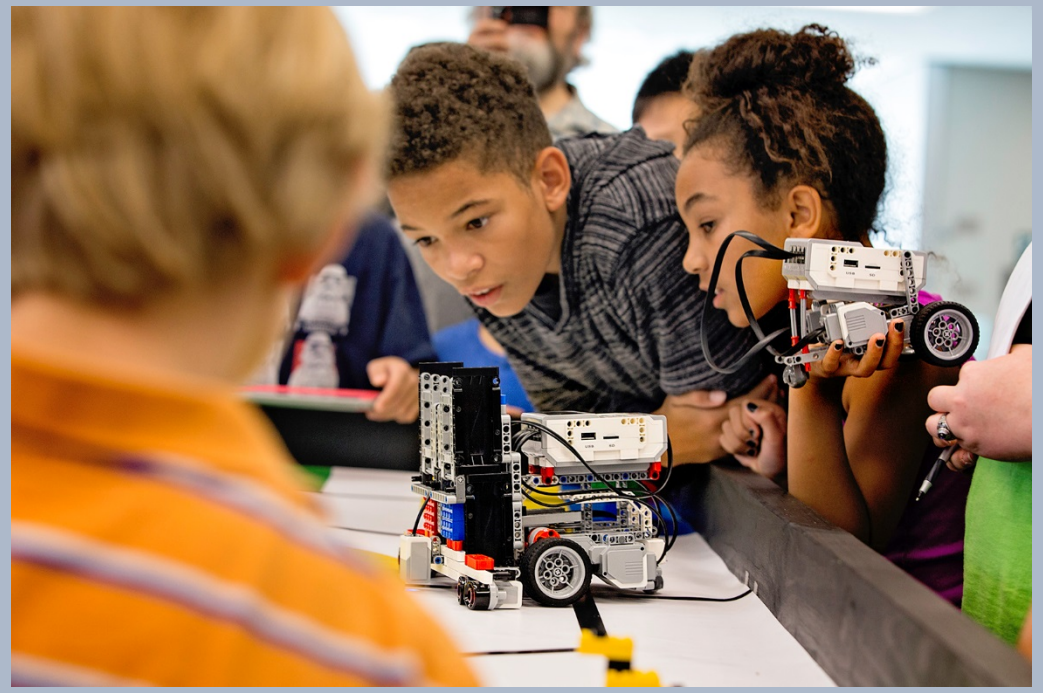
Ongoing Projects Sponsored by NASA WVSGC

prepared by Kati Baker and Candy Cordwell

NASA West Virginia
Space Grant Consortium

Marshall University, Southern WV FIRST LEGO League Robotics Outreach

The Robert C. Byrd Institute (RCBI) hosted a FIRST Lego League Robotics boot camp and weeklong summer camp at its Huntington facility in June and August of 2017.



Students were taught to build, program and operate Mindstorms EV3 robots and about the relationship between robotics and the STEM fields. The campers hailed from Boone, Cabell, Jackson, Kanawha, Lincoln, Logan, Putnam and Wayne counties in West Virginia.

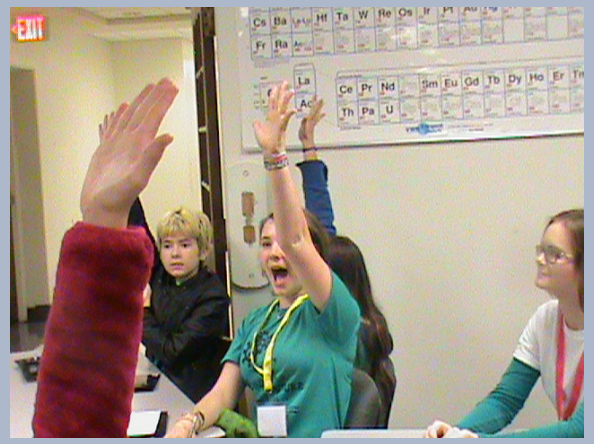
Project Name: Robotics Scale-Up Phase II **PI:** Charlotte Weber **Sponsored:** $5,000 **Cost Share:** $5,135

Putnam Pink Ladies

Hailing from Mountain View Elementary in Putnam county West Virginia, the Putnam Pink Ladies is an all girls First Lego League robotics team based in Hurricane, WV.

Project Name: FIRST LEGO League Competition in WV **PI:** Todd Ensign, NASA IV&V **Sponsored:** $5,000 **Cost Share:** Priceless

