

EDUCATION AND OUTREACH

A Summer in the Lab: Training Future Biofuels Leaders

By Erica Nelson

As he presented the findings of his research to an audience of his peers and mentors, it was clear: Jorge Montalvo is passionate about bioenergy.

“There’s no reason that we should still be polluting,” says Montalvo, a senior at the University of Puerto Rico – Mayagüez. “It’s obvious, the proof is there. I want to help the cause.”

Montalvo was one of six students who experienced bioenergy research first-hand this summer as a part of the Integrated Biological Sciences Summer Research Program (IBS-SRP) at the University of Wisconsin-Madison. Coming from all over the globe, young researchers were drawn to the bioenergy focus of the program, and the potential to contribute to a larger cause.

The student researchers in the bioenergy subgroup of the IBS-SRP program examined corn in the fields, manipulated the pathways of fatty acids, studied the symbiotic relationships deep within ant colonies, and explored the structure of plant cell walls in lunar-landing-sized analysis equipment.

As he spent the summer in Associate Professor of Bacteriology Cameron Currie’s UW-Madison lab, Montalvo worked with ant colonies, searching for enzymes that could degrade cellulose more effectively. He says the bioenergy focus of the program sparked an interest in environmental research that will carry through to graduate school.

Fellow student Om Shrestha’s zeal for bioenergy brought him back to the research program for a second summer.

Shrestha spent the summer working with UW-Madison Biochemistry Professor John Markley on nuclear magnetic resonance, or NMR. This technique allows researchers to identify and analyze the entire cell wall of a plant, providing a characteristic fingerprint of the wall’s components.

Currie and Markley were faculty mentors who hosted the



Om Shrestha presents his research during a poster session. (Photo by John Greenler)

students as part of the program. Both are researchers with the Great Lakes Bioenergy Research Center (GLBRC), which is working to develop the technology and techniques that will convert cellulosic biomass to ethanol and other advanced biofuels. Run as part of GLBRC Education and Outreach, the program is committed to training next generation scientists.

When he returns to Monmouth College for his senior year, Shrestha will continue working with biofuels. He plans to tackle biofuels on a smaller scale, turning the leftover oil from his school’s cafeteria into biodiesel.

“The trucks and cars on campus can then run with the biodiesel.” Shrestha says. “The cafeteria director is thrilled we’re going to use it.”

Shrestha has big plans for the future. He plans to attend graduate school at UW-Madison, continuing his research in biofuels. After graduate school, Shrestha is considering returning to his home country of Nepal to research the *Jatropha* seed, a largely unused crop that is a potential source of biofuels.

“I feel like I’m contributing to something good...like I’m contributing to the environment across the world,” said Om Shrestha. “If I make my environment clean, it’s clean for everyone else.”

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Members of the 2009 Bioenergy subgroup of IBS-SRP include:

Akwasi Amankwah, University of Illinois-Chicago; Gina Lewin, Pomona College; Jorge Montalvo, University of Puerto Rico – Mayagüez; Jorgen Nelson, Rice University; Laura Ramos, University of Puerto Rico – Mayagüez; Om Shrestha, Monmouth College.

GLBRC Mentors include:

Wes Marner, Microbial Synthetic Biology Lab; Rebecca Lennen, Biochemistry, Chemical & Biological Engineering; Garret Suen, Bacteriology; Frank Aylward, Bacteriology; Melanie Ivancic, Biochemistry; James Johnson, Agronomy; Jill Mahoy, Agronomy; James Ellinger, Biochemistry.

GLBRC PIs include:

Brian Pflieger, Chemical and Biological Engineering; Cameron Currie, Bacteriology; Michael Sussman, Biochemistry; Natalia de Leon, Agronomy; John Markley, Biochemistry.

About the GLBRC:

The Great Lakes Bioenergy Research Center (GLBRC) is led by the University of Wisconsin-Madison, in close partnership with Michigan State University. Located in the world's most productive agricultural region, the GLBRC is exploring scientifically diverse approaches to converting sunlight and various plant feedstocks — agricultural residues, wood chips, and grasses — into biofuels. In addition to its broad range of scientific research projects, the GLBRC is collaborating with agricultural researchers and producers to help develop the most economically viable and environmentally sustainable practices for bioenergy production.