



SES News

Semester in Environmental Science

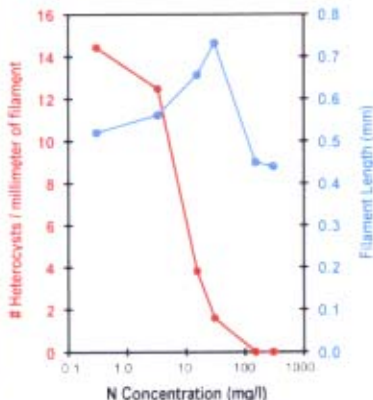
at the Marine Biological Laboratory in Woods Hole, Massachusetts

Vol. 11/Winter 2012

Bates Student Wins MBL Associates Award for Study of Resource Allocation

Blue-green bacteria are among the most abundant primary producers on Earth and are a key link in the nitrogen cycle. They have the unique ability to convert the abundant, but comparatively inert N_2 gas from the atmosphere into bioavailable, reactive nitrogen through the process of N-fixation. But this process requires energy.

He measured filament growth and counted the number of specialized N-fixing heterocyst cells formed by *Anabaena* under a broad range of nitrogen and phosphorus concentrations. Based in part on the response curve for heterocyst formation (see figure below), he developed a simulation model for resource allocation.



Given this trade-off between scarce energy resources and scarce nutrients, how do they "decide" how much energy to allocate to N-fixation?

Hansen Johnson of Bates College probed this question during his SES independent research project by assessing the growth response of *Anabaena* (a filamentous cyanobacterium) under differing nutrient regimes.

His work earned him the 2011 MBL Associates Award for Excellence in Independent Research. Hansen remarked: "For six weeks I stepped out of the shoes of an undergraduate as the Ecosystems Center staff brought me in as one of their own. From the casual chats around the coffee machine to the tense precision of the sterile hood, my friends and mentors inspired and motivated me." ■



Studying Climate Change in Antarctica

Pam Moriarity (SES '09, Kenyon '11) is the third SES alum to join Dr. Hugh Ducklow, director of the Ecosystems Center, at the West Antarctic Peninsula, where she will work on the Long Term Ecological Research Project (LTER) he leads. Dr. Ducklow addresses climate change and his research in lectures during the semester and has committed to taking one SES alum each year to Antarctica. Below are Pam's impressions of the experience.

On my fourth day aboard the 250-foot R/V *Lawrence M. Gould*, I wake up to snow-covered mountains and ice chunks in the water drifting past my porthole. After several months of anticipation, I have finally arrived in Antarctica. I have the opportunity to help conduct research in Antarctica during January and February, working with Dr. Hugh Ducklow's lab group as part of the Palmer Long Term Ecological Research (LTER) program.

The Palmer LTER is investigating the effects of climate change along the western Antarctic Peninsula. Climate change is progressing faster in this region than the rest of the world; mean winter temperatures have risen over 6°C since 1950. By studying this area, scientists hope to gain insights about how other systems may respond to future warming. Within the Palmer LTER, different lab groups study different trophic levels. Hugh's group focuses on the bottom of the food web, microbial activity, while others focus on phytoplankton, zooplankton and birds.

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MBL Associates have offered an award for research excellence in SES since 1997. Cynthia Eaton, president of the MBL Associates, with Hansen Johnson and judges for the award: Amanda Spivak, SES '99, currently an assistant scientist at WHOI; Will Daniels, SES '06, now a graduate student in the Brown-MBL program. Jim Casey (not pictured), associate professor at Washington and Lee University and 2011 SES faculty fellow, was also a judge.



SES Alums on Ecosystems Center Staff
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