

WV Space Connections

West Virginia Space Grant Consortium

NASA West Virginia Space Grant Consortium

Lead Institution:

West Virginia University

Affiliates:

Bethany College

Bluefield State College

Fairmont State University

Marshall University

NASA IV&V Facility

Shepard University

West Liberty State College

West Virginia Development

Office

West Virginia High Tech

Consortium Foundation

West Virginia State University

West Virginia Wesleyan

College

Wheeling-Jesuit University

WVU Institute of Technology

Letter from the Director

Greetings, and welcome to the spring 2005 edition of our newsletter. I'm happy to announce that West Virginia Space Grant Consortium received a very positive rating from NASA after undergoing a major program review by NASA. This review is mandated by the Space Grant Act and is conducted every five years by the NASA Headquarters. It is very gratifying to see that the close collaboration between our members' institutions and affiliates in the areas of STEM education and promotion of research infrastructure in West Virginia have paid off and have been acknowledged by NASA.

I am also happy to report that NASA Independent Verification and Validation Facility in Fairmont, WV is now part of our Consortium. Dr. Nelson Keeler, the Facility Director, will join our

Board of Directors as of April 9, 2005. Also, we want to welcome Mr. Ron Radcliff, Director of Governor's Workforce Investment Division, Mrs. Margie Cooke, from the Center for Educational Technologies housed on the campus of Wheeling Jesuit University, and Dr. Karl Burgher, Vice President for Research and Contracts at Fairmont State University to our Board. They are replacing their predecessor from those organizations.

This year we have been fortunate to forge new collaborations with TMC Technologies in Fairmont West Virginia and the WV High Technology Consortium Foundation, in addition to NASA IV & V for placing our students at those facilities for summer internships and research positions. I am particularly gratified to see that Mr. Wade Linger, President

of TMC Technologies is taking a personal interest in mentoring and supervising our students. This is a win-win for us, the company and our students.

Overall, this issue focuses on the work and achievements of three undergraduate students who have benefited from NASA funding, the Balloons Satellites Course at West Virginia University, and some important upcoming events.

We are, as always, open to suggestions for new programs, collaborative efforts, and ideas to better fulfill our mission to capture, channel, and enhance the activities of the current and potential scientists and engineers throughout the consortium institutions.

*Majid Jaraiedi, Director
West Virginia Space Grant Consortium
College of Engineering & Mineral Resources
West Virginia University*

Inside this issue:

Letter from the Director	1
Balloon Satellites Course Launches	1-2
John C. Johnson Award Winner Explores the Fungal Population	2-3
Bethany Graduate Attends NASA Academy at the Ames Research Center	3
Bethany Senior Studies the Dragline Silk of Marbled Orb Weaver Spiders	3
Upcoming Events	4

Balloon Satellites Course Launches into Its Third Year

This spring marks the third year of the Balloon Satellites Course (MAE 493 B) at West Virginia University.

The course, which is taught by Drs. G. Michael Palmer and John M. Kuhlman of the Mechanical and Aero-

space Engineering Department, was made possible in the Spring 2003 semester with the help of funding from the West Virginia Space Grant Consortium through a NASA Workforce Development grant. Weather permitting, this semester's launch will

take place Saturday, April 16, 2005. If it's raining on Saturday, the launch will be postponed until the next day.

In the Balloon Satellites Course, which is open to

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Balloon Satellites Course (Continued)

students of all majors, teams track, and recover small electronic payloads that are attached to helium-filled weather balloons in order to send their payloads into stratosphere and beyond. Global Positioning System (GPS) is used to allow students to track the satellite's travel path and to ultimately find and recover the satellite upon return to the earth's surface. Each team designs an instrumentation package for their balloon payload according to the weight, cost, and size constraints set by the course instructors. Typical instrumentation measures air temperature and pres-

sure versus altitude.

"Not only does the class teach students about teamwork and design, it also helps students to build confidence in themselves and with their work," said Dr. Kuhlman.

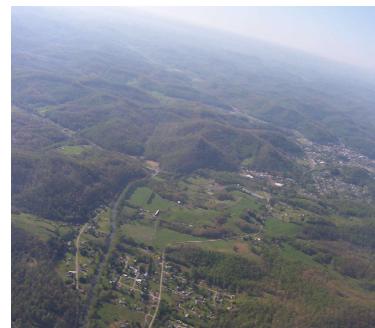
This semester, each of the three teams participating in the launch will be experimenting with new and unique measurement devices. The first team wishes to deploy a sticky board to capture and study micrometeorites, while the second team will use a Geiger tube to look at the radio activity in the atmosphere versus altitude. The third

team, on the other hand, plans to use an accelerometer to collect data on loads, and apply theory to calculate the acceleration data to compare balloon paths versus what will be observed from the GPS measurements.

"You have to be careful, and build a check list, because you don't get a second chance," said Dr. Palmer, who is now retired, but was asked to co-teach the course because of his amateur radio experience.