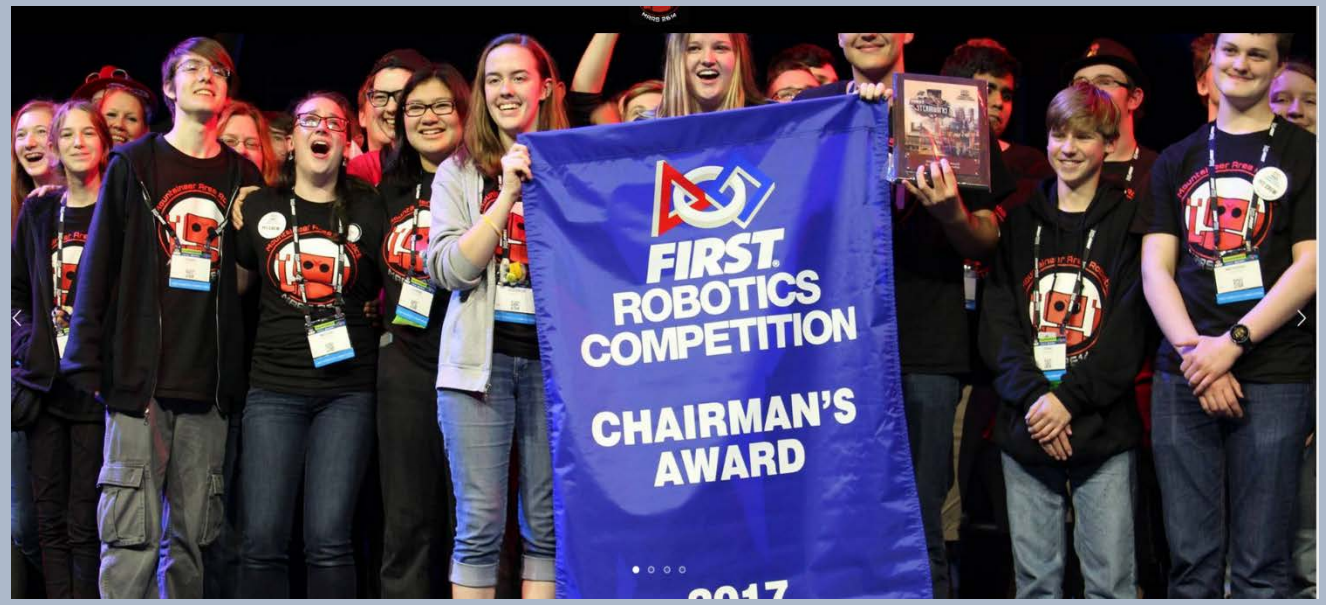
Shepherd University, Seeding Your Future Initiative



On October 14th 2017, Shepherd University will invite 5th through 8th grade girls out for a full day of hands-on workshops and interactions with STEM professionals in the hopes of increasing their interest in STEM areas. This will be the 4th annual Seeding Your Future conference.

Project Name: Seeding Your Future **PI:** Sytil Murphy **Sponsored:** $1,500 **Cost Share:** $23,172

Mountaineer Area RoboticS (MARS)



WVSGC is proud to have supported this program since its founding in 2008. Under the oversight of Dr. Earl Scime, this program has grown exponentially from its roots at two high schools in Morgantown to over 40 teams encompassing 23 West Virginia counties and one southwestern Pennsylvania county. In the 2017 season, MARS was awarded the Chairman's Award at the FIRST championship in St. Louis which is the most prestigious award at FIRST.

Project Name: Mountaineer Area Robotics **PI:** Earl Scime **Sponsored:** $5,000 **Cost Share:** $5,000

Society of Women Engineers (SWE) Girl Scout Day

Society of Women Engineers (SWE) hosts an annual event for Girl Scouts around the region, where daisies, brownies, juniors, and cadets come together for a day and learn about science, technology, engineering, and math (STEM) with college-age mentors. After the scouts have completed the day, they will receive a patch for participating in the event. This day is meant to be a stimulating day, full of activities in order to show how fun STEM-related fields can be!

Project Type: Higher Education

RockOn/RockSat-C

Students and faculty from several institutions in WV attended the RockOn/RockSat-C workshop that was held at the Wallops Flight Facility in Wallops Island, VA. During the workshop, participants learn how to build a sounding rocket payload through hands-on activities. On the sixth day of the workshop, the payloads are launched on a sounding rocket to about 73 miles into the space.

Major sponsorship by NASA IV&V

NASA Space Day

NASA Space Day was hosted at **WV State University** on April 28, 2017 with dozens of interactive exhibits that were enjoyed by school children, faculty, staff, and students. An estimated 800 area school children came to the campus, participating in the event.

The NASA Space Day event was free and several school groups, like the one shown, used the opportunity for a STEM-focused field trip.

West Virginia State University hosts **NASA Space Day, Research Symposium**

West Virginia State University (WVSU) hosted NASA Student Partnership for the Advancement of Cosmic Exploration (SPACE) Day in April on the university's Institute campus.

An exhibit featuring WVSU alumna Katherine Johnson, whose accomplishments at NASA were the basis for the film "Hidden Figures," was on display inside Hamblin Hall as part of the day's events. The event also featured a variety of hands-on activities designed to teach young people about science and space exploration.

The day included NASA Langley's travelling exhibit and a robotics station, rocketry station, a flight simulation and an exhibit on journeying to Mars. In addition, participants were able to build their own satellite out of Legos and tour an exhibit on the science of cycling that included a wooden bike, fat tire bike and electric bike.

More than 400 students from eight area elementary, middle and high schools attended.

