006

Lindsay, S.M., *Jackson, J.L., *He, S.Q, †Forest, D. Anterior tissue and nervous system regeneration in spionid polychaetes. Sigma Xi annual meeting, Seattle, WA November, 2005

.†Forest, D; **Lindsay, S.** Serotonin may influence escape response in a polychaete tube-worm. Society for Integrative and Comparative Biology, 2005 **(Integr. and Comp. Biol. 44(6):696)**

Tsie †, M; Rawson, P; **Lindsay, S.** Molecular Cloning of Putative Chemosensory G proteins from a Spionid Polychaete. Society for Integrative and Comparative Biology, 2005 **(Integr. and Comp. Biol. 44(6):756)**

Lindsay, S.M.; Jackson*, J.L.; He*, S.Q.; Forest, D †. Losing heads & making connections: anterior regeneration in spionid polychaetes. Society for Integrative and Comparative Biology, 2005. **(Integr. and Comp. Biol. 44(6): 593)**

Forest, S. † and **S.M. Lindsay.** Comparative morphology of the nervous system and peripheral sensory cells in three species of spionid polychaetes. Society for Integrative and Comparative Biology, 2004. **(Integr. and Comp. Biol. 43(6): 1035)**

Tonneson, J. †, R.A. Butler, **S. Lindsay**, G.R. Gardner and R.J. Van Beneden. Growth inhibition of early life stages of *Mya arenaria* by (2,4-D). 24th Society of Environmental Toxicology and Chemistry National Meeting, 2003.

Tonneson, J.M.[†], R.A. Butler, **S.M. Lindsay**, G.R. Gardner and R.J. Van Beneden. Exposure of soft shell clams (*Mya arenaria*) during early life stages to the herbicide, 2, 4-dichlorophenoxyacetic acid (2, 4-D). 12th Pollutant Responses in Marine Organisms International Meeting (2003)

RESEARCH & INFRASTRUCTURE FUNDING IN THE LAST 5 YEARS:

Title: Ecology of Injury in Marine Sedimentary Habitats: Effects of repeat injury on infaunal condition and sediment bioturbation.

PI: **Sara Lindsay**

Agency/Program: NSF/OCE Biological Oceanography

Award: \$381, 823 Dates: 09/01/2008-08/31/2011

Title: Histology meets Ecology: Developing and field testing a staining method to assess the frequency of injury in marine worms

PI: **Sara Lindsay**

Agency/Program: University of Maine Summer Faculty Research Award

Award \$7500 Dates: Summer 2007

Title: Linking bioturbation and sensory biology: Chemoreception mechanisms in deposit-feeding polychaetes

PI: **Sara Lindsay** Co-PI: Paul Rawson

Agency/Program: NSF/OCE Biological Oceanography

Award: \$ 342,663 Dates: 09/01/02 – 08/31/06

Title: Assessing potential population-level effects of pesticide and herbicide toxicity to softshell clams in Maine

PI: Rebecca Van Beneden Co-PI: **Sara Lindsay**

Agency/Program: Maine Sea Grant Program

Award: \$163,358 Dates: 02/01/02 – 01/31/03

Title: Effects of Biota on High-frequency Acoustic propagation: completion of SAX99 Analysis

PI: Peter Jumars Co-PI: **Sara Lindsay**

Agency/Program: Office of Naval Research

Award: \$ 32,521 Dates: 10/01/2001-01/31/2003

EDUCATION & OUTREACH FUNDING IN THE LAST 5 YEARS:

Title: Bioethics Forum: Interactive Panel Model, Sigma Xi Chapter Collaboration by Pace University, University of Maine and University of Central Florida

PI: Charlene Hoegler (Pace University) Co-PIs: **Sara Lindsay** (UMaine), Leslie Lieberman (UCF)

Agency/Program: Sigma Xi, The Scientific Research Society/ Multi-chapter Collaboration Grant

Award: \$2000 (to Pace U.) Dates: 07/01/2006 – 06/30/2008

Title: Grant to Support Sigma Xi Distinguished Scientist Seminar Fall 2004

Submitted by: **Sara Lindsay** and Francois Amar for the University of Maine Chapter Sigma Xi and School of Marine Sciences

Program: University of Maine Cultural Affairs/Distinguished Lecture Series Committee

Award: \$550 Dates: 04/26/04 – 12/31/04

Title: The Silver Wake: An Integrative, Community-based Curriculum for Middle-School Environmental Education

PI: **Sara Lindsay** Co-PI: Esperanza Stancioff (UMCE)

Agency/Program: US Environmental Protection Agency, Environmental Education

Award: \$123,438 Dates: 01/01/2002- 06/30/2004

STUDENTS MENTORED

Graduate Thesis advisor for :

Timothy J. Riordan, Jr. (M.S., Marine Biology, Univ. Maine, August 2001)

David Forest (M.S., Marine Biology, Univ. Maine, May 2005)

Marlene Tsie (M.S., Marine Biology, Univ. Maine, August 2006)

Megan McOsker (Master of Science Teaching, Univ. Maine, in progress)

Graduate Thesis Committee member for

Sarah Gerken (PhD, Oceanography, Univ. Maine, 2000)

Susan Hayhurst (M.S., Marine Biology, Univ. Maine, 2001)

Anne Simpson (M.S., Oceanography, Univ. Maine, 2003)

