

DirtWaterCell

Special Interest Articles:

- Dr. Hilairy Hartnett, Assistant Professor of Biogeochemistry

Individual Highlights:

Events 2-3

Greetings from DirtWaterCell, the occasional newsletter of the biogeosciences at ASU. We hope this becomes your main resource for exchanging research news, keeping in tune with seminars, and staying alert to various dates and deadlines. This issue contains a feature on new faculty member Hilairy Hartnett.

Hilairy Hartnett: Welcome!

DWC is pleased to welcome Hilairy Hartnett to ASU. She has joined the faculties of Geological Sciences and Chemistry & Biochemistry as an Assistant Professor. Hilairy was hired as a result of last year's search in Biogeochemistry. Her office and lab are in F-wing of Physical Sciences.

Hilairy is pursuing research on three fronts: analytical breakthroughs, coupled elemental cycling, and ecosystem dynamics.

Analytical Breakthroughs: Methods that rely on gas chromatography are ideal for working with nonpolar organic compounds like hydrocarbons.

Traditionally, working with polar organic compounds, like amino acids, has required considerable effort to make them less polar before the analytical measurement is made. In the process, enormous care must be taken to keep track of material and avoid contamination. Hilairy points out that new analytical methods that combine liquid chromatography and

electrospray mass spectroscopy offer the potential for major breakthroughs in analyzing polar organic compounds in natural fluids. These methods work best with polar compounds, do not require as much sample manipulation, and work with aqueous solutions, where the compounds of interest already are! Implications for biogeochemistry are enormous, because it is the polar organic compounds that are generally bioavailable, meaning that these are the compounds directly involved in the biogeochemical cycles of carbon and nitrogen. Hilairy will be developing these methods and applying them to characterize dissolved organic matter in aquatic and marine systems.

Coupled Elemental Cycling: What could be better than organic compounds as sources of carbon? If they are also sources of nitrogen! Nitrogen that is already fixed into an organic form can cost much less energy for an organism to

process than inorganic forms such as nitrate. In fact, the availability of nitrogen (or phosphorous) in dissolved organic compounds may influence or control their bioavailability in surface waters. Not much is known about the actual chemical compounds that host organic nitrogen, but new analytical breakthroughs could solve that problem soon. Hilairy plans to investigate the processes and feedbacks that promote and/or limit the transfer of carbon, nitrogen and phosphorous, as well as energy between different geological pools.

Ecosystem Dynamics: Much of what matters in biogeochemistry derives from the interplay of relative rates of biotic and abiotic processes in ecosystems. There is a long tradition of measuring rates of microbial activity, and making comparisons among various ecosystems or portions of a given ecosystem. With the rapid development of methods in molecular

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Hartnett (continued)

biology it is increasingly possible to develop correlations between *in situ* rates of biogeochemical processes (e.g., denitrification reactions) and molecular measures of microbial genetic expression (e.g.,

messenger RNA) in natural systems. Hilairy's goal is to bridge these existing disciplines with combined methods that simultaneously reveal which reactions are occurring and which organisms are

responsible. In the process, she seeks to develop a more mechanistic understanding of biogeochemical processes and how they relate to global scale patterns.

Upcoming Events

Wednesday, November 19, 2003

"Paleokarst in the Ordovician of the Southern Great Basin, USA: Implications for Relative Sea-level History," 3:40 p.m., Bateman Physical Sciences Center (PS) F-101, Speaker: John Cooper, California State University, Fullerton. Sponsored by Department of Geological Sciences.

Full Proposal Deadline NSF 03-012 MURI Multidisciplinary University Research Initiative.

University Research Initiative: Multidisciplinary Program (MURI) - U.S. Department of Defense, Details:

<http://www.acq.osd.mil/ddre/researchtest/muri/muri.htm>.

Thursday, November 20, 2003

STAR Graduate & Minority Graduate/Undergraduate Fellowships - U.S. Environmental Protection Agency, Details: <http://es.epa.gov/ncer/rfa/>.

