The Underwater Robotics Team (UWRT) is a student-led and student-driven extra-curricular activity at The Ohio State University. Currently consisting of 17 active members, the team has shown major progress in the design and construction of remotely operated vehicles (ROVs). ROVs are piloted vehicles used to perform tasks which are too dangerous for a human diver, such as underwater construction, harbor security, and exploration. In 2013, the team competed in the Marine Advance Technology Education (MATE) ROV International Competition winning the award for the most spirited team. Furthermore, the team is consistently involved in The Ohio State Fair, winning the award for “Best Technology Exhibit”, but more importantly, actively engaging the surrounding community.

The Underwater Robotics Team designed a remotely operated vehicle this past year to compete in the MATE International ROV Competition held in St. Johns, Newfoundland, Canada. The vehicle itself consists of an anodized aluminum housing with a CNC’ed acrylic dome and three thrusters, as shown in Figure 1.

The vehicle’s two forward thrusters are able to rotate 360˚ to allow for a 5 degree of freedom control, as well as an airplane style flight control. The company chose this design because it results in a very versatile and agile ROV. Having rotating thrusters not only expands the ability for movement, but does so in a cost and space efficient manner. The rear thruster that was present in the previous iteration has been moved to the top of the chassis. This allows for a surge motion by the ROV as well as making the rear plate easier to remove. This has greatly reduced the time required to access the internal electronics of the vehicle.

The thrusters can be seen in Figure 2.

Continued on Page 4
Director’s Corner

Summer, 2015

It has been a couple of months since I assumed the title of “Director” of the Ohio Space Grant Consortium (OSGC). The path to directorship was not straight. After the sudden retirement of Dr. Gary Slater as OSGC Director in September, I was nominated and elected to Director. Unfortunately, the process had to be halted for a while to fulfill the NASA Headquarters’ requirements, and I served as in the interim capacity until being officially voted again as OSGC Director on April 9, 2015. Thank goodness, this came at a perfect time, the day before our annual Student Research Symposium! I would like to thank Ms. Ann O. Heyward, Executive Vice President of the Ohio Aerospace Institute (OAI) for presiding over the election process, and OSGC’s Executive Committee for nominating and electing me in my current position. Many thanks to Dr. Lenell Allen, Director, Aerospace Research and Career Development (ARCD), Office of Education, for granting final approval, and also to Dr. M. Warfield Teague, Senior Program Associate, NASA Space Grant/EPSCoR, for participating in the meeting and also providing a very educational Orientation Session for new Space Grant Directors. Special thanks to our most capable Program Manager, Ms. Laura Stacko, and of course who would forget our most loyal Program Assistant, Timothy Hale, for making sure that things are moving smoothly at OSGC.

I started my year by meeting with the Community College – STEM Training and Retention of Students (CC-STARS) Program partners on a snowy day at the end of January; and then a successful submission of the FY2014 Annual Performance Document. The highlight of my Spring was my attendance at the National Council of Space Grant Directors' Spring 2015 Meeting and visits to the Ohio Congressional and Senate offices in Washington, D. C., in February with Ms. Laura Stacko, Dr. Kelly Cohen (University of Cincinnati Campus Representative), and Ms. Amy Jameson (Teacher, Gilbert A. Dater High School). The OSGC also supported Dr. Cohen and Ms. Jameson who also presented “University of Cincinnati Flight Camp for Middle & High School” at the meeting. We (OSGC Team) did pass our first hurdles by being selected for our three-year renewed funding of our base budget. As a result of this effort, our scholarship and fellowship program, which I view as our hallmark effort, is in good shape, and we anticipate that over 100 undergraduate and 6 graduate students are going to in the next academic year. Please make sure that your school is taking advantage of this grant and filling the quota of their allotted scholarships.

I attended the recent NASA Glenn Dayton Area Representatives workshop run by the Education group at Glenn, and all the attendees (University of Dayton, Central State University (HBCU), Wilberforce University (HBCU), Air Force Institute of Technology, Sinclair Community College, and Wright State University) all seemed enthused about the my presentation on OSGC opportunities. I believe that OSGC will make a positive contribution in a stronger partnership between Ohio Universities and NASA Glenn Research Center.