The WVSU College of Natural Sciences and Mathematics also hosted its annual Research Symposium throughout the day, which featured a keynote address from Dr. David Atkinson of NASA's Caltech Jet Propulsion Laboratory.

"We are very excited to host NASA SPACE Day alongside the College of Natural Sciences and Mathematics' 22nd Annual Research Symposium day," said Dr. Naveed Zaman, dean of the College of Natural Sciences and Mathematics. "NASA's interactive displays and engaging activities, and WVSU students' research presentations, inspire the younger generation of scientists. I am also very thankful to our college students who are always ready to volunteer for these events."

The day was sponsored by the NASA West Virginia Space Grant Consortium in collaboration with WVSU, the NASA IV&V Facility and NASA Langley.

Sole sponsorship by WVSGC

Teacher Workshop
The Science Behind the Crime

The purpose of this workshop was to introduce teachers to the fundamental principles of bloodstain pattern analysis and how to convey them to their students. Through a series of hands-on laboratory exercises, teachers learned how to use math and science to study the size, shape, and location of bloodstains in order to determine the physical events which gave rise to their origin.

Project Name: The Science Behind the Crime **PI:** Christopher Bily **Sponsored:** $3,000 **Cost Share:** $3,000

Elementary Astronomy Workshop

This three-day summer workshop at the SMART Centre Market in Wheeling, WV taught fifteen K-8 teachers various activities to utilize in their classrooms, covering topics such as air and weather, Earth and Sun, and planetary science. These same participants will also be sharing the information they learned at this event with other teachers at the West Virginia Science Teachers Association (WVSTA) conference that will be held from November 2nd-4th in Wheeling, WV at Oglebay Resort.

Project Name: Elementary Astronomy Workshop **PI:** Elizabeth Strong **Sponsored:** $4,950 **Cost Share:** $5,987

Clarke Park Project

Hosted at Grand Vue Park in Moundsville, WV, this new program set up twelve outdoor interactive exhibits and held monthly StarWatches that used GoTo telescopes (seen right). On December 16th, there will be a Clarke Park dedication, ground breaking, and celebration. This same day will also be the 100th anniversary birthday of Sir Arthur C. Clarke.

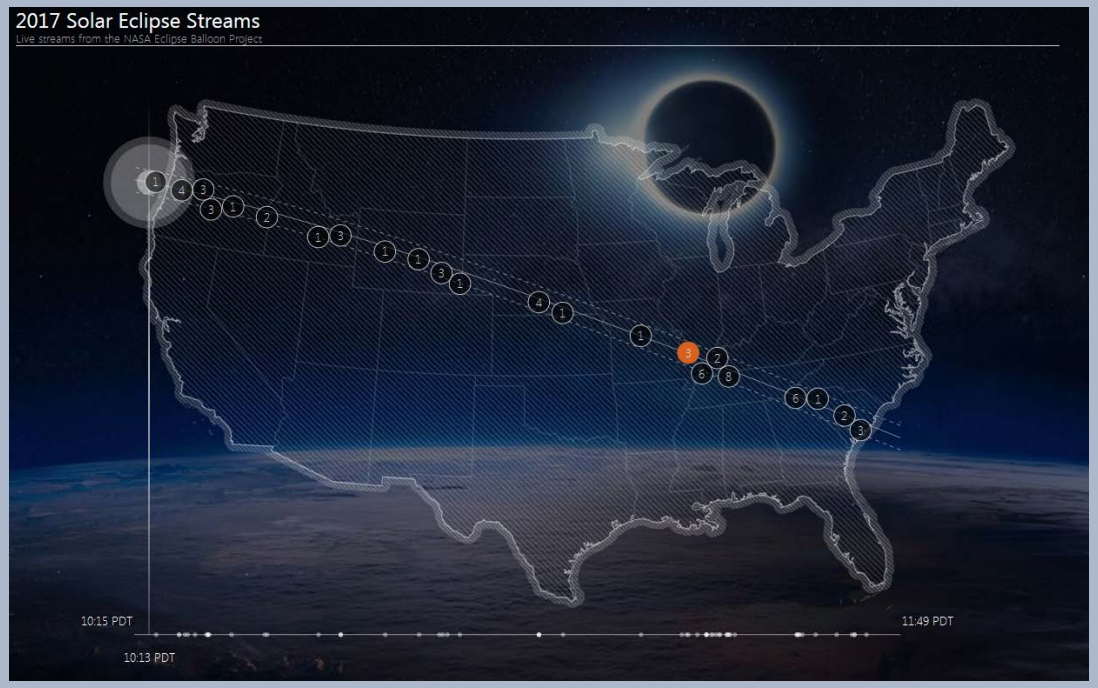
Project Name: Clarke Park Project **PI:** Robert Strong **Sponsored:** $5,000 **Cost Share:** $5,461

VEX Robotics Academy

A partnership with the Clay Center in Charleston and WVSGC have come together to create robotics camps for 9-14 year olds over multiple one-week camps. The curriculum was based on VEX, and interns from WVSGC were staffed for the sessions along with a Clay Center Educator.

