

## ANGELA N. KNAPP

Research Assistant Professor

Marine and Atmospheric Chemistry

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## EDUCATION

Ph.D. 2006, Geosciences Dept., Princeton University, Princeton, NJ.

M.A. 2002, Geosciences Dept., Princeton University, Princeton, NJ.

B.A. 1999, Biology-Geology, Whitman College, Walla Walla, WA.

## PROFESSIONAL EXPERIENCE

- 2010 – Present **Research Assistant Professor**, Marine and Atmospheric Chemistry Division, Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, FL.
- 2009 – 2010 **Postdoctoral Researcher**, University of Miami, Rosenstiel School of Marine and Atmospheric Science, Miami, FL, Dennis Hansell, advisor.
- 2006 – 2008 **UCAR/NOAA Climate and Global Change Postdoctoral Fellow**, Dept. of Marine and Environmental Biological Sciences, University of Southern California, Los Angeles, CA, Doug Capone, advisor.
- 2000 – 2006 **Graduate Research Assistant**, Princeton University, Department of Geosciences, Princeton, NJ. Daniel Sigman, advisor.
- 1999 – 2000 **Laboratory Technician**, University of Washington, School of Oceanography, Jeff Richey/John Hedges lab.

## Research Interests

Nitrogen cycling, especially in the ocean; using stable isotopes to identify and quantify sources, sinks, and cycling of nitrogen; inorganic and organic nutrient cycling; dissolved organic nitrogen isotopic composition; biomarkers as indicators of environmental change.

**Broader Impacts:** Training of undergraduate and graduate students; mentor for U. of Miami “Scientists and Engineers Expanding Diversity for Success” (SEEDS) program; co-founded Southern California “Team Nitrogen” research consortium; co-founded USC Women in Science and Engineering (WiSE) postdoctoral group; Scientific American interviewee.

## Funding

University of Miami Provost Research Award, 2011, \$17,000; Competitive research award

*Co-PI, NSF, Chem. Oceanography, \$164,358 (RSMAS portion)*, “Collaborative Research: Documenting N<sub>2</sub> fixation in N deficient waters of the Eastern Tropical South Pacific”. Start date: 8/15/2009, duration: 36 months.

*Co-PI, NSF, Chem. Oceanography, \$356,314*, “Direct measurement of dissolved organic nitrogen concentration and 15N/14N ratio”. Start date: 10/1/2009, duration: 36 months.

### Manuscripts in Review

- 2011 **Knapp, A.N.**, J. Dekaezemacker, S. Bonnet, J.A. Sohm, and D.G. Capone, Sensitivity of Trichodesmium and Crocosphaera growth and N<sub>2</sub> fixation rates to varying NO<sub>3</sub><sup>-</sup> and PO<sub>4</sub><sup>3-</sup> concentrations in batch cultures; *submitted to Aquatic Microbial Ecology*
- 2011 **Knapp, A.N.**, A.B. Kustka, D.M. Sigman, D.G. Capone, and S.A. Sanudo-Wilhelmy, The distinct nitrogen isotopic compositions of low and high molecular weight marine DON; *submitted to Marine Chemistry*