Continued on Page 3
Director’s Corner (Continued from Page 2)

While we were still working on our FY2014 NASA Office of Education Performance Measurement (OEPM) reporting, we received a surprise visit by Mr. Donald Gregory James, Associate Administrator for Education at NASA Headquarters. We enjoyed sharing all the good things we are doing in Ohio with respect to NASA/Space Grant activities, and had an excellent dialogue with Donald James. In response this is what he said: “I enjoyed talking to you about our shared interest in Education and appreciate the work you are doing to advance the cause. I am adding my Admin to this email to put a placeholder on my calendar for this (2016 Student Symposium). I welcome the opportunity to talk to the students.”

I am also looking forward to some of our collaborative programs, getting our OEPM report out, and taking a vacation sometime in the future. Please feel free to contact me at any time to talk about your ideas. I am confident OSGC will continue to thrive within our network of colleges and universities.

With Every Good Wish!

Sincerely,

P. Ruby Mawasha
Director, Ohio Space Grant Consortium
Email: ruby.mawasha@wright.edu
Phone: (937) 775-3575

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Director

Ms. Laura A. Stacko
Program Manager

Mr. Timothy M. Hale
Program Assistant
The electronics plate, shown in Figure 3, was optimized for easy access and component mounting. The plate is made out of aluminum, for heat-sinking effects, and was milled for precision. The team can access all of the electrical components with ease by sliding them out of the aluminum housing by the rear plate.

The Underwater Robotics Team represents a unique niche in the local community. The team engages in the community by participating in events such as the Ohio State Fair. As a participant in the Ohio State Fair, the Underwater Robotics Team designs and builds an exhibit to educate the local community about marine engineering.

This involves smaller ROVs which guests can actively control and engage with in a small pool. The past year, electromagnets were attached to these smaller ROVs and guests were challenged to pick up painted washers from the bottom of the pool. This entertained many guests; both young and old. Although not a quantifiable metric, the joy the exhibit brought to everyone was a rewarding experience, engaging teachers and encouraging them to incorporate the aspects of underwater vehicular design to their classroom. We have even engaged younger interested individuals with special needs to encourage them to pursue their underwater interests! The team also participates in Ohio State camps hosted by Women in Engineering (WiE) as mentors and judges for the ROV camps to engage young adults in science, technology, engineering, and mathematics (STEM) fields. The team has a firm belief that STEM education is an important initiative.

The Underwater Robotics Team hopes to continue to make a local impact on STEM education through both participating in community events and with proper funding, sponsoring technology demonstrations of the team’s ROVS as a part of OSGC’s larger initiative.

This year, the team participated in two events – one was a semester long high school project using Sea Perch kits. The teams had to navigate through an obstacle course, and the local competition. Shown in Figure 4 is a picture of the winning team with the collegiate mentors.
The second activity was a year-long activity at a local middle school. The team helped mentor middle school students via the use of Arduinos. During the first half of the school year, the primary focus was teaching the students the Arduino programming language. As shown in Figure 5, a member of the team is shown explaining a quadcopter to students— one of the many applications of robotics. During the second half of the year, the students were given the task of designing and programming a line following robot. Figure 6, shows an example of the vehicle on the competition track.

For the upcoming year, the team would like to extend its focus to AUVs for the Association for the Unmanned Vehicle Systems International (AUVSI) Robosub Competition. Given the complex nature of the controls associated with AUVs, the team will move to a two-year design period to design and thoroughly test an AUV. The first year will be dedicated to the design and construction of the AUV whereas the second year will be used to practice and debug the code which controls AUV.

Preliminary AUV design work indicates the need for high efficiency thrusters for reduced power consumption. The AUV construction will involve plenty of raw materials, most notably aluminum and acetyl as well as the tools required to form and machine these components. Various sensors, including more sophisticated IMUs, pressure transducers, 3-D stereographic vision systems, as well as hydrophones and underwater speakers are desired to provide ample environmental feedback and provide a means of obtaining information for debugging purposes and potentially transmitting information.