Project Name: VEX Robotics Academy **PI:** Brandi Ettehadieh **Sponsored:** $5,000 **Cost Share:** $21,975

The Great American Eclipse



Organized by NASA Montana Space Grant Consortium, students across the country participated in a high altitude balloon flight on August 21st. The event was an opportunity to send live video and images from near space of the eclipse. Streams of the event were captured and made available online, allowing for collaboration across 30 state-based Space Grant Consortia.

With Dr. Jon Saken as faculty mentor, three Marshall University students created a team, MU-SPACE, to participate along with 54 other teams across 31 states. They went to Illinois to be in the totality path of the eclipse (see above). Other teams were sprinkled throughout the rest of the eclipse's path.

The Great American Eclipse

In preparation for the eclipse on August 21st, Dr. Williamson had multiple requests for eclipse glasses (above) over the summer from hundreds of teachers, schools, and educational organizations. During this time, she created videos for professional development as well as hosted an event in Morgantown the weekend before the eclipse.

Dr. Robertson-Honecker from WVU Extension also supplied STEM Ambassadors with glasses and materials to teach space related curriculum to 4-H youth throughout the summer. Together, both programs hosted a one stop shop website through WVU's planetarium, giving resources on the eclipse to all West Virginians.

Project Names: Solar Eclipse Teacher Professional Development & 4-H Summer Solar Eclipse Celebration **PI:** Kathryn Williamson & Jennifer Robertson-Honecker **Sponsored:** $4,920 & 4,940 **Cost Shares:** $7,425 & $5,000

Internships

Abigail Ida (above and right), Senior in Software Engineering.

Sebastian Reger, Senior in Computer Science and Computer Engineering.

Rosemberth Lopez, Junior in Aerospace Engineering.

This past summer, seventeen undergraduate and graduate students had the opportunity to participate in internships at various locations through WVSGC. These locations were: Bombardier, Goddard Space Flight Center, NASA IV & V, Langley Research Center, Clay Center, and JPL.

Internships (cont.)

What did you enjoy most about your internship?

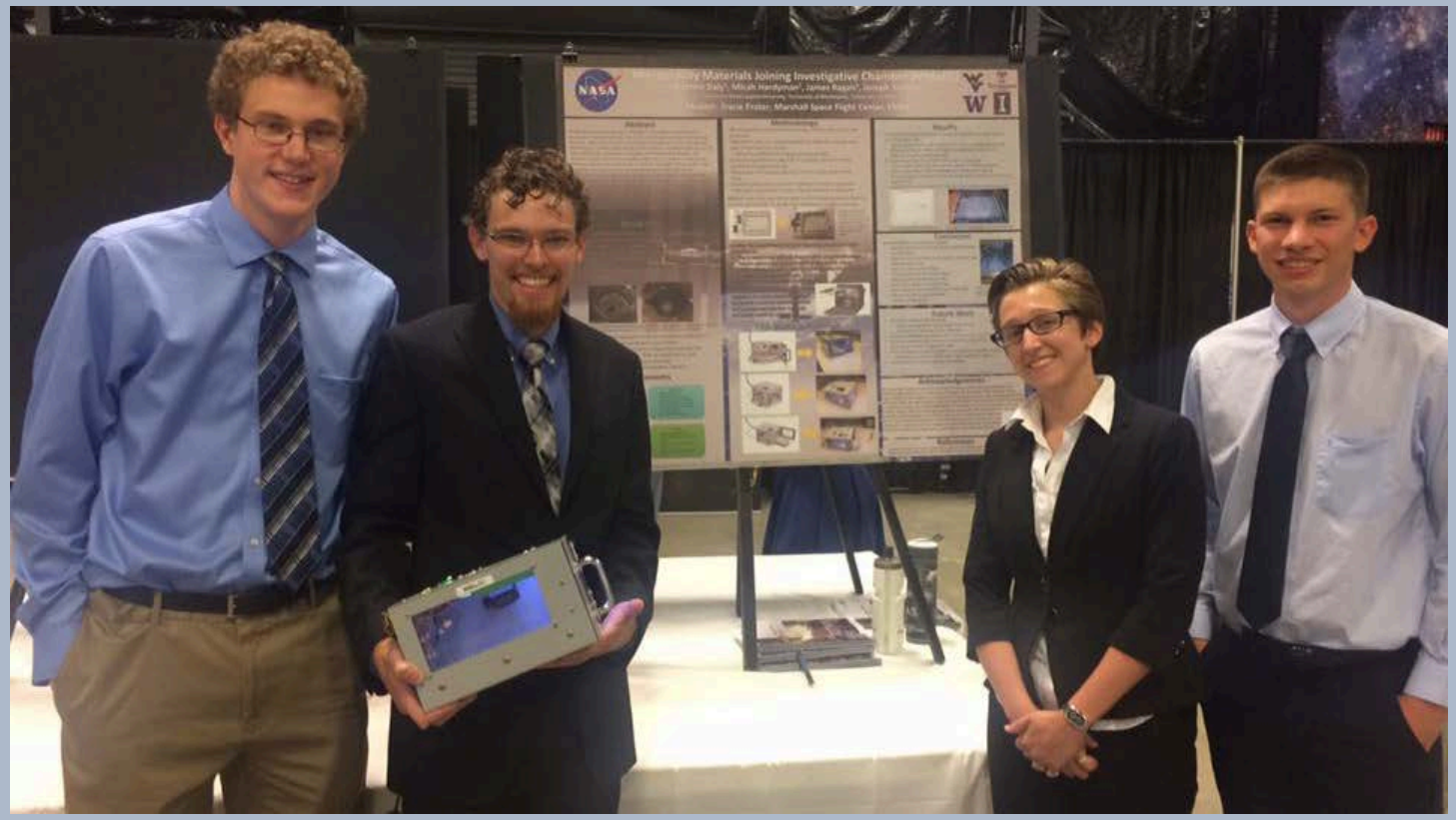
My favorite part of the experience was the opportunity to work with such an influential workforce within NASA IV&V. The NASA IV&V employees and mentors were extremely helpful in ensuring the interns had the resources to complete our best work. I also found inspiration in the other extraordinary NASA interns from around the country who formed lifelong friendships.

