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MOUNTAINS & MINDS

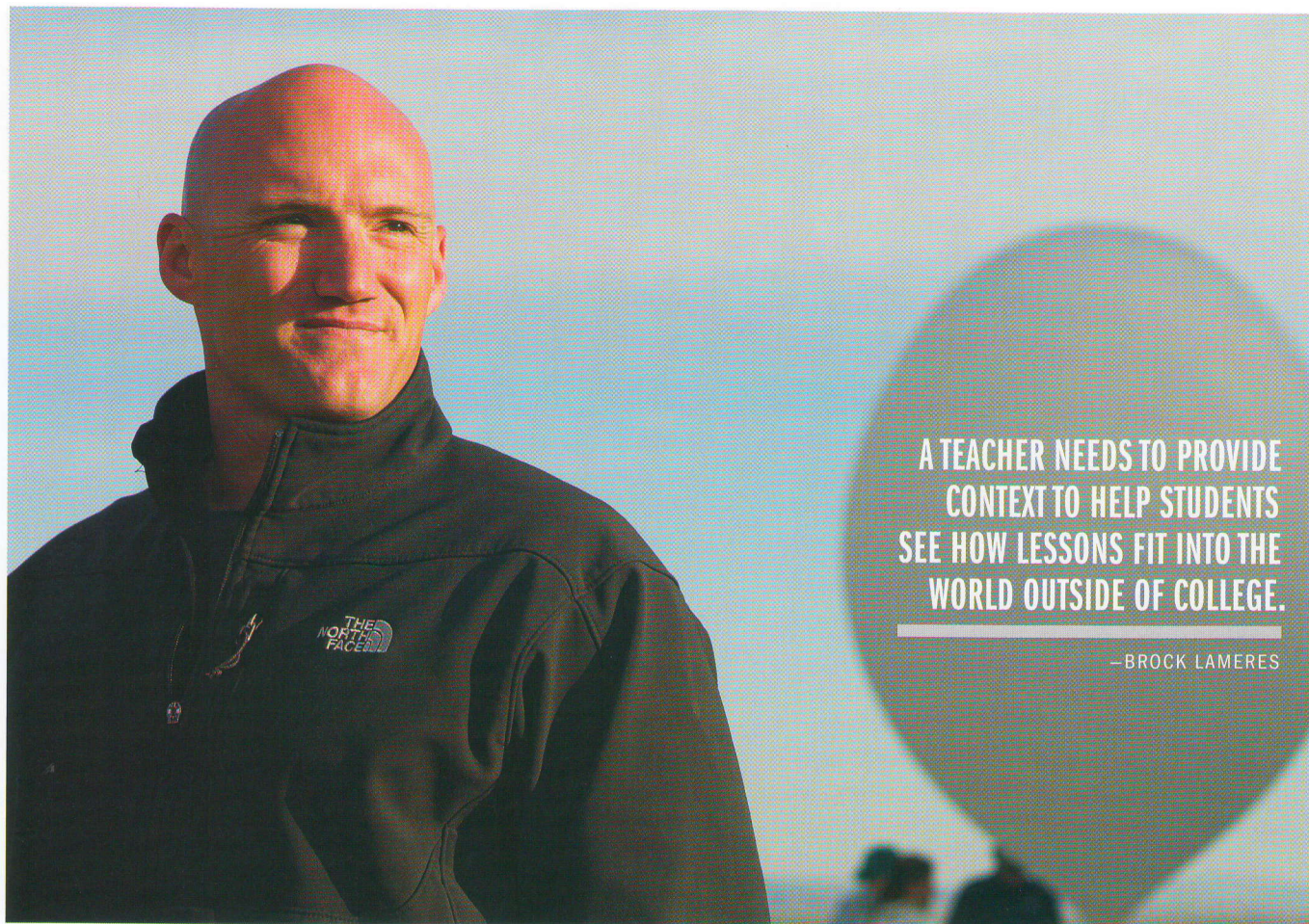
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In this issue

HEART OF MONTANA

Eleven students show that big talent comes from the state's smallest towns



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CONTEXT TO HELP STUDENTS
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'He's like Emeril Lagasse in a classroom'

by Michael Becker

The robot was having a hard time. Designed to dig in the dirt on the moon, it was bogging down in a sandy volleyball pit at Montana State University.

Computer science senior Justin Krohn of Kent, Wash., gunned the accelerator on the Xbox controller that operated the robot. Its lightweight wheels seemed to gain traction for an instant before the 150-pound robot went dead.

"Power cut out again," Krohn said.

Instantly, several sets of hands were prying at the robot's innards, bypassing circuits and trying to get power restored. In just a few weeks, the bot—dubbed Montana Mule 2.0—would be defending MSU's moon-dirt-digging title at the Kennedy Space Center. Time to get all the systems working together was running out.

A few yards away, on the edge of

the pit, was the team's adviser, Brock LaMeris, professor in the Department of Electrical and Computer Engineering.

