

SARAH N. GIDDINGS

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EDUCATION

Ph.D. Civil and Environmental Engineering, Stanford University, *December 2010*
Thesis: Dynamics of a shallow, macrotidal, strongly stratified estuary
M.S. Civil and Environmental Engineering, Stanford University, *June 2005*
B.S. Civil and Environmental Engineering, University of California, Berkeley, *December 2003*
EIT Certified, Certificate # 11749, *July 23, 2003*

RESEARCH & PROFESSIONAL EXPERIENCE

Assistant Professor at the University of California, San Diego, Scripps Institution of Oceanography, Integrated Oceanography Division (*1/14 - current*)

NSF Ocean Sciences Postdoctoral Research Fellow with sponsoring scientist Dr. Parker MacCready at the University of Washington (*1/13 - 1/14*)

- Investigating ocean/estuary exchange processes such as the influence of river plumes and estuarine exchange flow on nearshore transport
- Designing an interactive museum exhibit to introduce underrepresented minorities and socioeconomic groups to nearshore oceanography and estuarine processes

Postdoctoral Research Associate with Dr. Parker MacCready, University of Washington (*1/11 - 1/13*)

- Investigated transport processes that influence harmful algal bloom formation and spatial distribution in the Pacific Northwest utilizing numerical simulations in ROMS
- Investigated interannual variability in nearshore transport processes

Graduate Ph.D. Research with advisor Dr. Stephen Monismith and Dr. Derek Fong, Department of Civil and Environmental Engineering, Stanford University (*9/05 - 12/10*)

- Investigated dynamics specific to shallow, macrotidal salt-wedge estuarine systems
- Investigated the effects of intertidal mudflats and shoal regions on transverse circulations, frontogenesis, and mixing within the estuarine environment
- Designed and led several in-situ experiments in the Snohomish River, Everett, WA and South San Francisco Bay, CA as part of interdisciplinary, multi-university research efforts

Graduate M.S. Research with Dr. Jeffery Koseff and Ph.D. student Johanna Rosman, Department of Civil and Environmental Engineering, Stanford University (*Winter 2005*)

- Investigated the effects of hydrodynamics on kelp communities and the influence of kelp forests on mean currents and turbulence

Engineering Intern: Stetson Engineers Inc. water resources consulting engineers (*1/04 - 8/04*)

- Investigated groundwater and surface water interactions in a small watershed including field surveys and collaborating with geotechnical engineers on a groundwater model
- Designed an interactive environmental engineering reference and client database

**PROFESSIONAL
EXPERIENCE
CONTINUED**

Research Assistant for Dr. Mark Stacey, Department of Civil and Environmental Engineering, U.C. Berkeley (6/03-12/03)

- Examination of San Francisco Bay fronts and mixing parameters through the combination of time series georeferenced, projected surface images and water column ADCP data

Intern: Alameda County Water District Operations Department – drinking water treatment and distribution agency (1/02 – 8/02)

- Research in various areas of treatment plant optimization including field work; lab work; data collection, extraction, and analysis; and writing proposals and reports
- Proposed and completed a full-scale study of cationic polymers and a reservoir tracer test
- Collaborated with engineers, interns, and water treatment plant operators daily

Research Assistant for Dr. Robert Harley, Department of Civil and Environmental Engineering, U.C. Berkeley (6/01-6/02)

- Investigated decadal changes in motor vehicle emissions culminating in a paper

PUBLICATIONS

McKeon, M.A., A.R. Horner-Devine, and **S.N. Giddings** (in review), " Seasonal changes in structure and dynamics in an urbanized salt wedge estuary." *Estuaries and Coasts*.

Giddings, S.N., P. MacCready, B.M. Hickey, N.S. Banas, K.A. Davis, S.A. Siedlecki, V.L. Trainer, R.M. Kudela, N.A. Pelland, and T.P. Connolly (2014), "Hindcasts of potential harmful algal bloom transport pathways on the Pacific Northwest coast." *J. Geophys. Res.*, doi: 10.1002/2013JC009622.

Giddings, S.N., S.G. Monismith, D.A. Fong, and M.T. Stacey (2014), "Using depth-normalized coordinates to examine mass transport residual circulation in estuaries with large tidal amplitude relative to the mean depth." *J. Phys. Oceanogr.*, 44, 128-148, doi: 10.1175/JPO-D-12-0201.1.

Giddings, S.N., D.A. Fong, S.G. Monismith, C.C. Chickadel, K.A. Edwards, W.J. Plant, B. Wang, O.B. Fringer, A.R. Horner-Devine, and A.T. Jessup (2012), "Frontogenesis and frontal progression of a trapping-generated estuarine convergence front and its influence on mixing and stratification," *Estuaries and Coasts*, 35(2), 665-681, doi: 10.1007/s12237-011-9453-z.