Morgan Cassels, Junior in Industrial Engineering.

Internships (cont.)

What did you enjoy most about your internship?

I highly enjoyed the large amount of networking opportunities at the NASA Marshall Space Flight Center that I was given this summer. I got to meet and interact with a lot of very inspiring engineers and learn about the very interesting work being done at NASA.



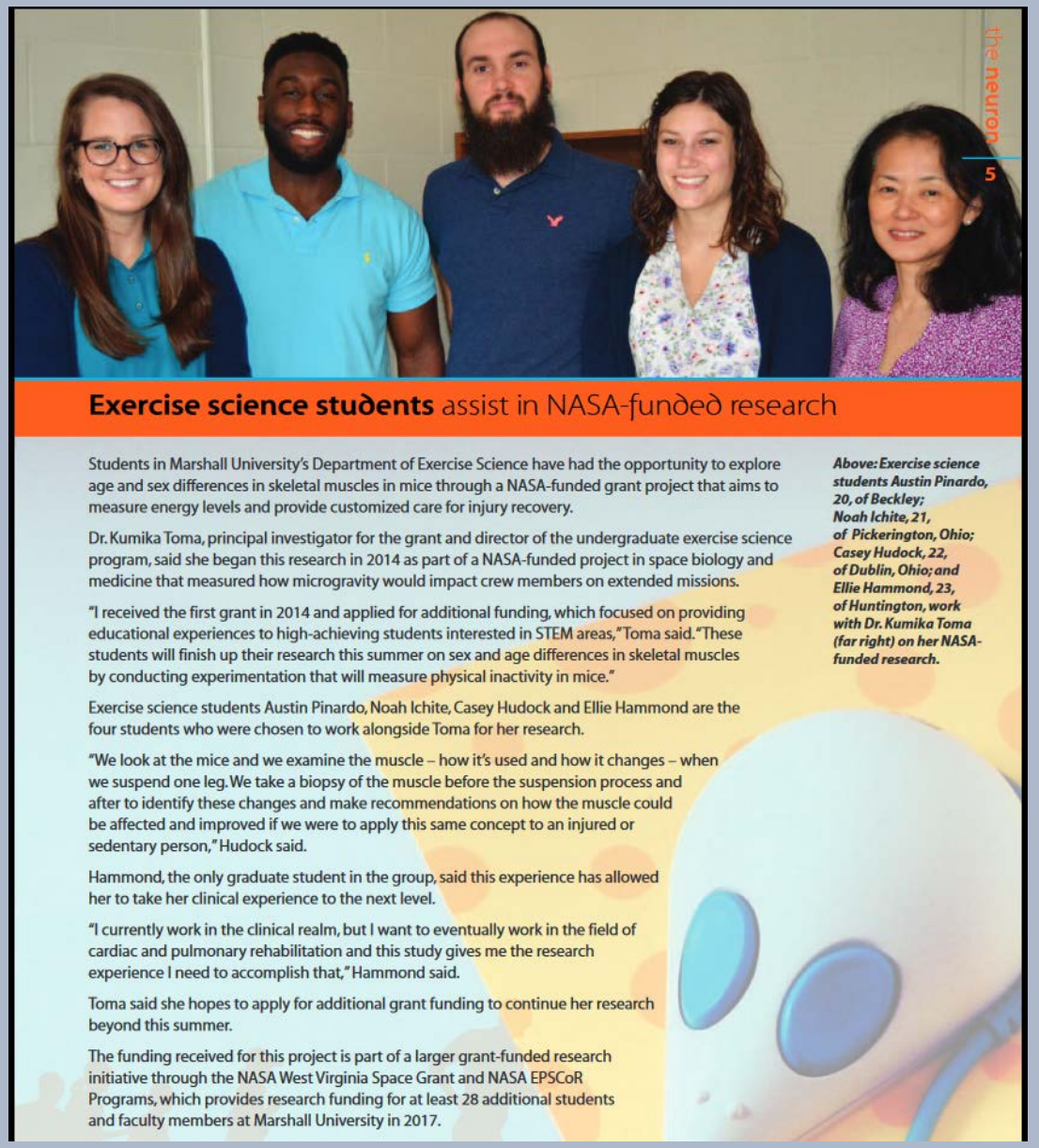
Shannen Daly (second from right), Graduate student in Mechanical and Aerospace Engineering.