### Peer-Reviewed Publications (h-index = 6, ISI Web of Science, updated 28 November 2011)

- 2011 **Knapp, A.N.**, D.M. Sigman, F. Lipschultz, A.B. Kustka, and D.G. Capone, Interbasin isotopic correspondence between upper-ocean bulk DON and subsurface nitrate and its implications for marine nitrogen cycling, *Global Biogeochemical Cycles*, 25, GB4004, doi:10.1029/2010GB003878.
- 2011 L.E. Collins, W. Berelson, D.E. Hammond, **A. Knapp**, R. Schwartz, and D. Capone, Particle fluxes in San Pedro Basin, California: A four-year record of sedimentation and physical forcing, *Deep-Sea Research I*, 58, 898-914, **1 citation**
- 2010 **Knapp, A.N.**, M.G. Hastings, D.M. Sigman, F. Lipschultz, and J. Galloway, The flux and isotopic composition of reduced and total nitrogen in Bermuda rain, *Marine Chemistry*, 120, 83-89, doi:10.1016/j.marchem.2008.08.007 (published online in final form in 2008), **6 citations**
- 2010 Spencer, P.K., and **A.N. Knapp**, New stratigraphic markers in the late Pleistocene Palouse loess: novel fossil gastropods, absolute age constraints, and non-eolian facies *Sedimentology*, 57, 41-52, doi: 10.1111/j.1365-3091.2009.01085.x
- 2009 Sigman, D.M., P.J. DiFiore, M.P. Hain, C. Deutsch, Y. Wang, D.M. Karl, **A.N. Knapp**, M.F. Lehmann, and S. Pantoja, The dual isotopes of deep nitrate as a constraint on the cycle and budget of oceanic fixed nitrogen, *Deep-Sea Res. I*, 56, 1419-1439, doi:10.1016/j.dsr.2009.04.007, **9 citations**.
- 2008 **Knapp, A. N.**, P. J. DiFiore, C. Deutsch, D. M. Sigman, and F. Lipschultz, Nitrate isotopic composition between Bermuda and Puerto Rico: Implications for N<sub>2</sub> fixation in the Atlantic Ocean, *Global Biogeochem. Cycles*, 22, GB3014, doi:10.1029/2007GB003107; **13 citations**.
- 2007 Capone, D.G. and **A.N. Knapp**, A marine nitrogen cycle fix?, *Nature*, 445, 159-160; **24 citations**.
- 2005 **Knapp, A.N.**, D.M. Sigman, and F. Lipschultz, N isotopic composition of dissolved organic nitrogen and nitrate at the Bermuda Atlantic Time-series Study site, *Global Biogeochem. Cycles*, 19, GB1018, doi:10.1029/2004GB002320; **50 citations**.
- 2003 Sigman, D.M., R. Robinson, **A.N. Knapp**, A. van Geen, D.C. McCorkle, J. A. Brandes, and R.C. Thunell, Distinguishing between water column and sedimentary denitrification in the Santa Barbara Basin using the stable isotopes of nitrate, *Geochem. Geophys. Geosyst.*, 4(5), 1040, doi:10.1029/2002GC000384, 2003; **40 citations**.

### Invited Talks

- 2011 Chemical Oceanography Gordon Research Conference

- 2010 CLIVAR Workshop, “Predicting the Climate of the Coming Decades”, RSMAS, University of Miami (A. Clement, B. Kirtman, Organizers)
- 2008 CSU Fullerton, Geological Sciences Department seminar (M. Kirby, host)
- 2007 Scripps Institute of Oceanography Geosciences, Marine Chemistry and Geochemistry seminar (L. Aluwihare, host)
- 2006 USC Marine Environmental Biology Dept. seminar series
- 2006 UCLA Dept. of Earth and Atmospheric Sciences, Coastal Meetings seminar series (N. Gruber, host)
- 2005 SPOT-ON Symposium (J. Montoya, M. Voss and W. Naqvi, organizers)
- 2005 DISCO symposium (NSF Chemical Oceanography, host)

**Honors and awards**

- 2011 University of Miami Provost’s Research Award
- 2011 University of Miami’s “SEEDS” (NSF-ADVANCE) You Choose Award
- 2006 UCAR/NOAA Climate and Global Change Postdoctoral Fellowship
- 2005 Arnold Guyot Teaching Award, Geosciences Dept., Princeton Univ.
- 2005 Invited participant of NSF/NOAA sponsored Dissertations Symposium on Chemical Oceanography (DISCO) XIX
- 2001 American Society for Engineering Education/National Defense Science and Engineering Graduate Fellowship
- 2000 Princeton University 1st Year Graduate Student Merit Fellowship
- 2000 Princeton University Graduate Student Merit Prize
- 2000 Princeton University Geosciences Department Harry Hess First year graduate student merit prize
- 1999 NASA Our Earth Space Grant summer internship
- 1999 Sigma Xi Honor Society member
- 1999 Whitman College Geology Dept. Leeds Prize in Geology
- 1999 Whitman College Abshire Award for Independent Study Research
- 1999 Whitman College Wailatpu Honor Society