Giddings, S.N., D.A. Fong, and S.G. Monismith (2011), "Role of straining and advection in the intratidal evolution of stratification, vertical mixing, and longitudinal dispersion of a shallow, macrotidal, salt wedge estuary." *J. Geophys. Res.*, 116, C03003, doi: 10.1029/2010JC006482.

Wang, B, **S.N. Giddings**, O.B. Fringer, E.S. Gross, D.A. Fong, and S.G. Monismith (2011), "Modeling and understanding turbulent mixing in a macrotidal salt wedge estuary." *J. Geophys. Res.*, 116, C02036, doi: 10.1029/2010JC006135.

Plant, W.J., R. Branch, G. Chatham, C.C. Chickadel, K. Hayes, B. Hayworth, A. Horner-Devine, A. Jessup, D.A. Fong, O.B. Fringer, **S.N. Giddings**, S.G. Monismith, and B. Wang (2009), "Remotely sensed river surface features compared with modeling and in-situ measurements," *J. Geophys. Res.*, 114, C11002, doi: 10.1029/2009JC005440.

Wang, B, O.B. Fringer, **S.N. Giddings**, and D.A. Fong (2009), "High-resolution simulations of a macrotidal estuary using SUNTANS." *Ocean Modelling*, 26(1-2), 60-85, doi:10.1016/j.ocemod.2008.08.008.

- PUBLICATIONS CONT'D** Harley, R.A, L.C. Marr, J.K. Lehner and **S.N. Giddings** (2005), "Changes in Motor Vehicle Emissions on Diurnal to Decadal Time Scales and Effects on Atmospheric Composition," *Environmental Science & Technology*, 39(14), 5356-5362, doi: 10.1021/es048172+.
- INVITED TALKS**
- "Mixing and interaction of freshwater plumes in the coastal ocean," talk at the Stanford University Fluid Mechanics Seminar, 1 April 2014.
 - "How birds, trash, a few field mistakes, and some luck have shaped my scientific interests." "Ignite" talk at the Coastal and Estuarine Research Federation meeting, 4 Nov 2013.
 - "What determines the strength of the far-field plume front?" discussion lead at the Workshop on River Plume Mixing, 3 Oct 2013.
 - "Coastal/Estuarine Interactions: modification of estuarine residual circulation by processes ranging from local turbulent mixing to offshore oceanic conditions and river plumes," UCLA Department of Atmospheric and Oceanic Sciences, 20 Feb. 2013.
San Francisco State University Geosciences Department, 5 Feb. 2013.
Scripps Institution of Oceanography, 23 Jan. 2013.
 - "Coastal Ocean & Estuarine Dynamics: what drives physical transport processes in the nearshore environment," Cal Poly San Luis Obispo Physics Department, 29 Jan. 2013.
 - "Transport processes in estuaries and the coastal ocean,"
Friday Harbor Labs, 22 Jun. 2012.
Virginia Institute of Marine Sciences, 23 Apr. 2012.
University of Florida, 16 Mar. 2012.
 - "Shoal/channel interactions and frontogenesis in estuarine systems," USACE Coastal & Hydraulics Laboratory, 13 July 2009.
- STUDENTS**
- Committee member**, Julia Fiedler, UCSD, Scripps Institution of Oceanography, PhD candidate
 - Committee member**, Maggie McKeon, UW Civil & Environmental Engineering, PhD candidate
 - Undergraduate research advisor**, Ross Dijulio, UW Physics Department, Oct. 2012 - current
 - Undergraduate research advisor**, Campbell Glass, UW Oceanography, *June 2013 – Nov. 2013*
- TEACHING EXPERIENCE**
- Guest Instructor** SIO 219 Observational Seminar, *25 April, Spring 2014*
 - Guest lecture** UW OCEAN569 Coastal Oceanography, *Spring 2013*
 - Presented a lecture on coastal modeling to an interdisciplinary student group
 - Instructor** UW CEE474 Hydraulics of Sediment Transport, *Spring 2013*
 - Head instructor for a graduate level sediment transport course
 - Instructor** Stanford CEE262B Transport and Mixing in Surface Water Flows, *Winter 2010*
 - Head instructor for a graduate level environmental fluids course
 - Teaching Assistant** Stanford CEE262E Lakes & Reservoirs, *Spring 2009*
 - Led a field class on hydrodynamic sampling in the Kranji Reservoir, Singapore
 - Teaching Assistant** Stanford CEE200A Teaching of Civil and Environmental Engineering, *Fall 2008*
 - Prepared and led discussions and assignments aimed at helping first time TAs set teaching goals, obtain constructive feedback, and improve upon their teaching skills
 - Teaching Assistant** Stanford CEE262E Lakes & Reservoirs, *Spring 2008*
 - Held weekly office hours and graded homework assignments
 - Prepared Field equipment for a joint Stanford/Singapore field experiment