Friday, November 21, 2003

"Controlling the Central Pattern Generator Locomotion After Spinal Cord Injury: Problems and Solutions," 12:15 p.m., Schwada Classroom Office Building (SCOB) Room 152, Speaker: Avis Cohen, Neuroscience & Cognitive Science and the Institute for Systems Research, University of Maryland. Sponsored by Harrington Department of Bioengineering.

"Global Desertification: Do Humans Cause Deserts?" 2 p.m., Life Sciences Center (LS) E-104, Speaker: Jim Reynolds, Department of Biology and Division of Environmental Science and Policy, Duke University. Sponsored by School of Life Sciences.

Summer Undergrad. Research Fellowships (Science, Math, Engineering) - Council on Undergraduate Research, Details: <http://www.cur.org/UGSF.html>.

Doctoral Dissertation Improvement Grants in the Dir. for Bio. Sciences (DDIG) - National Science Foundation, Details:

<http://www.nsf.gov/pubs/2002/nsf02173/nsf02173.htm>.

Monday, November 24, 2003

"The Liquid Water Surface: New Insights from X-Ray Spectroscopy," 2:40 p.m., Bateman Physical Sciences Center (PS) H-151, Speaker: Richard Saykally, Department of Chemistry, University of California. Sponsored by Department of Chemistry and Biochemistry.

Upcoming Events (continued)

"New Mass Spectral Strategies For Proteomics and Glycomics," 4:40 p.m., Life Sciences Center (LS) E-104, Speaker: Catherine Costello, Boston University School of Medicine. Sponsored by Department of Molecular and Cellular Biology.

Tuesday, November 25, 2003

LTD SUB - INTERNAL DEADLINE - NSF 04-509 Environmental Molecular Science Institute - (EMSI), OFFICE FOR RESEARCH AND SPONSORED PROJECTS ADMINISTRATION -- (ORSPA), Complete program announcement is available at Internet URL: <http://www.nsf.gov/pubsys/ods/getpub.cfm?nsf04509>

Friday, November 28, 2003

Research Tools Developments Grants (Life Science Research) - Invitrogen Corporation, Details: <http://www.invitrogen.com/content.cfm?pageID=22>

North American Wetlands Conservation Act Grants - U.S. Department of the Interior, Details: <http://northamerican.fws.gov/NAWCA/grants.htm>

Monday, December 1, 2003

Chemistry/Biochemistry Seminar, Topic TBA, 3 p.m., Bateman Physical Sciences Center (PS) H-150, Speaker: Joseph Wang, Department of Chemistry & Biochemistry, New Mexico.

LTD SUB - LOI Deadline - NSF 03-595 - Undergraduate Research Centers (URC), Details: OFFICE FOR RESEARCH AND SPONSORED PROJECTS ADMINISTRATION -- (ORSPA), Complete program announcement is available at Internet URL: <http://www.nsf.gov/pubs/2003/nsf03595/nsf03595.htm>.

Biocomplexity in the Environment (BE): Integrated Research and Education in Environmental Systems, NSF, Details: <http://www.nsf.gov/pubs/2003/nsf03597/nsf03597.htm>.

Friday, December 5, 2003

"Historical And Global Contexts For Extreme Droughts And Their Consequences In The Western U.S.", 2 p.m., Life Sciences Center (LS) E-104, Speaker: Julio Betancourt, Desert Laboratory, U.S. Geological Survey & University of Arizona. Sponsored by School of Life Sciences.

Petroleum Research Fund Programs - American Chemical Society, deadline, Details: <http://www.chemistry.org/portal/a/c/s/1/acdisplay.html?DOC=prf\index.html>

Monday, December 8, 2003

Chemistry/Biochemistry Seminar, Topic TBA, 3 p.m., Bateman Physical Sciences Center (PS) H-150, Speaker: Gregory Voth, Department of Chemistry, University of Utah.

Wednesday, December 31, 2003

General Research Grants - Association of American Geographers, Details: <http://www.aag.org/Grantsawards/Generalresearch.html>.

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