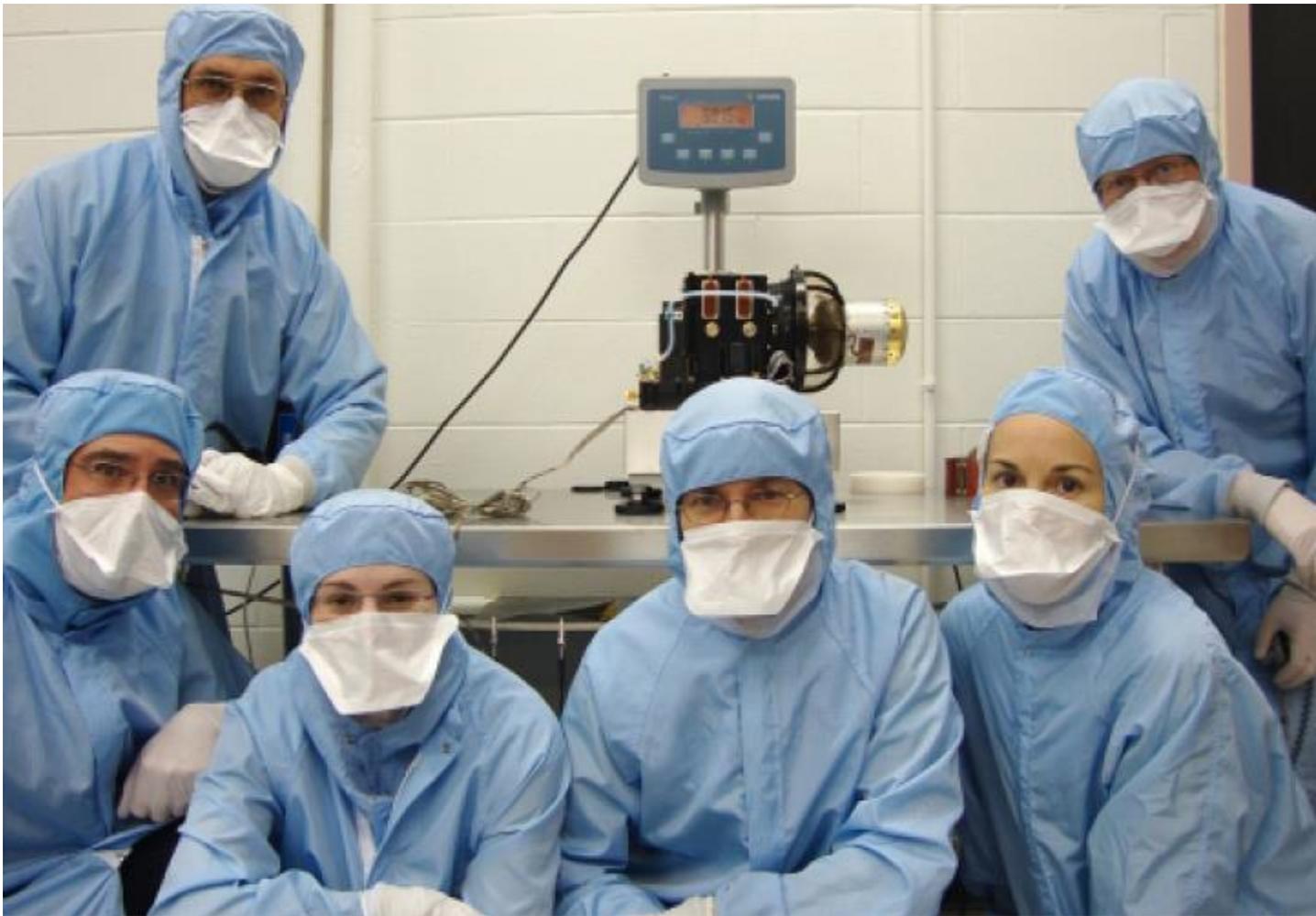


For These UNH Students, It Is Rocket Science

Work on NASA mission launches science careers

Thursday, March 5, 2015

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CALEIGH MACPHERSON (FRONT ROW, SECOND FROM LEFT) SPENT HOURS IN UNH'S "CLEAN ROOM" WORKING ON THE ELECTRONIC DRIFT INSTRUMENT OF MMS.

Long before it blasts into space March 12, the Magnetospheric Multiscale (MMS) mission will have launched the careers of would-be rocket scientists who contributed to the mission as UNH undergraduates.



AFTER WORKING ON MMS FOR MUCH OF HER UNH CAREER, CALEIGH MACPHERSON '12, '14G IS NOW A NASA AMBASSADOR.

"It really kick-started a passion," says [Caleigh MacPherson](#) '12, '14G, a mechanical engineering major who led UNH's LunaCats lunar mining robot team to NASA competitions and is now an official NASA Ambassador.

