

Andrew D. Steen

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Education

University of North Carolina at Chapel Hill

M.S. degree in Marine Sciences, May, 2005

Ph.D. candidate in Marine Sciences, expected August 2009

Dissertation title: Dynamics of polysaccharides, monosaccharides, and extracellular enzymes in the marine water column

Brown University

Sc.B. with honors in Chemistry, May 2000

Awards, honors, and funding

Best Student Poster Award, Symposium on Chemical Oceanography in a Changing World, Savannah GA, February. 2009

Outstanding Student Talk award, Ocean Sciences meeting, Orlando, FL, March 2008

EPA STAR graduate fellowship. Full tuition and stipend plus annual research budget from the Environmental Protection Agency, 2006-2009

Lead author of successful proposal to Duke/UNC Marine Consortium for 5-day cruise on R/V Cape Hatteras, 2007

Agouron Institute funded scholarship to attend USC Wrigley Institute Geobiology summer course, 2004

Institutional awards: UNC University Center for International Studies Doctoral Research travel award, 2005; UNC Graduate and Professional Student Federation travel award, 2005; IBM Watson Scholarship towards undergraduate tuition, 1996-2000

Peer-reviewed publications

Steen, A.D., P. Gururaj, J. Ma, N.V. Blough, C. Arnosti (2008). Fluorescence anisotropy as a means to determine extracellular polysaccharide hydrolase activity in environmental samples. *Analytical Biochemistry*. 383(2) 340-342.

Steen, A.D., L.J. Hamdan, and C. Arnosti (2008). Dynamics of dissolved carbohydrates in the Chesapeake Bay: Insights from enzyme activities, concentrations, and microbial metabolism. *Limnology and Oceanography* 53(3) 936-947.

Steen, A.D., C. Arnosti, L. Ness, and N.V. Blough (2006). Electron paramagnetic resonance spectroscopy as a novel approach to measure macromolecule-surface interactions and activities of extracellular enzymes. *Marine Chemistry* (101) 266-276.

Manuscript Submitted

Steen, A.D., and Arnosti, C. Degradation rates of extracellular enzymes in Arctic seawater: Implications for bioavailability of high molecular weight organic carbon. *Submitted to Limnology and Oceanography, 12/08*

Manuscripts in preparation

Steen, A.D., K. Ziervogel, S. Ghobrial, and C. Arnosti. Carbohydrate cycling in the Gulf of Mexico by microbial heterotrophs: Relationships between polysaccharide hydrolysis and monosaccharide uptake.

Robador, A., V. Bruchert, A.D. Steen, and C. Arnosti. Temperature sensitivity of extracellular enzymatic activity in Arctic and temperate sediments: Evidence for decoupling of carbon cycling pathways. In prep for *Geochimica et Cosmochimica Acta*.

Steen, A.D., and C. Arnosti. Microbial consumption of carbohydrates by microbial communities in the sediments and water column of an Arctic fjord.

Abstracts and presentations

Carbohydrate processing by pelagic microbial communities in polar, temperate, and subtropical environments: Implications for a warmer Arctic Ocean. Submitted for the meeting of the European Association of Organic Geochemists, Bremen, Germany.

Steen, A.D., and C. Arnosti (2009). Extracellular enzymatic activity in the water column: A comparison among polar, temperate, and subtropical environments. *Chemical Oceanography in a Changing World*, Savannah, GA. *Winner of Best Student Poster award.

Ziervogel, K., A.D. Steen, and C. Arnosti (2009). Enhanced extracellular enzyme activity in marine snow and in the surrounding water: Consequences for carbon cycling in coastal waters. *Chemical Oceanography in a Changing World*, Savannah, GA

Steen, A.D., K. Ziervogel, S. Ghobrial, and C. Arnosti (2009). Microbial turnover of high molecular weight dissolved organic matter: Where are the roadblocks? *ASLO Aquatic Sciences*, Nice, France.

Robador, A., V. Bruchert, A.D. Steen, and C. Arnosti (2009). Temperature sensitivity of extracellular enzymatic hydrolysis in Arctic and temperate marine sediments. *ASLO Aquatic Sciences*, Nice, France.

Steen, A.D., and C. Arnosti (2008). Degradation rates of extracellular enzymes in polar and subtropical seawater: Implications for bioavailability of high molecular weight organic carbon. *ASLO Ocean Sciences*, Orlando, FL. *Winner of Outstanding Student Talk award.

Robador, A., V. Brüchert, A.D. Steen, and C. Arnosti (2008). Temperature sensitivity of bacterial carbohydrate hydrolysis in Arctic and temperate marine sediments. Aquashift workshop, Konstanz, Germany.

Arnosti, C., L. Hamdan, and A.D. Steen (2007) Contrasting dynamics of high molecular weight dissolved organic carbon in the Chesapeake Bay and coastal ocean: Insights from enzyme activities, carbohydrate inventories, and microbial metabolism. Ocean Carbon and Biogeochemistry Summer Workshop. Woods Hole, MA.

Steen, A.D., L. Hamdan, C. Arnosti (2007). PowerBars vs. Cardboard: Small structural differences determine the fate of polysaccharides in an estuary. ASLO Aquatic Sciences, Santa Fe, NM.

Steen, A.D., and C. Arnosti (2005). The influence of marine polymer gels on the activity of extracellular enzymes. ASLO Ocean Sciences, Salt Lake City, UT.

Steen, A.D., C. Arnosti, and N.V. Blough (2004). Electron paramagnetic resonance spectroscopy used to measure polysaccharide hydrolysis and macromolecule-surface interactions in aquatic environments. Gordon Conference in Organic Geochemistry, Holderness, NH.

Steen, A.D. and C. Arnosti (2004). Measurement of extracellular enzyme activities in aquatic environments. Invited talk at U.S. Naval Research Laboratory, Washington, DC.

Steen, A.D., C. Arnosti, and N.V. Blough (2003). A novel approach to measuring macromolecule-surface interactions and extracellular enzyme activities in sediments. Hedges Symposium: New Approaches in Marine Organic Biogeochemistry; Friday Harbor, WA.

Teaching, outreach, and service

Mentor to two undergraduate students in the Arnosti lab

Science judge, National Ocean Science Bowl (a contest for marine science-related knowledge for high school students), 2006, 2007

Teaching assistant, Chemical Oceanography (graduate level class) and The Marine Environment (introductory undergraduate level class). Duties included lectures (including one three-week unit), leading discussion sections, grading, 2003-2007.

President, Graduate Action Group (UNC Marine Science department organization of graduate students), 2005-2006

Several guest lectures per year to undergraduate and high school classes (typically in series of 2-3 lectures) on various subjects, including the global carbon cycle, the marine microbial loop, and the diversity of life, 2003-2009

Field experience

R/V *Cape Hatteras*, Gulf of Mexico, 2007

R/V *Farm* (Arctic Ocean/Svalbard); 2005, 2006, 2007, 2008. Field trips to Svalbard, each including 2-5 day cruises and 1-2 weeks at Koldewey Research Station (Ny Ålesund, Svalbard), 2005-2008

R/V *Hugh R. Sharpe*, Delaware Estuary and mid-Atlantic Bight, 2006

Field course in geobiology, Agouron Institute Geobiology Course, Canadian Rockies, summer 2005

R/V *Cape Henlopen*, Chesapeake Bay and mid-Atlantic Bight, 2003

Summer field season, Lake Washington and Cascade Mountains (Washington State, USA): fish collection, water sampling, stream topography measurements, 1997

Professional society memberships

American Chemical Society

American Geophysical Union

American Society of Limnology and Oceanography