OSGC Fellow Receives Doctoral Degree!

Congratulations to Dr. Robert D. Knapke, OSGC Doctoral Fellow, on receiving his Ph.D. Degree in Aerospace Engineering from the University of Cincinnati on May 1, 2015. Robert is shown here at the Doctoral Hooding Ceremony with his Research Advisor, Professor Mark Turner, Associate Professor, Aerospace Engineering.

“The OSGC allowed me the freedom to choose a topic that interested me and the financial support provided by the Fellowship allowed me to focus entirely on my research.”

–Robert D. Knapke
Thanks to NASA online educational resources, the Ohio Space Grant Consortium and other generous funders, iSPACE was able to present the iSPACE STEM Educator Academy for 5th grade educators here in Ohio during the 2014-2015 academic school year. This project focuses on increasing educator skills, knowledge and expertise in STEM. The overall objective of the project is to develop educators who can train their colleagues to exponentially increase the number of skilled STEM educators.

The rationale for this project is that, beginning in 2014-2015, students were being assessed based on new content and standards. Some of this content moved to different grade levels so many educators lack the expertise to teach it. This is particularly an issue with 5th grade where most educators have limited exposure to physical science. This past year, they had to demonstrate that, not only did their students understand the content, but they also had to show that they could apply it. With topics such as “light” and “forces and motion” being added to 5th grade curriculum, educators were very concerned that, without significant support, they would not be successful in conveying the content and skills to their students.

iSPACE solicited applications and, based on those applications, selected participants for our first cohort. Our initial goal was a ten-person cohort but the applicants were so competitive that we chose to accept the top thirteen. We also thought by taking the additional educators, it would provide a cushion for anticipated dropout. To our surprise and delight, all thirteen educators enthusiastically remained in the program throughout the year and are still highly engaged.

So far, the educators have attended 5 iSPACE Professional Development educator workshops covering grade appropriate curriculum, inquiry learning, skills and methods to enrich their teaching strategies. Many of the lessons were taken from NASA Education and adapted to fit grade level standards and tie into 5th grade curriculum. (OSGC funds partially were used for the curriculum development.) Participants received curriculum kits that contain lesson plans and all materials and equipment needed to replicate those lessons for a class of 30 students as well as additional consumable materials to convert the kit into a Presenter Kit to use when they presented professional development sessions for other educators in their school/district. They also received CEUs (Continuing Education Units).

Each educator who participated in iSEA was invited to bring his/her class to iSPACE for a field trip at no cost. This provided an opportunity for iSPACE educators to model the content delivery for classroom teachers. Teachers have repeatedly told us that this is a very valuable part of the professional development model we use. (OSGC funds partially covered the cost of these field trips.)

The teachers will attend one more professional development workshop this summer and another in the Fall of 2015 where they will develop their own lessons to present at the iSPACE STEM Educator Experience (iSEE), a regional two-day educator conference that iSPACE will host in November. In addition, they will learn to develop rubrics to help them evaluate their own teaching success as well as the progress of their students.
iSpace STEM Educator Academy (Continued from Page 6)

Beginning in September, the iSPACE STEM Educator Academy will add a second cohort of ten, 3rd grade educators to repeat the process to benefit teachers in that grade level in their schools and districts.

Not only will this approach build sustainability but it will also demonstrate for educators how they can foster the curiosity and innovative thinking in their classrooms that can steer their students toward STEM careers.

Below are educator comments from Cohort 1 regarding the five workshops attended to date:

✦ The kids really enjoyed all the lessons I received, and we used all our materials. What a great workshop!!!

✦ I especially like having the flash drive with the lessons and the step-by-step for the spectroscopes.

✦ The workshop was great, and lessons were able to be utilized immediately.

✦ I have more lessons for my light unit & I can take my lessons deeper. I engaged in a great dialogue with other colleagues.

✦ This was by far some of the best professional development and hands-on instruction that I can use in my classroom that I have ever received—probably the best—but just in case I can't remember something I leave it to at least the first or second best!