**Active Professional Memberships:** American Geophysical Union (AGU), American Society for Limnology and Oceanography (ASLO), Sigma Xi

**Professional Service:** Panelist for NSF Chemical Oceanography and NOAA Global Carbon Cycle programs, Referee for NSF, BSF, Moore Foundation, California Sea Grant, MIT/Massachusetts Sea Grant and Rhode Island Sea Grant proposals; referee for Science, Global Biogeochemical Cycles, Limnology and Oceanography, Geology, Biogeochemistry, Biogeosciences, Marine Ecology Progress Series, Applied Geochemistry, Annals of Glaciology, Nitrogen in the Marine Environment (book chapter), and Marine Microbiology (book chapter).

**Community & Departmental Service**

- 2010 - current Multiple mentoring activities for Univ. of Miami’s NSF-ADVANCE sponsored “Scientists and Engineers Expanding Diversity for Success” (SEEDS) program.
- 2007 – 2008 Co-founder of Southern California “Team Nitrogen” research consortium
- 2006 - 2008 Co-founder of Women in Science and Engineering postdoc group at USC
- 2003-2004 Graduate student liaison to Princeton University Geosciences department faculty meetings.

- 2002 Organized Geosciences departmental retreat to Killington Ski Resort, Killington, VT. Coordinated housing, meals, transportation, lift tickets, and academic talks for ~45 people.
- 1997 Whitman College Resident Advisor.

### Professional Presentations

- 2011 J. Dekaezemacker, S. Bonnet, K. Turk, T. Moutin, O. Grosso, **A. Knapp**, and D. Capone, Dinitrogen fixation above oxygen minimum zones, EUR-OCEANS Conference on ocean de-oxygenation, Toulouse, France.
- 2011 **A.N. Knapp**, D.M. Sigman, F. Lipschultz, A.B. Kustka, D.G. Capone, Isotopic analysis of bulk, LMW, and HMW DON  $\delta^{15}\text{N}$  indicates recycled nitrogen release from marine DON, Chemical Oceanography Gordon Research Conference, invited talk.
- 2011 **A.N. Knapp**, J. Dekaezemacker, S. Bonnet, J.A. Sohm, D.G. Capone, Sensitivity of *Trichodesmium* and *Crocospaera* spp. growth and  $\text{N}_2$  fixation rates to macro nutrient variation in batch cultures, ASLO Aquatic Sciences Meeting, talk.
- 2010 **A.N. Knapp**, D.M. Sigman, F. Lipschultz, A.B. Kustka, D.G. Capone, Isotopic analysis of bulk, LMW, and HMW DON  $\delta^{15}\text{N}$  indicates recycled nitrogen release from marine DON, AGU Fall Meeting, Abstracts with program, #OS32A-02, talk.
- 2010 **A.N. Knapp**, New insights on new nitrogen: Implications for the biological pump on decadal time scales, CLIVAR Workshop, Predicting the Climate of the Coming Decades, invited talk.
- 2009 Spencer, P.K., and **A.N. Knapp**, Age, correlation, and ecology of eolian and non-eolian facies of the Palouse silt, Southeastern Washington, GSA Cordilleran Section meeting, 2009, GSA Abstracts with Programs, talk.
- 2008 M.G. Hastings, **A.N. Knapp**, D.M. Sigman, F. Lipschultz, and J.N. Galloway, The isotopic composition of fixed nitrogen species in precipitation at Bermuda: Implications for the atmosphere and ocean, AGU Fall meeting, EOS Trans., AGU, 89(53) Fall Meet. Suppl., Abstract OS14B-03.
- 2008 **A.N. Knapp**, M.G. Hastings, D.M. Sigman, F. Lipschultz, and J.N. Galloway. The flux and isotopic composition of reduced and total nitrogen in Bermuda rain. Ocean Sciences meeting, 2008, Abstracts with program, p. 124, talk.
- 2007 **A.N. Knapp**, D.M. Sigman, A. Kustka, F. Lipschultz, D.G. Capone, T. Gunderson. Oligotrophic bulk surface ocean dissolved organic nitrogen does not respond to changes in  $\text{N}_2$  fixation rates. ASLO Spring Meeting, 2007, Abstracts with program, p. 96, talk.
- 2005 **A.N. Knapp**, D.M. Sigman, F. Lipschultz. Nitrate and DON concentration and isotopes between Bermuda and Puerto Rico. SPOT ON symposium, 2005. Abstracts with program, p.12, invited talk.
- 2004 **A.N. Knapp**, D.M. Sigman, F. Lipschultz. The nitrogen isotopes of nitrate and total nitrogen between Bermuda and Puerto Rico. AGU 2004 Fall Meeting, Abstracts with program, H51E-04, p. 367, talk.
- 2004 **A.N. Knapp**, D. M. Sigman, F. Lipschultz. The isotopic composition of dissolved organic nitrogen and nitrate at the Bermuda Atlantic Time-series Study. ESA 2004 Annual Meeting. Abstracts with program.
- 2003 **A.N. Knapp**, D.M. Sigman. Stable isotopic composition of dissolved organic