"We're hopeful for a successful launch, and that we don't lose any payloads," said Dr. Kuhlman. "We

hope that at least one works, so that everyone in the class will be able to study and learn from it's results," he added.



Up, up, and away! This picture was taken from the 2004 launch at Jackson's Mill last spring.

John C. Johnson Award Winner Explores the Fungal Population Structure in the South Eastern United States Flood Plain Forest

This summer, Hasan Shahid, a senior Biology major at West Virginia University, won the John C. Johnson Award in the Micro Biology category for the best poster presentation for his project, "Characterizing Fungal Population Structure in the South Eastern United States Flood Plain Forest."

The John C. Johnson Award was established in 1992 in honor of John C. Johnson, Sr., the first Vice President of Beta Beta Beta, a national biology honor society. This year, the conference was held in Grand Junction, Colorado.

"My favorite part of the experience was being able to see the other projects and compare techniques with the other students," said Shahid. "The sight-

seeing wasn't bad, either," he added.

Shahid, a NASA West Virginia Space Grant Consortium Scholar, began working on this project his junior year, when he met John Navarathnam, graduate student, in the biology section of the Life Sciences building at WVU. Ostensibly, his research involved using DNA that was taken from soil samples collected in wetlands across the south eastern portion of the United States. The DNA was derived from anything living in the soil, and was extracted from cells in the soil and compacted in to a big "blob." The blob consisted of animal, plant, bacterial, fungal, and archae DNA.

Since his project dealt with trying to figure out what species of fungi inhabited the wetlands, he had to use a specific

PCR reaction to only replicate the fungus DNA in his blob. The PCR took whatever fungus in the DNA that was present, and made 1,000 more copies of it, so that he had a mass big enough to see/work with. This DNA pool was then run on a Denaturing Gradient Gel Electrophoresis which is a technique that can separate the DNA strands individually according to what the species is. By figuring out what species he had, Shahid created a library that showed what species of fungi are dominant in wet areas of the country. That way if the wetland is ever destroyed it can be restored exactly as it was.

"I'd like to thank Dr. Jaraiedi at the West Virginia Space Grant Consortium for

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"Through this experience, I've learned that research isn't easy - there were times when I spent about 50 hours in the lab trying to get my project to work."

-Hasan Shahid

John C. Johnson Award Winner Explores the Fungal Population... (Continued)

presenting me with this opportunity," said Shahid. "Through this experience, I've learned that research isn't easy – there were times

when I spent about 50 hours in the lab trying to get my project to work."

Shahid is currently a member of the Alpha Epsilon-

Delta Pre-Med Honor's Society. He also participated in the Robotics Club his freshman, sophomore, and junior

years. He has recently been accepted into the WVU School of Medicine, and will attend classes this fall.

Bethany Graduate Attends NASA Academy at the Ames Research Center

This past summer, David Smithbauer, a Spring 2004 graduate of Bethany College, was given the chance to attend the NASA Ames Academy in Mountain View, CA.

Throughout the ten-week program, Smithbauer had the opportunity to work on a group project, attend various lectures, and travel to the Desert Research Institute in Reno, NV; the team-building event in Lake Tahoe, CA; the Lick Observatory in Santa Cruz, CA; the Half Dome in Yosemite National Park; the Johnson Space Center in Houston, TX; the Jet Propulsion Laboratory in Pasadena, CA; the Space Systems Loral in Palo Alto, CA; and the Monterey Bay Research Institute in Monterey, CA. His summer research project, "Stimulation Test Bed for Robotic Exploration of a Martian Surface," involved designing and implementing various methods of exploring rover interactions with Martian soil in a physically accurate computer model. In the end, he was expected to give a presentation on his work with the pro-

Smithbauer, who was one of thirteen students selected to attend the Academy, spent his last two years at Bethany College working on his senior project, "Exploration in Controlling and Mapping Multiple Wireless Robotic Units." The project, which received funding from the West Virginia Space Grant Consortium, involved designing and creating two small autonomous robots that were capable of randomly navigating the internal perimeter of an enclosed area, and communicating with a remote computer.

"By helping to fund my project, the West Virginia Space Grant Consortium enabled me to begin a study into an area of computer science that has fascinated me for many years," says Smithbauer. "I appreciate, very much, the help that I have received from the West Virginia Space Grant Consortium, and all the opportunities that it afforded me at a small school in West Virginia that would have not been possible otherwise," he added.

Smithbauer is currently working for the Institute of Scientific Research in Fairmont, WV. His work there entails

developing software applications for NASA Goddard Space Flight Center's ST5 mission, which is scheduled to launch in February of 2006. His primary responsibility, since he began working there in October of 2004, has been to create a web interface to ISR's Simulink ST5 predictive modeling and trending application. The application ingests mission plans and live telemetry as inputs and outputs the predicted health and status of the satellite's various systems such as the solid state recorder system, power system, and radio frequency antennae system.