**TEACHING
CONT'D**

Instructor Stanford CEE364X Data Analysis Methods in Environmental Fluid Mechanics, *Winter 2007*

- Designed the syllabus and organized a new graduate level data analysis course covering data analysis techniques particular to environmental fluid mechanics

Teaching Assistant Stanford CEE262A Hydrodynamics, *Fall 2005 and Fall 2006*

- Taught one review lecture a week covering basic hydrodynamic topics
- Held weekly office hours with Stanford and Singapore students (via teleconference)
- Graded homework assignments, prepared laboratory demonstrations, and course website

**FELLOWSHIPS
AND HONORS**

- NSF Ocean Sciences Postdoctoral Research Fellowship, *Jan 2013*
- UW Postdoctoral Association research symposium award for best talk, *2011*
- Outstanding contribution to manuscript review, Coastal and Estuarine Research Federation, *2011*
- Society of Women Engineers Teaching Excellence Award, *2010*
- Physics of Estuaries and Coastal Seas Conference award for best oral presentation, *2008*
- Achievement Rewards for College Scientists Foundation Fellowship *2008-2009*
- National Science Foundation Graduate Research Fellowship *2004-2007*
- Stanford Graduate Fellowship, NSF-Wells Family Fellow, *2004*
- Departmental Citation, U.C. Berkeley, *2003*
- Represented U.C. Berkeley as the top CEE student in the CE News "Star Student," *2003*
- Winzler & Kelley Civil Engineering Scholarship, *2001*
- California Alumni Leadership Scholarship, *1999-2003*
- Robert C. Byrd Scholarship, *1999-2003*

**PROFESSIONAL
AFFILIATIONS**

- National Association of Geoscience Teachers *Member 2014-current*
- Coastal & Estuarine Research Federation *Member 2007-current*
- American Society of Limnology and Oceanography *Member 2007-current*
- American Geophysical Union *Member 2006-current*
- Tau Beta Pi Engineering Honors Society *President Spring 2003, Historian Fall 2003, Vice President Fall 2002, Service coordinator Fall 2001–Spring 2002*
- ASCE (American Society of Civil Engineers) *Member 2003-current*
- Chi Epsilon (Civil Engineering Honors Society) *Member Spring 2003-current*

**FIELD
EXPERIENCE**

- Extensive field experience in over 10 projects worldwide utilizing in-situ instrumentation including moorings, boat-based surveys, autonomous underwater vehicles, and scientific diving. 4 experiments as the lead scientist including experimental design and organization.
- Measurements include hydrodynamic properties (currents, salinity, temperature, turbulence) and biological parameters (chlorophyll, dissolved oxygen, turbidity).

SERVICE

Educational Outreach Volunteer for Avanzamos, UCSD, *March 2014*

- Presented density and exchange flow experiments to middle school and high school Latinas

Panel member for the University of Washington Program on Climate Change Postdoctoral Panel, *23 October 2013*

Educational Outreach Volunteer for Discover Science Weekend, Seattle Aquarium, *Nov 2012*

- Presented density and exchange flow experiments to young children and parents

Conference Chair Eastern Pacific Ocean Conference (EPOC) Co-chair, *2012*

**SERVICE
CONT'D**

- Planning and organizing sessions and speakers for the 59th annual EPOC conference, a 3-day conference focused on interdisciplinary research in the Eastern Pacific Ocean and coast

Educational Outreach Volunteer for World Ocean Weekend, Seattle Aquarium, *June 2011*

Educational Outreach Volunteer for UW Engineering Discovery Days, *April 2011, 2012*

Educational Outreach Volunteer for Ocean Inquiry Project, *April 2011 – December 2013*

- Giving students experience in ocean field work including taking CTD casts, water samples, and phytoplankton and zooplankton tows while teaching ocean and estuarine processes

Educational Outreach Expanding Your Horizons Conference, *March 2006 and 2007*

- Presented at the Expanding Your Horizons Conference for young high school women designed to encourage woman to pursue college degrees in the sciences and engineering

Educational Outreach Teaching Science Literacy for a Sustainable Society, *Spring 2005*

- Developed a one day course on water resources and presented the information to several underprivileged middle school science classrooms

Workgroup participant In a variety of workgroups including:

- Puget Sound Current Survey stakeholder participant, NOAA COOPS, August 2013
- Modeling Workgroup participant for the Puget Sound Environmental Monitoring Program (PSEMP), November 2012 – May 2013
- OCNMS Marine Moorings Working group participant, July 2012

Manuscript review for a variety of journals including:

- Journal of Marine Research, Journal of Marine Science; Estuaries and Coasts; Ocean Dynamics; Continental Shelf Research; Estuarine, Coastal, and Shelf Science; Journal of Marine Systems; Journal of Physical Oceanography

Proposal review for a variety of institutions including:

- National Science Foundation OCE, National Science Foundation OCE-PRF, Sea Grant