MacPherson stumbled into a summer position with UNH's [Space Science Center](#) in her sophomore year and worked on the Electronic Drift Instrument (EDI) and Spin-plane Double Probe (SDP) components of MMS until her graduation with a master's degree. Directed by senior research project engineer Mark Granoff, MacPherson did "literally whatever an engineer or machinist needed help with, from quality control to basic prototyping for non-flight critical parts and assembly work," she says.

In addition to burnishing her engineering skills, MacPherson learned that rocket science isn't always glamorous. One element of the SDP, which will send a titanium sphere out on the end of a 60-meter-long wire boom, proved particularly frustrating.

“One summer I was in the clean room six hours a day spooling and unspooling that wire, trying to condition it so it would flow through some of the tubes without catching,” she says, adding that temperatures hovered around 90 degrees.

MacPherson, who will be in Cape Canaveral for the launch, anticipates that watching the MMS blast into space will be bittersweet.



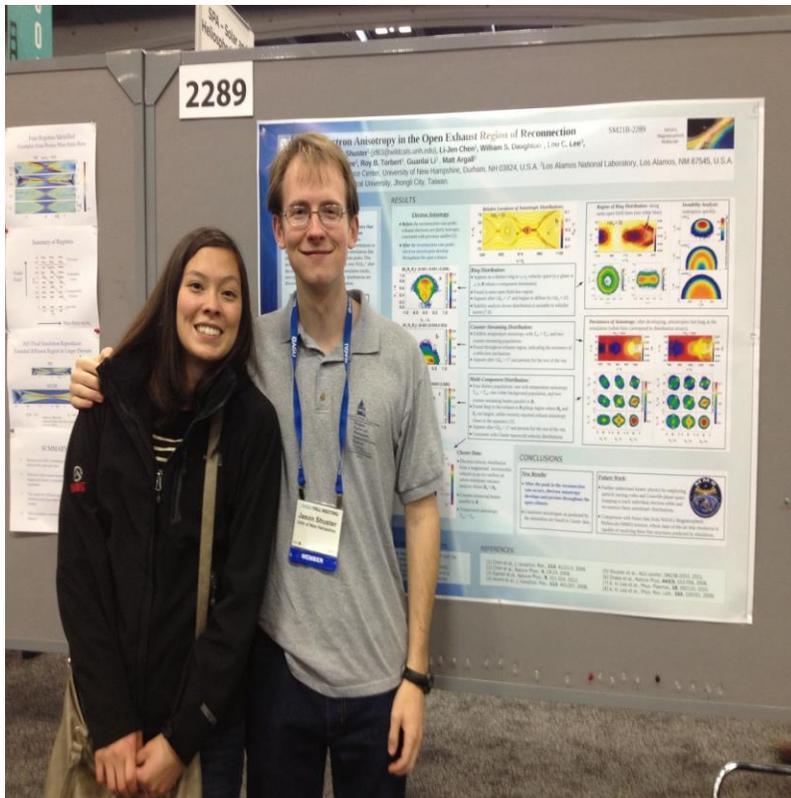
“I am going to be a little sad to see it go,” admits the Lee, N.H., native, calling her work at the Space Science Center “the best experience I ever had. I was so excited going to work every single day, because I got to do something new and something different and it all had to do with space science.”

MacPherson won't be the only UNH student watching the launch at the Kennedy Space Center. UNH associate professor of mechanical engineering May-Win Thein and a dozen students who worked with NASA's Goddard Space Flight Center's MMS Attitude Control Systems group will road-trip to Florida to watch their work blast into space.

For eight years, Thein has shepherded several generations of undergraduates through a project aimed at helping NASA confirm the MMS attitude — satellite orientation — system. They've developed tabletop prototypes of the MMS satellite that graduate students used for dynamic modeling and simulation.

When Jason Shuster '12, who is pursuing a Ph.D. in physics at UNH, began working on MMS with former Space Science Center research assistant professor Li-Jen Chen (now at Goddard) as a junior, he says he “didn't have a clue that UNH was involved in space science, let alone world-class space science.” Jen's passion for magnetic reconnection — a mystery since the phenomenon was identified half a century ago that MMS aims to unlock — inspired him.

Shuster's work has been primarily theoretical, working to better understand the magnetic reconnection processes MMS will observe and, recently, the physics behind the EDI instrument.



JASON SHUSTER '12

(RIGHT, WITH HIS COUSIN) PRESENTED HIS WORK ON MAGNETIC RECONNECTION AT THE AMERICAN GEOPHYSICAL UNION MEETING.

MMS has taken Shuster far: He attended the massive American Geophysical Union (AGU) meeting as an undergraduate, where he wrote [articles](#) for the Society of Physics Students. In 2014, he published a paper in a peer-reviewed journal and presented at the AGU meeting. He participates in regular MMS teleconferences and is awestruck to be in company of the international team of scientists.

Shuster's mother stoked his space dreams when she gave him a cardboard cut-out of a space shuttle as a boy in Bethlehem, N.H. "And now I can say, 'hey I'm involved in a NASA mission,'" he says. "It really is fascinating to me that we can pull off something of this magnitude. It's so impressive."

[Learn](#) more about UNH's involvement in the MMS mission.

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