NASA WV Space Grant Consortium Footprints

NASA West Virginia
Space Grant Consortium

Undergraduate Research

Working at Marshall University with Dr. Kumika Toma, Noah Ichite was one of four exercise science students to participate in ongoing research relating to injury recovery that was funded through both NASA's WV Space Grant and EPSCoR programs. The project was subsequently featured in the Summer 2017 issue of Neuron the West Virginia journal of science and research (seen right).



Exercise science students assist in NASA-funded research

Students in Marshall University's Department of Exercise Science have had the opportunity to explore age and sex differences in skeletal muscles in mice through a NASA-funded grant project that aims to measure energy levels and provide customized care for injury recovery.

Dr. Kumika Toma, principal investigator for the grant and director of the undergraduate exercise science program, said she began this research in 2014 as part of a NASA-funded project in space biology and medicine that measured how microgravity would impact crew members on extended missions.

"I received the first grant in 2014 and applied for additional funding, which focused on providing educational experiences to high-achieving students interested in STEM areas," Toma said. "These students will finish up their research this summer on sex and age differences in skeletal muscles by conducting experimentation that will measure physical inactivity in mice."

Exercise science students Austin Pinardo, Noah Ichite, Casey Hudock and Ellie Hammond are the four students who were chosen to work alongside Toma for her research.

"We look at the mice and we examine the muscle – how it's used and how it changes – when we suspend one leg. We take a biopsy of the muscle before the suspension process and after to identify these changes and make recommendations on how the muscle could be affected and improved if we were to apply this same concept to an injured or sedentary person," Hudock said.

Hammond, the only graduate student in the group, said this experience has allowed her to take her clinical experience to the next level.

"I currently work in the clinical realm, but I want to eventually work in the field of cardiac and pulmonary rehabilitation and this study gives me the research experience I need to accomplish that," Hammond said.

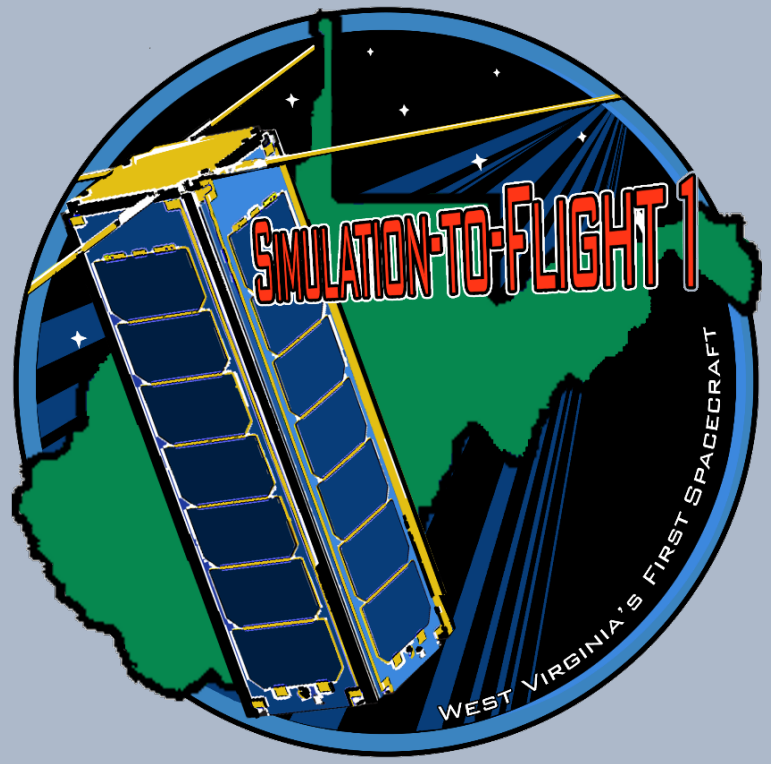
Toma said she hopes to apply for additional grant funding to continue her research beyond this summer.