✦ Having the PowerPoint was useful for showing the students step-by-step procedures and also helpful to give an image of the laser.

✦ These workshops have been very valuable, and many of my colleagues want them available to their grade levels as well.

✦ Can't wait to do the paper rockets with my students as a review of the Force and Motion we learned about earlier in the year.

✦ I was so excited going into Force and Motion because of this workshop. This is one area that all of our science info and teachers had the least amount of info because it was a new topic for 5th grade. However, this conference made going into this unit very exciting! And, I have already used principles from this unit in our unit, and I will be doing more specific labs from the iSPACE materials this week. My students have been having so much fun, and yet they are learning. The information and materials that you have given us is amazing and invaluable. You have boosted my confidence in science tremendously.

✦ I was unaware that the Sun is closer to Earth than Saturn. Do we revolve at about the same rate or something? Is that why Saturn is always farther?

Additional NASA education materials and resources for teachers by grade level, type, and subject are available online at:  http://www.nasa.gov/education/materials/
OSGC Celebrates Twenty-Third Annual Student Research Symposium!

OSGC Director Ruby Mawasha welcomed attendees to the 23rd Annual Student Research Symposium on Friday, April 10, at the Ohio Aerospace Institute (OAI) in Cleveland, Ohio. Students from colleges and universities across Ohio convened to discuss their research projects with university mentors, NASA personnel, OAI senior researchers, and fellow students. OSGC Junior, Education, and Community College Scholars presented posters and competed in a “Best Poster” competition. Senior Scholars and Fellows made oral presentations discussing progress made on their research projects. The University of Akron Lunabotics team also presented. Representatives from NASA Glenn Research Center Human Resources and other companies also attended and provided career guidance. Dr. Janet L. Kavandi, NASA Glenn Research Center Deputy Director and former Astronaut, was the keynote speaker, and spoke to the group after lunch about her career as an Astronaut and with NASA.
OSGC Celebrates Twenty-Third Annual Student Research Symposium! (Continued from Page 8)

OSGC Director Ruby Mawasha flanked by the winners of the Poster Competition (From left to right):
*Anthony O. Smoktonowicz, Owens Community College – “Best Community College Poster”
*Jenna M. Falldorf, Wright State University – “Best Education Poster”
*Calvin J. Anderson, Cedarville University – “Best Junior STEM Poster”

The University of Akron Lunabotics Team

Kenneth Smith, Jr. (University of Akron)

Taylor Manahan (Ohio Northern)

Daniel Zillich (University of Dayton)

Tiffany Bailey (Central State University)

Kyle Flenar (University of Cincinnati)

Grace Revenaugh (Cedarville University)
OSGC Celebrates Twenty-Third Annual Student Research Symposium!
(Continued from Page 9)

Daniel Peoples, Jr. (Central State)  Kristen Schuler (Cleveland State)  Jeremy Lee (Wright State University)

Heather Hitchcock (Wright State)  Zachary Sirois (Cedarville University)  Andrea Terrasi (Case Western Reserve)

Kia Potts (Kent State University)  Owen Macmann (University of Cincinnati)  Chidiobi Nwagu (Central State)

Michael Radetic (Youngstown State)  Calia Battista (University of Akron)  Ashley Bowers (Youngstown State)
Student Team – The Wright State University Lunar Mining Team

By Brian Cheatwood

The Wright State University 2013-2014 Lunar Mining Team members are: Andrew Proeschel, Nick Heitkamp, and Brian Cheatwood with Dr. Scott Thomas as the Team Advisor.

Designing, manufacturing, and assembling the robot was a challenging and rewarding experience for everyone on the team. The team started the design process in August of 2013. During the early stages of the project, we examined photos and videos of previous Lunabotics robots and began generating ideas on how we wanted our excavation, locomotion, and unloading systems to work. We also made a presentation to Dean Klingbeil to secure some additional funding for the robot and began looking at other avenues of funding such as OSGC.

