OSGC Observations
A publication of the Ohio Space Grant Consortium

Surveillance for Intelligent Emergency Response Robotic Aircraft (SIERRA) project at the University of Cincinnati takes fire detection to a new level

OSGC Awards Research Grant to the University of Cincinnati!

Surveillance for Intelligent Emergency Response Robotic Aircraft (SIERRA) is a student managed project at the University of Cincinnati (UC), focused on providing a tactical Unmanned Aerial Systems (UAS) for the benefit of emergency response organizations. The team's current mission is directed toward the area of wildland (forest) fire UAS applications. The University of Cincinnati, in collaboration with the West Virginia Department of Forestry, the State of Ohio, Marcus UAV Corporation, NASA, and the Ohio Space Grant Consortium (OSGC) has acquired a fully functional UAS for technological development. The goal of the current program is to lay the groundwork to integrate UAS technology with State Fire Agencies in a cost-effective manner, through collaboration with customers, researchers, manufacturing, and industry experts. It is expected that through practical application this technology will be able to decrease response time, decrease uncertainty, and increase safety which will result in fewer lives lost due to fires, better use of resources, and a potential cost savings.

2011 Unmanned Aerial Systems (UAS) Training
From left to right: Roger Ozburn (WVDF), Sushil Garg (UC), Jesse Bushong (MARCUS UAV), Dr. Kelly Cohen (UC), Phillip Italiano (UC), Bipin Shedge (UC), Bryan Brown (UC), Robert Charvat (UC), Andrew Nels (UC), Dr. Manish Kumar (UC), and Chris Klick (RiteWingRC).
Photo taken by Balaji Sharma (UC).

Currently, fire detection technology is based primarily on the use of human spotters on the ground or on aircraft. The SIERRA team believes building on this with autonomous systems will allow not only for the reduction of personnel in the danger zone but also allow for new technologies to be implemented at this level. The team has specialized in integrating fire detection capabilities with Geographic Information Systems (GIS) to allow for live data plotting. This technology is being developed to allow for a suite of fire platforms to combine data into one system for an "entire situation" approach. This allows for more informed, intelligent decision making. The team also specializes in UAS flight research for understanding how to increase safety with UAS regulations while maintaining the versatility which has made the platforms so unique

SIERRA Team Members (from left to right): Robert Charvat (UC),Jesse Bushong (MARCUS UAV), and Team Leader Dr. Kelly Cohen (UC).

What sets this program apart from many other collegiate programs is the research approach promoted by Dr. Kelly Cohen, Associate Professor of Aerospace Engineering and Engineering Mechanics (UC), and Dr. Manish Kumar, Assistant Professor, Department of Mechanical Engineering (UC). The approach is centered upon systems engineering, in which students focus results to support two important end customer drivers: time and money.

(Continued on page 5).

Inside this Issue:

Director's Corner

Diane D. DeTroye, Manager, Space Grant and EPSCoR Programs, NASA Headquarters, and Nathan A. Wukie, Senior, Aerospace Engineering, University of Cincinnati, conversing at the Great Midwest Regional Student Poster Session. (October 4, 2011)
Photo taken by Dr. Gary L. Slater.

You should always be suspicious when someone asks you to do a job and adds "It really shouldn't take too much of your time!" I'm finding that true also for the job of Director of OSGC! I'm writing this just before the Thanksgiving holidays, and it seems like now I can take a breath and relax for a few days. We have just submitted our proposal to NASA Headquarters for the final "Augmentation" proposal for our FY2011 budget. (Note FY2012 started almost two months ago! That means I guess we should have a month or two before we have to write a FY2012 proposal for next year's budget!) Our other Fall activities included a National Space Grant meeting in Green Bay, Wisconsin, and a Regional meeting in Champaign, Illinois, an Ohio-SAT workshop, and the general business of reviewing a slew of proposals from our affiliates and students.