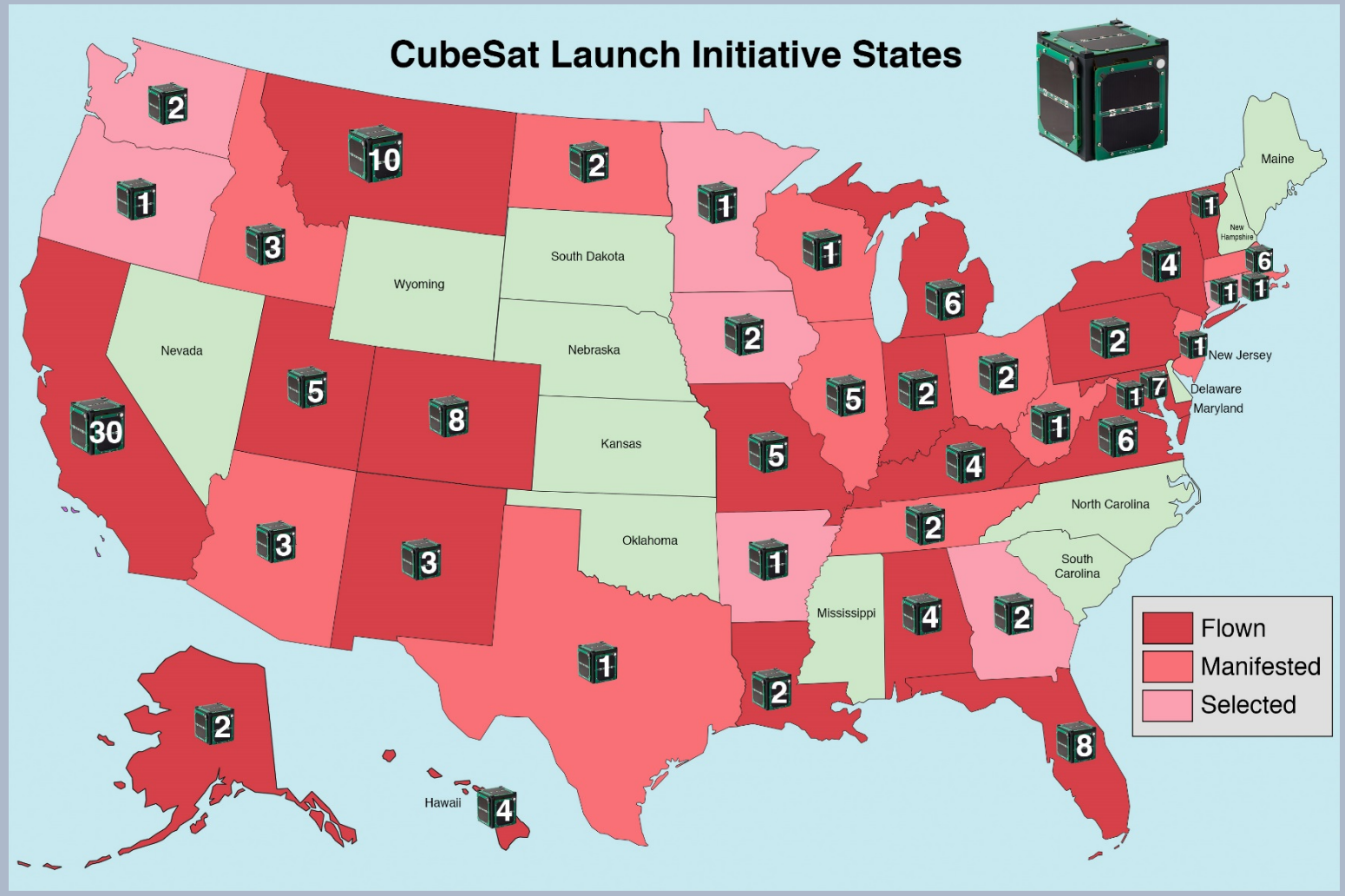
The funding received for this project is part of a larger grant-funded research initiative through the NASA West Virginia Space Grant and NASA EPSCoR Programs, which provides research funding for at least 28 additional students and faculty members at Marshall University in 2017.

Above: Exercise science students Austin Pinardo, 20, of Beckley; Noah Ichite, 21, of Pickerington, Ohio; Casey Hudock, 22, of Dublin, Ohio; and Ellie Hammond, 23, of Huntington, work with Dr. Kumika Toma (far right) on her NASA-funded research.

STF-1

Simulation-To-Flight 1, known as STF-1, will be launching in Q1 of 2018 as West Virginia's first CubeSat to be part of NASA's CubeSat Launch Initiative. STF-1 is one of 152 missions across the country which includes up to 38 states and the District of Columbia.





Women & Technology Conference

On June 26th of this year, the Women & Technology Conference was held in Charleston, WV to encourage professional women to share their current and future work in relation to the STEM fields.

This was the fourth conference in a series with the hopes of addressing issues such as the under-representation of women in STEM fields as well as ideas to help grow the state's economy.

West Virginia Science Teachers Association Conference

Educators and professionals from across the state come together for a three day conference wherein they share best practices in science education to return to their place of work and promote scientific literacy.