After we had decided upon a conceptual design for the robot, the team focused their efforts on studying the material properties of lunar regolith and looking at ways to create an efficient design for each subsystem to cater to the unique properties of this substance (45° angle of repose and high cohesion). The team first looked at previous research done in lunar mining arena and then purchased some crushed basalt (which closely mimics the properties of lunar regolith) to perform tests of their own. In the interest of testing, we constructed a shear box, a tumbler bin, a scoop bucket testing apparatus, a wheel testing apparatus, and a conveyor testing apparatus. This process took the better part of two months to complete. Upon completion, we had many collected data regarding how much torque was required to operate the excavator buckets and unloading system, which conveyor belt configuration was the most efficient, anticipated wheel traction, the volume collected by each excavator bucket, and the anticipated unload rate of the robot.

After collecting testing data during the end of the Fall Semester and the first week of Spring Semester, it was time to finally start creating a concrete design for the robot. During this process, the team worked together to create a CAD model of the robot in Solidworks. After completing the chassis, unloading system, and excavator designs, the team began fabricating and assembling these subsystems and worked on creating a CAD model which integrated all of these systems together. The biggest challenge during the integration process was creating a method for actuating the excavating system and designing a bin wall which accommodated the folding action of the excavator. It took a couple of weeks to figure out this dilemma, but finally by the beginning of April these problems were solved using a four-bar system to actuate the excavator and a three-piece folding wall to accommodate the excavator. Construction of the robot was completed by the end of April, and the electronics system was finalized shortly after. Overall, the team felt that the process of building and designing the robot was an extremely valuable learning experience. This project taught us the importance of teamwork, funding, and project planning. We also learned a great deal about design, manufacturing, project timelines, budgets, electronics, micro controllers, and programming.

Overall, the team really enjoyed getting to experience the 2014 NASA Lunabotics competition. In the pits it really showed that NASA worked hard to promote a culture of friendliness and camaraderie among the participants – teams openly shared information about how their robots were constructed and were happy to give advice about how our robot could be improved. One team even brought in a snow cone machine and gave out the frosty treats to anyone who wanted to cool down from the Florida heat.

Continued on Page 12
The team arrived at Kennedy Space Center on Monday, May 19, about 10 minutes before the check-in deadline. We quickly unloaded our robot, tools, and other equipment and made our way over to the pits. After getting our robot unpacked, we were allowed to complete a trial run in the mining arena to see how our robot performed. We dawned some full body suits and respirators and made our way to the mining arena to get the robot set up and our WiFi configured properly. Next, we headed over to the control trailer where we set up our laptop and fiddled with the remote camera to get a better view of our robot. We finally got the green light to begin our mining run. During our trial run, we tested all of the systems of the robot and found that, for the most part, everything worked pretty well except for the fact that our robot did not drive quite as well as we expected—we were unable to make sharp turns in the regolith due to a lack of low end motor torque and our wheel cleats were digging too far into the regolith. After the completion of our trial run, we formulated a plan to modify the wheels by shaving off some of the excess cleat height to try to decrease the robot's tendency to dig into the regolith.

The next day at the competition, we took our wheels over to the full-service machine shop that NASA provided, and they graciously shortened our cleats. After this we took our robot over to the sand pits (NASA has a practice arena filled with sand that can be used at any time) and tinkered with it to see if our adjustments had worked. It seemed like it worked a little bit better than before, but since sand and regolith are very different in terms of driving properties, it was tough to tell whether our modification had actually improved the robot.

Wednesday marked the day of our first official run at the competition. We took our robot to the inspection area, where they measured the height and weight of our robot and helped us tie up some loose ends. As the run started, we managed to make it through the obstacle course, but once in the mining area, the robot had difficulty turning again. We were able to successfully mine and unload some regolith while in the mining area, but we were unsuccessful in our attempt to navigate back to the unloading station. After the run, we formulated another plan to get some replacement motors with more torque. As Thursday rolled around it became apparent that there was simply not enough time or funds for us to get replacement motors and modify our wheel mounting assembly. We removed about half the cleats from our wheels, ran some more tests in the sand pit, and prepared for our run on Friday. On Friday the team completed our final run at the competition. As before, the robot had motor torque issues, and we were unable to make it back to the unloading station. We talked with West Virginia University (our closest neighbor in the pits) about these motor issues and they mentioned that they had the same problems their first year at the competition and gave us some advice on good candidate motors to be used for next year’s robot.