Actually it has been fun—and it is exciting to see the good work that we can do with funding which on the national scale is fairly small. Our scholarship and fellowship program is continuing its strong showing in all our affiliates. We currently are supporting over 65 students (undergraduates, graduates, and community college). Pending approval of our Augmentation funds, we intend to add 14 Senior Scholars, 10 Education Scholars, and 10 Community College Scholars to the list. That plus the various student projects under the SI-CHOP program add up to over 50 students that receive support from OSGC. In addition, using Augmentation funds we will be supporting several new K-12 programs including a Student Spaceflight Experiment Program (SSEP) in the Cincinnati Public School System that will create and fly a small experiment aboard the International Space Station later in 2012.

Among our affiliates I am happy to acknowledge the start of a new Balloon-Sat program at Miami University, and the continuing work on the Ohio-SAT concept whereby we are working to put together an Ohio nano-satellite program under the leadership of Jon Black at the Air Force Institute of Technology (AFIT). At the time of this writing, a team at the University of Dayton is working on the instrument bus for a satellite, and we are hoping to bring in other affiliates as the program progresses. Also in this issue take a look at the student interns we have supported this year. In addition to our traditional program at the various NASA Centers this year, we instituted an intern program focused on Ohio small businesses through funding from NASA's Exploration Systems Mission Directorate (ESMD). We have had great reviews on these both of programs from students and employers, and we hope to continue next summer (using Augmentation funds.)

As for the future, well, the crystal ball is a bit murky right now. All the affiliate representatives have helped support us by writing to our congressmen (and congresswomen) and senators about the work we do. The country is operating right now on a "continuing resolution" for FY2012—although House and Senate conferees are currently meeting to establish a final budget. In view of the political climate I expect we will be given a reduced budget next year—but are hoping the cuts are small and consistent with the general reduction in the NASA Education line. Further down the road, the NASA Associate Administrator for Education, Leland Melvin, has indicated all the NASA Education budgets and funding priorities are being reevaluated, so we're waiting to see what that means.

Sometimes I feel Space Grant is the best-kept secret in the STEM education area. I suggest that if you are doing something noteworthy—tell people about it. The University Public Affairs Offices at most schools are anxious to put out news about their programs. The current articles on the Cincinnati SIERRA project and the Akron Lunabotics team are two examples where OSGC funding has helped students and generated great publicity for them and for us. We at the University of Cincinnati (UC) have found that advertising some of our student projects is a great recruiting tool.

As a final note, in each newsletter, Laura Stacko tries to include success stories from some of our graduates. If you have a Space Grant graduate you are proud of and want recognized—give Laura a call at (440) 962-3032, and tell her about him or her.

Sincerely,

Prof. Gary L. Slater
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Upcoming Events:

Student Research Symposium – April 20, 2012
Education Scholars Workshop – February 20, 2012

More Information About the Ohio Space Grant Consortium:

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The Nineteenth Annual Student Research Symposium
Friday, April 8, 2011

Dr. Gary L. Slater, OSGC Director, welcomes participants to the 19th Annual Symposium.

The Ohio Space Grant Consortium held their Nineteenth Annual Student Research Symposium on Friday, April 8, 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. Dr. James Gilland, Senior Scientist and Research Team Manager at the Ohio Aerospace Institute, spoke to the group during lunch about Engineering careers. The day concluded with a group photograph and results from the poster competition.

Senior and Fellow Oral Presentations

Junior, Education, and Community College Poster Presentations

Dr. James Gilland (OAI) presents "Who Are You Calling an Engineer?"

Poster contest winners (from left,to right): "Best Community College Poster", Jennifer E. Allison (Lakeland Community College), "Best Junior Poster", Carré D. Scheidegger (Cleveland State University) and "Best Education Poster", Leah R. Mendenhall (Marietta College).

2010-2011 OSGC Scholars and Fellows

OSGC Summer Internships

OSGC supported a number of students across Ohio at NASA Centers and with industry during Summer, 2011. Ohio-Space Partnerships Advancing Career Exploration! (OH-SPACE!), a NASA Exploration Systems Mission Directorate (ESMD)-funded program under the direction of Gloria Murphy, helped provide support for student internships at five different companies throughout Ohio.