CONFERENCE SCHOLARSHIPS - Apply Now

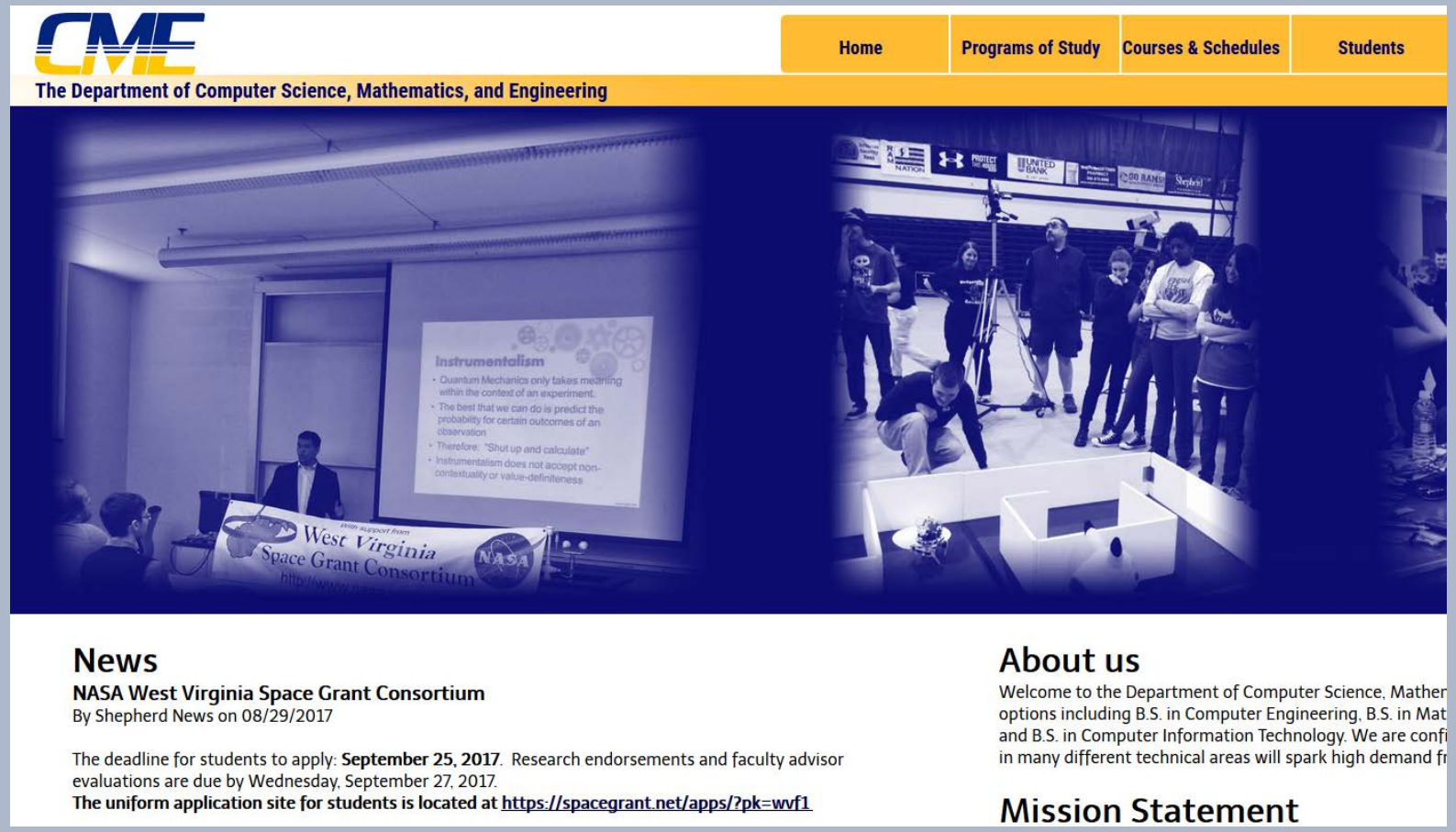
NASA WV Space Grant Consortium Scholarships

Thanks to the generous support of the NASA WV Space Grant Consortium, 40 conference scholarships are available for life science, biology, and environmental science teachers and pre-service teachers. Scholarship recipients will be required to attend HHMI Biointeractive workshops (6 hours). Scholarships awarded on a rolling basis.

Apply online: https://goo.gl/forms/mpdlpNdSORWGCGZH3

Currently, WVSTA has awarded 30 of their 40 conference scholarships which will convene at Oglebay Resort in Wheeling, WV on November 2nd-4th.

Affiliate Mentions



Shepherd University promoted the NASA WV Space Grant Consortium through a departmental website, encouraging students and faculty to submit applications for available fellowships.

Source: http://www.shepherd.edu/cmeweb/

NASA Mars Rovers

Having received a three-year **$750,000 grant from NASA EPSCoR**, WVU will develop software for future Mars rovers, specifically with the onboard autonomy of planetary rovers. A major foundation piece for the project will be Cataglyphis (seen right) which won Level 2 of the Sample Robot Return Challenge last year. Along with this, the WVU team will partner with researchers at NASA Jet Propulsion Laboratory Mobility and Robotic Systems Section for the project.

Research for the ISS

Another grant was awarded to WVU for **$100,000 from NASA ESPCoR** to conduct research and technology development aboard the ISS. WVU will partner with researchers at University of Rome Tor Vergata to further advance robotic printing of titanium dioxide foams (seen left). This research has the potential for applications in space such as efficient solar cells, batteries, and radiation shielding.