- nitrogen from the surface waters of BATS. ASLO Spring Meeting 2003. Abstracts with program, SS3.18; p. 78-79, talk.
- 2001 **A.N. Knapp**, D.M. Sigman, L. van Geen, D.C. McCorkle, J.A. Brandes, R.C. Thunell. Discerning between water column and sedimentary denitrification in the Santa Barbara Basin using the nitrogen isotopes of nitrate. Eos. Trans. AGU, 82(20) 2001 Spring Meet. Suppl., Abstract #H51C-06, talk.
- 1999 **A.N. Knapp** and P.K. Spencer. Gastropod molluscs of the Palouse Loess; A potentially useful biostratigraphic marker. GSA Cordilleran Section Meeting, 1999. Abstracts with Program, poster.
- 1999 **A.N. Knapp** and A.G. Monders. Aqueous geochemistry of Roaring Brook, Mill River watershed, Northampton, MA. Northwest Scientific Association Annual Meeting, Tacoma, WA, 1999. Abstracts with program, p.39, talk.
- 1999 **A.N. Knapp** and A.G. Monders. Aqueous geochemistry of Roaring Brook, Mill River watershed, Northampton, MA. Northwest Scientific Association Annual Meeting, Tacoma, WA, 1999. Abstracts with program, p.39, talk.

### Research and Field Experience

- 2011 **Field work**, Co-PI on 5 week cruise aboard R/V Melville studying nitrogen cycling in the Eastern Tropical South Pacific
- 2010 **Field work**, Co-PI on 5 week cruise aboard R/V Atlantis studying nitrogen cycling in the Eastern Tropical South Pacific.
- 2002, 2003 **Field work, R/V Weatherbird II and R/V Revelle** Collected water samples for DON and NO<sub>3</sub><sup>-</sup> analysis between Bermuda and Puerto Rico, and off Hawaiian Islands, respectively.
- 1999-2000 **Research technician** University of Washington, Chemical Oceanography department. Supervised by Anthony Aufdenkampe, Jeffrey Richey, and John Hedges. Made [DOC] measurements, prepared samples for CHN, nutrient, and stable isotope analysis. Field work off Baja California on R/V Melville.
- 1998 – 1999 **Independent research** Completed thesis “Aqueous Geochemistry of Mill River, MA Watershed”, as well as second research project, “Biostratigraphic significance of two gastropod mollusk faunules from the Palouse loess, southeastern Washington”.
- Jul-Aug 1998 **Geologic Field camp** YBRA/U Penn Field Camp, Red Lodge, MT.