Kirsten S. Nicolaisen – ZIN Technologies

Kirsten S. Nicolaisen, a Junior Mechanical Engineering major at Cedarville University, interned this summer at ZIN Technologies in Cleveland, Ohio. During her time at ZIN, Kirsten worked on three different projects: Observations and Analysis of Smectic Islands in Space (OASIS), Exercise Countermeasures Project (ExCP), and In-Suit Injection System (ISIS) with her mentors, Brian Finley, Program Manager, and Chris Sheehan, Project Lead.

She spent the majority of her time working on OASIS, a research experiment designed to fly on the International Space Station in order to analyze the behavior or liquid crystal in a 2D form. Kirsten did various design work and research, parts ordering, materials testing, and assembly. The ISIS project is devoted to designing an injection system that can be used in space in the event that cabin pressure is lost. The device includes a 3-1/2", 18-gauge needle that would be capable of puncturing an astronaut's suit and thigh. Kirsten tested different springs and septum heights and did buckling calculations on the needle. For the ExCP project she created fluid schematics in AutoCAD.

"Working at ZIN has definitely given me a deeper appreciation for the aerospace industry, and I would love to do something along those lines after graduation. Everyone was more than willing to explain things to me and showed me applications of what I'd been learning in school. In the same respect they still treated me as a professional and were counting on me to pull my weight which was a definite confidence booster."

Kirsten advises other students to apply to a variety of internships, even if they don't sound like a perfect fit for you. Once you interview with the company you may find that it is the perfect opportunity. Outside of school Kirsten enjoys reading, sports, and traveling. She plans to backpack through Europe next summer.

ZIN Technologies

Eden F. Hummel – NASA Glenn

Eden F. Hummel, a Senior Electrical Engineering major at Cleveland State University, spent her second summer as an intern at NASA Glenn Research Center. This summer she worked with Gregg Calhoun in the Engine Research Center on three test cells; Lean Direct Injection (CE-13C), Pre-Processing of Hydrocarbon Fuels (CE-24), and Optically Accessible High Pressure Burner (SE-5).

Using the Lean Direct Injection cell, Eden and Gregg tested field devices such as thermocouples, pressure transducers, flow meters, and pressure differential switches for alarms and functionality. Problems encountered during testing were diagnosed and repaired. Eden also developed data sheets and made modifications to a Graphical User Interface (GUI) in the program WonderWare, becoming familiar with piping and instrumentation diagrams (P&IDs) during this process. Eden also worked on the Pre-Processing of Hydrocarbon fuels, configuring field devices in the programmable logic controller (PLC) as well as installing devices to allow for remote operations. A human- machine interface (HMI) screen was created in WonderWare for this project as well as assembly of different category 5 (CAT5) interface cables to link the network to the pump. Eden also designed and computed a GUI for the liquid flow system in the Optically Accessible High Pressure Burner test cell. "There have been numerous pieces of test and lab equipment that I've become familiar with including a process calibrator, digital multimeter, thermocouple simulator, local area network (LAN) cable tester and a cable tracer."

Eden plans to pursue her Master's Degree in Electrical Engineering after graduating from Cleveland State University in December, 2011.

GRC GLENN RESEARCH CENTER at Lewis Field

Amy M. Newman – Etegent Technologies

Amy M. Newman, a Junior Mechanical Engineering student at Miami University, interned this summer at Etegent Technologies in Cincinnati, Ohio, with her mentor Dr. Stuart J. Shelley. The main focus of her work involved ultrasonics. Amy was responsible for using Matlab and modeling software to reproduce and analyze experiments.

According to Amy, the best part of being an intern was "I get to be a part of an engineering company and see how it works from the inside. I get to interact with everyday people that have really interesting jobs. I really like that I am given a task, and then left to solve it. It gives me a certain responsibility and freedom to complete it as efficiently as I can."

Although she may not spend her career in ultrasonics, Amy feels confident that she would be able to handle work of that nature in future jobs. She cautions prospective interns to be flexible with their expectations, since you really don't know what you will be getting into until you begin your work.

Amy plans to study abroad in Germany next year and following graduation from Miami, attend graduate school.

Etegent TECHNOLOGIES

Visit **http://www.osgc.org/Opportunity.html** for more internship information.

SIERRA Project (Continued from Cover page)

Kelly Cohen (center), flanked by Manish Kumar (left) and Robert Charvat (right) .