Jennifer Albright (M.S., Marine Biology, Univ. Main, Dec. 2006)

Erin Fisher Owen (Ph.D., Marine Biology, Univ. Maine, Aug. 2008)

Jody Beers (Ph.D., Marine Biology, Univ. Maine, in progress)

Undergraduate Students Mentored:

Kristin Tomlinson (University of Maine, Senior Capstone project, 2001)

Jennifer Jackson (University of Maine, Honors Thesis Advisor, 2003)

Matthew Babineau (University of Maine, Senior Capstone project, 2005)

Justin Barnes (University of Maine, BMMB, Senior Capstone project, 2005)

Elizabeth Ann Pomerleau (University of Maine, Member Honors Thesis committee, 2005)

Gordon Lorensen (University of Maine, Senior Capstone project, 2006)

Amanda Brooks (University of Maine, Senior Capstone project, 2006)

Andrea Dufour (University of Maine, Senior Capstone project, in progress)

Shotaro Takahashi (University of Maine, Honors Thesis committee, in progress)

Erin Wilkinson (University of Maine, Member Honors Thesis committee, in progress)

High School Students Mentored

Lucy Gross (Bangor H.S., summer MERITS intern)

Si Qing He (John Bapst H.S., summer MERITS intern)

Jennifer Jackson (Bangor H.S., summer MERITS intern)

SERVICE

Manuscripts Reviewed:

(average 3 to 5 manuscripts reviewed per year from among the following journals)

Animal Behavior; Aquatic Biology; Biological Bulletin; Deep Sea Research, Part I ; Invertebrate Biology, Journal of Experimental Biology; Journal of Experimental Marine Biology and Ecology; Journal of Marine Research; Journal of Morphology; Limnology & Oceanography; Marine Biology; Marine Ecology Progress Series; New Zealand Journal of Marine and Freshwater Research; Sea Grant National Conference on Marine Bioinvasions

Grants reviewed:

(average 2 to 3 proposals reviewed per year from among the following agencies/programs)

Norwegian Research Council; NSF Office of Polar Programs; NSF/OCE Biological Oceanography

NSF/DEB Population Biology; NSF Major Research Instrumentation, Member NSF Advisory Panel, Major Research Instrumentation Panel, Biological Sciences Directorate (1999-2000); WHOI/MIT Sea Grant Program

Textbooks reviewed:

Introduction to Ecology, by Begon, Harper, Townsend & Vanderklein, Blackwell Science, Inc.

Service to Professional Societies:

President (2004-08), Vice President (2003-04), University of Maine Chapter, Sigma Xi

Nominating Committee, American Microscopical Society (2008)

Chair, Student Awards Committee, Division of Invertebrate Zoology, Society for Comparative and Integrative Biology (2002-2005)

Student presentation judge, Division of Invertebrate Zoology, Society for Comparative and Integrative Biology (2002-2006)

University of Maine Service:

University of Maine Graduate Board (SMS representative, 2006 - present)

University of Maine Graduate Board Executive Committee (2007- present)

University of Maine Graduate Curriculum Committee (2006)

School of Marine Sciences Graduate Admissions Committee (2004 - 2006)

Professional Employee Promotion Review Committee for Maine Sea Grant (2006)

School of Marine Sciences Curriculum Committee

School of Marine Sciences Policy Advisory Committee

College of Natural Sciences, Forestry & Agriculture Undergraduate Curriculum Committee

Participant, Coastal Stewardship and marine Education panel, NH/ME Sea Grant PAT Review (2001)

Participant, Maine Sea Grant Program Review

Outreach Activities:

Glowing Fish and Living Light, Old Town Elementary School, Old Town ME (2007)

Invited Participant, Strategic Visioning Workshop for National Ocean Sciences Bowl program, sponsored by CORE, Washington DC (November 2006)

Participant, science concept mapping for NSF Funded Centers for Ocean Sciences Education Excellence (COSEE)-Ocean Systems project (2005-2006)

Participant, former Regional Coordinator (2000) & Member Steering Committee, Northern New England Regional National Ocean Sciences Bowl (1999-2004, 2006)

Field Guide, Old Town Elementary School 3rd grade field trip to Darling Marine Center (2005)

Bioluminescence workshop, Stillwater Montessori School, Old Town ME (2004)

Bioluminescence: Light in the Sea, 6th Grade Science Day at UM-NSFA (2004)

Bioluminescence, Old Town Elementary School and Viola Rand School, Bradley, ME (2004)

Introduction to Intertidal Ecology, Leonard Middle School, Old Town, ME (2003)

Be a Sandy Shore Sleuth, Maine Beaches Conference, Saco, ME (2003)

Ecology of Sand Shores, Herbert Gray Elementary School, Old Town, ME (2003)

Bioluminescence workshop, Herbert Gray Elementary School, Old Town, ME (2002)

Maine State Science Fair (2002)

Bioluminescence workshop, Stillwater Montessori School, Old Town, ME (2002)

Community Reading Day Volunteer, Herbert Gray School, Old Town ME (2001)

Community Reading Day Volunteer, Helen Hunt School , Old Town ME (2000)
Participant, Expanding Your Horizons, University of Maine (1999, 2002)

Other Activities:

Developed content for Maine Sea Grant Program education website (www.seagrant.umaine.edu)
Authored radio spots on Bioluminescence and Shipworms for Maine Public Radio Sea & Shore Program