LaMeris stood with his hands in his pockets, toeing the edge of the sand and offering quiet suggestions. Mostly, he let the students solve the problem themselves, but one look at his face said that—had it not been a good learning experience—he would have had his hands inside the robot right along with them.

"It was always hard for me to learn as a student when someone was just writing equations on the board for an hour," LaMeris said, sitting behind the big, immaculate desk in his Cobleigh Hall office.

A teacher needs to provide context, he said, something to help students see how the lessons fit into the world outside

of college.

That is one of the reasons LaMeris has been so supportive of student research in general and, specifically, the two Montana Mule projects.

The first Mule competed in NASA's 2010 Lunabotics Mining Competition at Kennedy Space Center. Designed by six MSU engineering students as their senior design project, the Mule beat 22 other teams by digging more than 45 pounds of simulated moon dust. No other team even met NASA's minimum requirements.

More than winning, though, the trip to Florida let the students meet with scientists working on some of the same things they are studying at MSU.

"It really helps them see that there is a career track with advanced degrees," LaMeris said. "To hear a NASA scientist

"He's like Emeril Lagasse in the classroom," says undergraduate Jennifer Hane of Brock LaMeris. His enthusiasm, she said, comes out in front of the class with yelling, cheers and emphatic white-board slapping.

break down a mission to the moon to the tiny component they're designing, it really gets them excited."

The students aren't the only ones getting excited, though, said Jennifer Hane, one of LaMer's graduate students.

"He's like Emeril Lagasse in a classroom," she said, comparing LaMer's to the energetic TV chef. His enthusiasm, she said, comes out in front of the class with yelling, cheers and emphatic whiteboard slapping.

In addition to making students excited about the science—LaMer's courses focus on digital systems and microprocessors—he helps them find career paths. Hane, who grew up in Fort Shaw, Wash., said she wouldn't have even considered graduate school if it weren't for LaMer's encouragement.

Now, she is working with LaMer's on a project to design radiation-resistant computers for spacecraft, a project funded by LaMer's three-year, \$750,000

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Experimental Program for Stimulating Competitive Research (EPSCoR) award.

"He doesn't shrink from getting excited about things in the classroom," Hane said. "He seems to love the material he's talking about."

A Billings native, LaMer earned his bachelor's degree in electrical engineering from MSU in 1998. He worked in research and development for seven years for a firm in Colorado Springs, Colo., while working on his doctorate at the University of Colorado, Boulder. He returned to MSU as a professor in July 2006, joining a faculty that still included many of the professors who'd taught him.

By all accounts, they were more than happy to have him back.

"He left quite an impression," said ECE department head Rob Maher of LaMer's undergraduate days at MSU.

"It was really nice to see a student who had been through our program and been out and did good be able to come back

and make an impact," Maher said.

His passion for engineering and teaching rubs off not only on the student but on a lot of "jaded old faculty members" too, Maher said.

"He is really in love with being a professor," he said. "I think all of us in academia do it because we like it, but when I see the glimmer in his eye or see his eyebrows go up when he talks about something his students are working on in the lab, you can just see that this is more than just a job."

It is still work, though.

"Teaching is a full-time job, and then some, and research is a full-time job, and then some," he said.

But in spite of the workload, he still finds in teaching the same heart-pumping excitement he felt the first time he walked in front of a classroom.

"I fell in love with teaching and decided I wanted to make it a part of my life," he said. "It's really a rush."

It's a love he was recognized for in January 2011 with a President's Excellence in Teaching award. LaMer said he was honored to win the award, considering that he was

still an untenured, junior faculty member. "I was in the presence of some good company," he said. "As an instructor, you often don't get a lot of feedback on how you're doing so it is very rewarding to be told you're doing something right."

Their power problems solved, the Mule 2.0 team went back to work digging in the volleyball pit, one Xbox controller moving the bot, another controlling the digging buckets.

Motors whirred and sand flew. Within a minute, the machine had dug as much as it could reach—then the power cut out again.

The students were annoyed, but LaMer took a look into the robot's hopper and pointed out that their minute of digging had already dug more than the first Mule had dug in Florida.

They went back to work.

"The design seems pretty solid," LaMer remarked with a smile. ■



THE MONTANA MULE

The MSU Mule may have won NASA's 2010 Lunabotics Mining Competition, but it was a different story in 2011.

During MSU's competition run, the Mule got stuck in a rut and blew out its motor trying to free itself. The failure happened about three minutes into the 15-minute competition period.

Of the 38 teams that competed, only 14 were able to dig any simulated regolith at all, LaMer said. A team from Laurentian University of Sudbury, Ontario won the competition, digging 237.4 kilograms (523 pounds) of regolith.

However, LaMer said, after stepping away from the competition for half of a day, the MSU team decided to fix the Mule 2.0 and do a demo dig after competition ended. So, as all the teams began to pack up, the repaired Mule went into the arena and dug 27 kilograms (59 pounds) of material.

"It wasn't official, but they felt really good about showing that their design was sound enough to improve upon last year if they hadn't had a mechanical failure," LaMer said. "The team really showed some heart."