> "Just like today's cars can sense wheel slippage and automatically apply anti-lock brakes, modern wild land fire management systems can automatically detect a fire via a camera from a UAS and add the information, in the form of a map, to a user. This allows the user to focus on 'what is the best action?' and not 'where is the fire?'"
> -Robert Charvat, SIERRA Student Team Leader

SIERRA Student Team leader and OSGC Fellowship Recipient Robert Charvat summarizes: "By focusing on financially responsible, timely solutions, the team has been able to minimize developing technology, and instead develop the best use for advanced technology currently available for the customer. This is important as it closes the loop in modern technology development by not only developing a technology, but also by working with the manufacturer and customer to deploy it in the most effective manner possible."

Using simulation tools the team has been able to demonstrate significant benefits with emerging UAS technology. Robert elaborates, "By working with industry, it was quickly learned that a system capable of identifying fires, was also easily capable of doing other tasks such as wild game monitoring and timber inspections. Simulations became a very important and powerful tool as they not only verified individual mission capabilities, but opened doors for further discussion of other mission types, in which by the click of a mouse a system could be analyzed for its multiple mission versatility." The team has specialized in interfacing Geographical Information Systems (GIS) with optimal control and decision making technologies.

On November 5, 2011, the team flew a tactical UAS airframe, the Zephyr, produced by Marcus UAV Corp. in Morgantown, West Virginia, supporting a 36-acre wildland fire burn. In this demonstration the team conducted 5 flights including 3 over the fire area while testing the systems performance in the operational environment. "The demonstration clearly demonstrated the potential of the aircraft to support both first responders and extended fire response. The team is currently analyzing the data which will be summarized and presented at national and international conferences in the coming year. A second field test is being planned for December which will involve the use of multiple UAVs in a more operational mode.

The SIERRA team has always focused hard on working to get field experience and data, as it can provide for a great opportunity to gain practical experience which a lab cannot simulate. This is important as a University a great place to bring together customers, government and manufactures of technology. This is because a University can provide a non-profit venue in which technology can flourish based on what is most effective and beneficial for the technology and industry as a whole. The SIERRA project is another demonstration of this in which, by the support of government and state sponsors industry and customers can work together for improved solutions," Charvat said.

The SIERRA project has created a portable fire tracking device light enough to be carried in a backpack and thrown into the air by one person. Once in the air SIERRA can be preprogrammed or flown by remote control, mapping and transmitting fire and firefighter locations

The team is now looking to move into its next research phase which will include an in-depth systems engineering approach to providing a wildland firefighting organization its own squadron of flying robots, without having to depend on a third party in an emergency. This is expected to include an initial operational capability for West Virginia Department of Forestry with 5 UAVs, ground stations, communication and computer systems, and decision making software.

SIERRA Student Team Leader Robert Charvat has also been a part of the OSGC Scholarship program since 2008, receiving Junior and Senior Scholarship awards throughout his undergraduate years. He is currently the recipient of the OSGC Special Minority Fellowship as he finishes his Master's Degree in Aerospace Engineering at the University of Cincinnati. Other student team members are: Andrew Nels, Ted Meyer, Nick Buhr, Bryan Brown, Nate Bodenschatz, Balaji Sharma, and Sushil Garg.

The SIERRA project has generated significant interest on the Internet with features on numerous websites such as Medical News Today, a BBC interview, and a Discovery Channel feature.

Alabama Space Grant Plays Key Role in Reuniting Former Ohio Student! After Graduation – Thomas E. Beechem, III

I am sure you have heard the idiom, "It's a small world," meaning we frequently see the same people in different places. What are the chances of running into a former OSGC student while waiting for an elevator in the Sheraton Crystal City, Virginia, Hotel Lobby?