Mission Accomplished! Sarah Sonnett and David Smithbauer visit the Advanced Flight Simulator in Ames' Crew Vehicle Systems Research Center.

Bethany Senior Studies the Dragline Silk of Marbled Orb Weaver Spiders

Nicole Hoy, a chemistry major at Bethany College, has been working diligently to analyze the dragline silk of a marbled orb weaver spider using gel electrophoresis for her senior project.

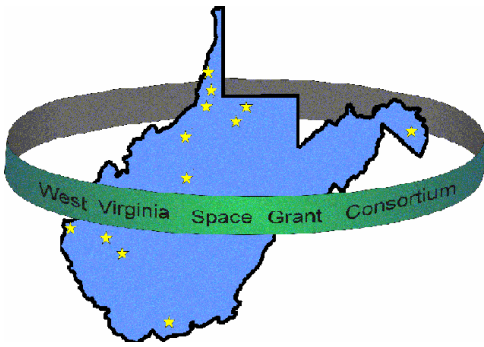
Hoy is working in conjunction with two other students, Kelly Chaney and Kirsten Trbovich, to complete an overall analysis of the orb weaver spider silks. Her project, which has been funded by the West Virginia Space Grant Consortium, involves isolating three different types of silk – radial, spiral, and dragline. After isolating the protein strands,

she will perform gel electrophoresis in order to find their size. The isolated strands can then be used in the experiment to find actual sequence of the amino acids in the protein. Chaney's work involves finding the actual amino acids present in the silk proteins, while Trbovich is responsible for finding the peptide map.

The project was passed onto Hoy by a student before her who was working on it. The main goal is to find uses for the silk, like making bullet-proof vests.

"My project is interesting to me because I enjoy trying to find the makeup of things," said Hoy. "Inch for inch and ounce for ounce, the silk is as strong as steel," she added.

Hoy is currently a member of Bethany's Alpha Xi Delta sorority and the American Chemical Society. When she's at home for breaks from school in Gibson, PA, she works at a nursing home. In the future, she plans to attend medical school.



West Virginia Space Grant Consortium

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Please Visit Our Website at:
<http://www.nasa.wvu.edu>

The West Virginia Space Grant Consortium is a group of West Virginia academic institutions with industrial partners who have joined under the sponsorship of NASA in order to encourage and support West Virginia's participation in science and engineering. The Consortium's Programs focus on research, fellowships, and K-12 Outreach; and a strategic vision for the state's involvement with the nation's future endeavors in science and technology.

The Consortium, which was established in August of 1991, consists of Bethany College, Bluefield State College, Marshall University, Fairmont State University, NASA IV&V Facility, Shepherd University, West Liberty State College, West Virginia High Tech Consortium Foundation, West Virginia State University, West Virginia University, West Virginia Wesleyan College, Wheeling Jesuit University, and the WVU Institute of Technology. The Consortium is housed in the College of Engineering and Mineral Resources at West Virginia University.

Upcoming Events

April: NASA Space Calendar (<http://www2.jpl.nasa.gov/calendar/#0504>)
April 12-14: Spring 2005 Aerospace Technology Working Group Forum; Johns Hopkins University, Maryland (<http://www.atwg.org/>)
April 12-14: National Astronomy Day 2005; Johns Hopkins University, Maryland (<http://www.atwg.org/>)
April 15: NASA Scholars Poster Presentations for the WVU Weekend of Honors
April 19-20: National Astronomy Week
May: NASA Space Calendar (<http://www2.nasa.gov/calendar/#0505>)
June: NASA Space Calendar (<http://www2.nasa.gov/calendar/#0506>)
June 13: Sixty-First Birthday - Jet Propulsion Laboratory (<http://www.jpl.nasa.gov>)
July: NASA Space Calendar (<http://www2.nasa.gov/calendar/#0507>)
July 4: Nine Hundred and Fifty-First Anniversary of the Crab Nebula Supernova (http://www.sedsorg/messier/more/m001_sn.html)
August: NASA Space Calendar (<http://www2.nasa.gov/calendar/#0508>)
August 12-21: NASA Exhibit at the Lewisburg State Fair (Those interested in attending can please contact Candy Ramsey)
September: NASA Space Calendar (<http://www2.nasa.gov/calendar/#0509>)
September (Date TBA): Fall Director's Meeting
October: NASA Space Calendar (<http://www2.nasa.gov/calendar/#0510>)
October 17: Partial Lunar Eclipse (<http://sunearth.gsfc.nasa.gov/eclipse/OH/image1/fig06-PL2005.GIF>)
October 26-29: National Space Grant Meeting at the Kennedy Space Center
November: NASA Space Calendar (<http://www2.nasa.gov/calendar/#0511>)
November 5: NASA Means Business Student Competition 2005 (<http://www.tsgc.utexas.edu/nmb/what.html>)
December: NASA Space Calendar (<http://www2.nasa.gov/calendar/#0512>)