Overall, the team had a fantastic time at the competition. It was great to network with the other teams at the competition and learn about improvements that could be made on the robot for next year's design. We received many compliments on the design of our robot, and many people were shocked at the fact that we were able to build the robot with such a small team. Our experience at the competition will be immensely helpful in providing guidance for the Wright State Lunabotics Team. For more information go to: https://www.youtube.com/channel/UCWR5khxCySNygNl7Ab3M24g/videos
Ohio Space Informal Education Grant Award – “Star Gazers”
Cincinnati Observatory - Cincinnati, Ohio
By Dean Regas

“Keep Looking Up!” That is the philosophy and catch phrase for the nationally syndicated TV program, Star Gazers. Star Gazers is the unique, bite-sized astronomy show that challenges you to get outside and experience the night sky. The program is a continuation of the iconic astronomy weekly, Star Gazer, made famous by the late Jack Horkheimer, and I have been privileged to be the co-host since 2010 along with fellow astronomer James Albury.

Each week Star Gazers broadcasts a 5-minute and 1-minute program around the globe to show you "What's Up" in the night sky. It's fun, quirky, and full of the latest astronomical discoveries.

We film the show in North Miami, Florida, at the studios of PBS affiliate WPBT. Every two months I fly to Florida and record the highlights for the following two months in front of a green screen. Graphic designers then put in the stars, planets, and special effects. Since October, 2014, the Ohio Space Grant Consortium has helped fund my travel to film the show and to survey PBS stations around the country. In Ohio, Star Gazers airs on WBGU, Bowling Green; WCET Cincinnati; WOSU Columbus; WOUB Athens; and WPTD Dayton.

For more information on the show and to watch past and future episodes, please visit the official Star Gazers site: http://www.stargazersonline.org

Spread the word and, “Keep Looking Up!”

Dean Regas is the Astronomer for the Cincinnati Observatory and co-host of PBS’ Star Gazers.

He can be reached at dean@cincinnatiobservatory.org
Dr. Janet L. Kavandi, National Aeronautics and Space Administration's John H. Glenn Research Center Deputy Director in Cleveland, Ohio, was the keynote speaker at the annual OSGC Student Research Symposium. Dr. Kavandi spoke about her career path with NASA and how to succeed as a scientist or engineer, and also provided an update of current NASA Missions. She also took time to answer questions from the audience. One student paid her the highest compliment by stating: “I could listen to you speak all day!”

In her position as Deputy Director, which she assumed in March, 2015, Dr. Kavandi shares responsibility for planning, organizing and managing the programs and projects assigned to the Center along with the Center Director. The Glenn Research staff consists of more than 3,200 civil service and support contractor employees and has an annual budget of approximately $581 million.

Prior to being named Deputy Director, Dr. Kavandi served as the Deputy Director of the Health and Human Performance Directorate at NASA’s Johnson Space Center in Houston where she was responsible for the NASA flight surgeons and human research investigations on the International Space Station. She also served as both the Director and Deputy Director of Flight Crew Operations at Johnson, where she was responsible for the Astronaut Corps and Aircraft Operations at Ellington Field near Johnson.

Dr. Kavandi was selected as an astronaut in December, 1994. During her time in the Astronaut Office, she supported payload integration for the International Space Station, Capsule Communications, Robotics, and served as Deputy Chief of the Astronaut Office. She is a veteran of three space flights, serving as a Mission Specialist on STS-91 in 1998, STS-99 in 2000, and STS-104 in 2001. Dr. Kavandi has logged more than 33 days in space, traveling more than 13.1 million miles in 535 Earth orbits.

Born in Springfield, Missouri, Dr. Kavandi earned a Bachelor of Science Degree in Chemistry from Missouri Southern State College in Joplin, a Master of Science Degree in Chemistry from the University of Missouri in Rolla, and her Doctorate in Analytical Chemistry from the University of Washington in Seattle.