March 2, 2011—After returning from a long day of visiting Ohio Congressional and Senate offices on "The Hill" in Washington, D. C., OSGC Director Gary Slater, Associate Director Gerald Noel, and Program Manager Laura Stacko were enthusiastically flagged down by members of the NASA Alabama Space Grant Consortium—Director John C. Gregory and Assistant Director Debora Nielson—who had also returned from their Hill visits when they were approached by a young man who recognized the "Alabama Space Grant Consortium" logo on their folders and inquired if they knew anyone from the Ohio Space Grant. Within moments as if fate somehow played a role, the Ohio contingent walked in, and **thanks to Dr. Gregory and Ms. Nielson**, a reconnection was made with Thomas E. Beechem, III, former OSGC Master's fellowship recipient from the University of Dayton. Tom just happened to be in Washington, D. C., presenting his research for Sandia National Laboratories at a national conference and was staying at the same hotel!

The following story highlights what Tom has been doing since graduating from the University of Dayton and leaving Space Grant:

Thomas E. Beechem III, former OSGC fellowship recipient.

A native of Kentucky, Thomas Beechem made the short drive up to I-75 to obtain his undergraduate degree in Mechanical Engineering from the University of Dayton (UD) in 2003. A recipient of the Ohio Space Grant Consortium (OSGC) fellowship in 2004 and 2005, he continued his studies at UD working under Khalid Lafdi to study the fabrication and mechanical properties of pitch based carbon foams being developed for use as a multipurpose material for aerospace applications.

Upon receiving his Master's Degree in Materials Science in 2005, Thomas began his Ph.D. work at the Georgia Institute of Technology where he focused on micro/nanoscale heat transport and specifically thermal measurements of microelectronics using Raman spectroscopy. Immediately after graduating from Georgia Tech in 2008, he began work as a staff scientist in the nanomaterials science department of Sandia National Laboratories in Albuquerque, New Mexico. Currently, Thomas oversees a diverse research program at Sandia that develops new implementations of Raman spectroscopy to gain insight into both thermal phenomena as well as the growth and properties of nanomaterials including graphene, carbon nanotubes, and differing kinds of semiconductor nanowires. He has authored over 30 articles in peer-reviewed journals and his review article on Raman thermometry will be featured on the cover in the latest issue of Spectroscopy (**http://spectroscopyonline.findanalytichem.com/**).

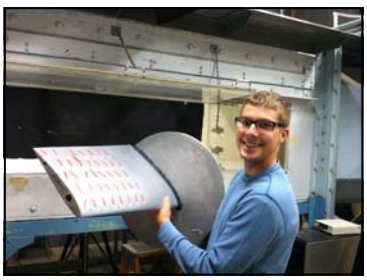
Thomas credits the Ohio Space Grant Consortium as being pivotal in his decision to continue on to graduate school and pursue an advanced degree. "I came to UD more focused on playing ball [he was part of UD's varsity baseball team from 2000-2004] than becoming a scientist. Graduate school was not something I ever intended to pursue." After finishing his undergraduate degree, he still had another year of eligibility to play baseball and began examining his options. "It was at this point that I was made aware of the Ohio Space Grant Consortium. I remember thinking that this almost seemed too good to be true. I could keep playing baseball, begin studying something of my choosing, and make money doing it." He smiles at this point and continues, "In fact, because of the tuition coverage and the stipend, I was able to give back my baseball scholarship for the final year. You could say that in a way the Ohio Space Grant Consortium paid for my Master's Degree and a second baseman."

> "Ohio Space Grant afforded me the opportunity to explore what working in science looked like. It let me see that research was something that I enjoyed doing and made me look forward to going to work every day. Without this opportunity, science is not something that I would have pursued."

UNIVERSITY of DAYTON

Sandia National Laboratories

OSGC Scholar Spotlight – Joseph V. Balla
The Ohio State University



Joey Balla, native of Canton, Ohio, was awarded an OSGC scholarship at The Ohio State University in 2010 for his studies in Aerospace Engineering. Over that summer, he also participated in the ESMD internship project, working at Marshall Space Flight Center under the direction of Dr. Kurt A. Polzin, studying pulse inductive plasma accelerator circuits. The OSGC scholarship that Joey received allowed him to continue working on his research throughout the academic year. The developments made by Dr. Polzin and Joey were presented and well received at the 32nd International Electric Propulsion Conference in Germany. Joey plans to continue his studies in Aerospace Engineering at Ohio State to complete his Master's Degree this June.