### Teaching experience

- 2011 **Guest lecturer**, Univ. of Miami, MSC 315, Marine Biota and Biogeochemical Cycles
- 2009 - 2011 **Guest lecturer**; Univ. of Miami, RSMAS MAC 605, Marine and Atmospheric Chemistry
- 2004 – 2006 **Teaching transcript**, Princeton University. McGraw Center for Teaching and Learning program for training graduate students in pedagogical technique.
- Fall 2004 **Assistant in instruction**, Princeton University. Led discussion and problem solving sessions for GEO 207, “A Guided Tour of the Solar System” taught by Prof. Thomas Duffy.
- Fall 2003 **Assistant in instruction**, Princeton University. Developed, taught, and graded labs for Freshman Seminar, “The Ocean Environment” as well as

organized and participated in week-long field trip to Bermuda Institute of Ocean Sciences. Taught by Prof. Daniel Sigman.

1998 – 1999

**Teaching assistant**, Whitman College. Assisted in instruction for both introductory and historical geology laboratories, which included field trips, stream table, rock identification, and paleontology.

### **Student Mentoring**

2011 – current      Jeremy Whitehead, RSMAS, Undergraduate student, NO<sub>3</sub> analysis  
2011 – current      Joseph Kelly, RSMAS, Undergraduate student, NO<sub>3</sub> analysis  
2011 – current      Stephanie Cortes, RSMAS, Undergraduate student, NO<sub>3</sub> analysis  
2011 – current      Andrew Christopher, RSMAS, Undergraduate student, NO<sub>3</sub> analysis  
2011 – current      Julie Sanders, RSMAS, Undergraduate student, NO<sub>3</sub>, DON analysis  
2009 – 2011      Brian Peters, RSMAS, Undergraduate student, NO<sub>3</sub>, DON analysis  
2009 – current      Rob Letscher, RSMAS, Ph.D. student with Dennis Hansell, DON/DOP  
2009 – 2010      Lauren Zamora, RSMAS Ph.D. student with Dennis Hansell, DON/DOP  
2007 – 2009      Lisa Collins, USC, Ph.D. student with Will Berelson, δ<sup>15</sup>N budget project  
  
2006 – 2008      Laila Barada, USC, Ph.D. student with Doug Capone, NanoSIMS project  
2007 – 2008      Zack Porter, USC work study, training on NO<sub>x</sub> box, Berelson lab  
2007      Carla Steinbring, USC, REU summer student, DON/DOP project

### **References**

**Daniel Sigman**      Professor, Dept. of Geosciences, Guyot Hall, Princeton University, Princeton, NJ 08544, USA. Email: [sigman@princeton.edu](mailto:sigman@princeton.edu), phone: (609) 258-2194.

**Doug Capone**      Professor, Dept. of Biological Sciences, University of Southern California, 3616 Trousdale Parkway, AHF 108, Los Angeles, CA 90089-0371, USA. Email: [capone@usc.edu](mailto:capone@usc.edu), phone: (213) 740-2772.

**Dennis Hansell**      Professor, Dept. of Marine and Atmospheric Chemistry, RSMAS, 4600 Rickenbacker Cswy., University of Miami, Miami, FL 33149, USA. Email: [dhansell@rsmas.miami.edu](mailto:dhansell@rsmas.miami.edu), phone: (305) 421-4078.

**Will Berelson**      Professor, Dept. of Earth Sci., University of Southern California, Los Angeles, CA 90089-0740, USA. Email: [berelson@usc.edu](mailto:berelson@usc.edu), phone: (213) 740-5828.

### **Collaborators & Institutions**

Will Berelson (USC), Sophie Bonnet (IRD, Marseille, France), Larry Brand (RSMAS), Douglas Capone (USC), Karen Casciotti (Stanford Univ.), Dreux Chappell (URI), Meredith G. Hastings (Brown Univ.), Dennis Hansell (Univ. Miami/RSMAS), Adam Kustka (Rutgers Univ.), Masha Prokopenko (USC), Daniel Sigman (Princeton Univ.), Jill Sohm (USC), Peter Swart (Univ. Miami/RSMAS)