Dr. Kavandi has been recognized with a Presidential Rank Award, two NASA Outstanding Leadership Medals, two Exceptional Service Medals and three NASA Space Flight Medals.
New OSGC Faces!

Colonel Matthew Sambora – Air Force Institute of Technology (AFIT)

The OSGC’s new Campus Representative and member of the Executive Committee at the Air Force Institute of Technology (AFIT) is Colonel Matthew Sambora, Director, Center for Space Research and Assurance. Many thanks to Alan L. Jennings for his service to the OSGC. Welcome Colonel Sambora!

Dr. Joseph D. Ortiz – Kent State University (KSU)

The OSGC’s new Campus Representative and member of the Executive Committee at Kent State University is Dr. Joseph D. Ortiz, Professor, Department of Geology, Center for Ecology and Natural Resources Sustainability. The OSGC thanks Dr. Yanhai Du for his contributions to the Ohio Space Grant Consortium. Welcome Dr. Ortiz!

Dr. James Moller, P.E. – Miami University

OSGC’s newest Campus Representative and member of the Executive Committee at Miami University is Dr. James Moller, P.E., Associate Professor, Mechanical and Manufacturing Engineering. The OSGC thanks Dr. Tim Cameron for his years of service to the Ohio Space Grant Consortium. Welcome, Dr. Moller!

Dr. Freddie L. Jordan – Wilberforce University

Dr. Freddie L. Jordan, Associate Dean, Professional Studies Division – Natural Sciences is the current Campus Representative and member of the OSGC Executive Committee at Wilberforce University. Dr. Jordan is filling in for Dr. Edward A. Asikele who is currently recovering from a serious health condition. Dr. Asikele has been a part of the program since its inception, and we wish him well as he continues to recover, and thank him for his dedicated years of service to the OSGC. Welcome, Dr. Jordan!

Mr. Andrew Carroll – Terra State Community College

Mr. Andrew Carroll, Dean of Engineering, Technologies, Mathematics & Workforce Development, is the new Campus Representative at Terra State Community College. The OSGC is grateful to Dr. James Bighouse for his exemplary years of service, and we wish him well in his retirement. Welcome Dean Carroll!
Goodbye to Dr. Jennings!
Ohio, a Land of Opportunity! By Alan Jennings, Ph.D.

Those of you reading this ought to know, Ohio is a great place, and the Ohio Space Grant is one piece that helps it shine. I have been raised here and want to share some of the special opportunities that have helped shape me.

From middle school to adult workforce education, Ohio leverages its great industrial base. School extracurricular activities give a comradery that motivates beyond the classroom. Career centers provide the chance to get critical skills on relevant machines. Community colleges and extension campuses are scattered around the state so that geography is not so much of an issue. Ohio universities have top-notch programs, but it's the student chapters and internship programs that give them so highly sought after. Ohio's big research facilities and international headquarters and its agile small businesses are solving today's and tomorrow's challenges in medicine, manufacturing, businesses, energy and agriculture.

The Aerospace Research Center (ARC) was established in August, 2013, to focus aerospace activities within the College of Engineering to optimize and connect core strengths and to address current and future air transportation challenges. The ARC is a unique concept among U. S. academic institutions.

I have benefited from each one of these. I'm pleased to say that my Space Grant Fellowship was a key enabler to pursue a PhD. And with that, I was able to give back by serving on the OSGC Executive Committee. This is literally the case where OSGC was able to develop the workforce needed to sustain Ohio technical leadership. It's with a sad heart that I am heading to Arizona. I'll be working with missiles, and there many more wide open spaces there. Traveling around the country has helped me know not to take all these advantages for granted. Take the time to look for opportunities at your community college or university extension campus just down the street from you, or volunteer in your local school or library.

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<td>Terra State Community College</td>
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Ohio Space Grant Consortium Membership

Ohio Space Grant Consortium
22800 Cedar Point Road
Cleveland, OH 44142

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