THE OHIO STATE UNIVERSITY

Krista J. Kroninger – ZIN Technologies

Krista J. Kroninger, a Senior Electrical Engineering major and Computer Science minor at Cedarville University, spent her summer interning at ZIN Technologies in Cleveland, Ohio. She worked on the PBRE (Packed Bed Reactor Experiment), an International Space Station (ISS) payload that studies how microgravity affects the hydrodynamics of liquid-gas flow in a packed bed reactor with her mentor, Tony Bruzas. The packed bed reactor that is currently on the ISS purifies liquid and is not currently working the way that scientists think that it should be. While at ZIN, Krista learned LabVIEW, a graphical programming environment to automate testing on the PBRE breadboard prototype. The LabVIEW software allowed Krista to input one file and create multiple sets of conditions.

Krista's favorite part of being an intern was being able to learn without deadlines or stress. She advises peers to look into companies before applying for internships to make sure that the work will be a good fit.

Outside of school Krista enjoys reading fantasy and science fiction and writing poetry. She plans to finish off her Bachelor's Degree this year and begin work to explore different areas of electrical engineering. Krista also plans to go to graduate school.

ZIN Technologies

Kamau B. Mbalia – NASA Ames Academy

A recent Environmental Engineering/Mathematics graduate of Central State University, Kamau B. Mbalia was selected to participate in the NASA Ames Academy this summer under the direction of his mentor, Friedemann Freund. The main focus of his research was earthquake forecasting. Kamau monitored water oxidation and polyaromatic hydrocarbons at the rock-water interface due to the stressing of rocks to determine the probability of earthquake occurrences. Throughout the summer Kamau greatly enjoyed the opportunity to conduct, run, and monitor his own experiments. "The knowledge learned thus far has been simply amazing. Taking part in such cutting edge research and being part of the team has taught me a lot and will be very beneficial in my career."

Kamau advises all students to acquire internship experience that aligns with their future career goals during their matriculation. Kamau enjoys playing soccer, basketball, and golf in his free time. He plans to attend graduate school at The Ohio State University in the Fall.

NASA Ames Research Center

Jacob R. Kilver – NASA Goddard

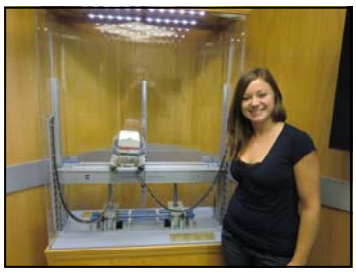
A Junior Electrical and Computer Engineering student at The Ohio State University, Jacob R. Kilver spent his summer interning at NASA Goddard Space Flight Center in Maryland. Jacob worked in the Altitude Control Systems Branch with his mentor, Eric Stoneking, on the development of flight simulator software by fitting a curve to the pressure field of a thruster plume. He interned at NASA Glenn Research Center the previous summer and couldn't wait to return to NASA again this year.

The internship at Goddard helped bring Jacob closer to the day-to-day operations of engineering and challenged him to solve problems not typically encountered in the classroom. "The learning curve is a lot steeper. Even though you have an experienced engineer overseeing you, he might not necessarily know what to do either, so you have to teach yourself a lot. It is also different because usually the problems you are solving do not have just one correct answer. You can't look in the back of the book to check to see if you are correct."

Jacob plans to work in industry after finishing his undergraduate degree and complete his graduate education in Robotics Engineering at Carnegie Mellon University.

NASA Goddard

Ashley J. Pugh – NASA Ames



Ashley J. Pugh is currently a Junior majoring in Aeronautical and Computer Science Engineering at The Ohio State University. Ashley interned this summer at NASA Ames Research Center, working with the Vertical Motion Simulator testing of the Large Civil Tilt Rotator with her mentor, Carlos Malpica. During her internship, 10 pilots tested the simulator rate the handling qualities on the Cooper-Harper scale. The team she worked with has been testing the concept for three years and plans to build put their plans for the Large Civil Tilt Rotator to commercial use.

This is Ashley's second year as an intern at Ames, and she continues to gain skills that will help her in the classroom and the workplace. "The first time [at Ames] my project dealt with a subject that I hadn't covered in class yet. This created an intense learning curve that I had to overcome, which ended up helping me gain skills that are good for future class work. This time, the fundamentals of understanding what the engineers and pilots are doing on the Large Civil Tilt Rotator was something I learned right before starting the internship. Therefore, I am able to make the wonderful realization that the material I put so much work and time into learning will actually be used once I start my career, and I get to see it be used first hand, which is the best motivation a student can be given." Ashley enters the first of two senior years this fall. After completing this, she plans to work in the aeronautics field. She is also the President of the National Social and Professional Sorority for Women in Engineering and Related Majors, Phi Sigma Rho.

NASA Ames Research Center

OSGC Supports Ohio State Buckeye Minesweepers Team

Supported in part by an OSGC Student-Innovative-Creative-Hands-On Project (SICHOP) grant, The Ohio State University created the Buckeye Minesweepers team to participate in the International Collaboration for Aerial Landmine Detection (ICALD) under the direction of Dr. James Gregory, Assistant Professor, Mechanical and Aerospace Engineering Department. The mission of the ICALD is to design and develop an aerial vehicle to detect undetonated landmines in Lebanon. The most prevalent methods of detecting undetonated landmines include manual detection with a metal detector and land vehicles (a tank-type vehicle that simply drives where landmines are suspected and detonates them). These methods are both dangerous, as humans are necessary to drive the tank or carry the sensor, and time-consuming. Therefore, the ICALD mission calls for the unmanned aerial detection of landmines such that human lives will not be at risk and the mine-sweeping can be more efficient. An aerial vehicle also lessens the risk of accidentally detonating such mines, as it does not come in contact with the ground.

Students on the team designed, built, and tested an aerial platform for the detection of buried anti-personnel landmines and unexploded cluster bombs in cooperation with students and faculty at the American University of Beirut. The OSU team was responsible for constructing the air vehicle while the Lebanese team designed the sensor system.

The Ohio State students analyzed several airship designs. The team examined the size, weight, and cost of each design, performed an aerodynamic analysis, estimated the range and endurance, and researched various materials and propulsion systems that could be used to construct the airship. An ellipsoidal airship design was chosen to be further developed, as the team already had an ellipsoidal inflatable in their possession. Due to export control regulations barring the integration of the airship and sensor package, the team was forced to abandon the construction of an optimized design in favor of a smaller vehicle for flight testing purposes. An electric propulsion system was used to both propel and maneuver the airship as needed. The OSU team completed a successful flight of the airship in June.

The team also shared their research with 8th-grade students at Indian Valley Middle School in Enon, Ohio. The students were taken on a field trip to the OSU lab to learn the basic principles of landmine detection and lighter-than-air flight. The hands-on experiences and demonstrations helped the students learn about the impact of STEM technology on society. Plans have been made to continue the project next year.

The University of Akron Lunabotics Team Places 3rd

Akron's Lunabotics Mining Competition team placed **third** out of 36 teams for the Joe Kosmo Award of Excellence under the direction of their Advisor Tom Hartley. The award was presented to the team with the most cumulative points in the Lunabotics Mining Competition at Kennedy Space Center. The University of North Dakota received the highest honor.

Held for the second year in a row, the Lunabotics Mining Competition was established to engage students in Science, Technology, Engineering, and Mathematics (STEM) in a competitive environment potentially resulting in innovative ideas and solutions applicable to lunar excavation for NASA.

NASA Space Academy @ Glenn – Michael C. Johnston

Michael C. Johnston, a current Aerospace Engineering Master's student at Case Western Reserve University (CWRU), received the honor of participating in one of NASA's most prestigious programs this summer, the NASA Space Academy at Glenn Research Center, under the direction of Dr. M. David Kankam, University Affairs Officer.

He worked on combustion research, focusing mainly on ignition and flame spread, helping design and build a test platform able to perform large scale upward flame spread combustion experiments within a controlled pressure/oxygen environment while ensuring accurate reproducible radiatiave ignition. This new test facility will be used to develop an understanding of how materials burn in a zero-g environment.

Michael also worked in conjunction with CWRU to develop a high fidelity computer model which can closely simulate the test conditions of proposed experiments. The computer program hopes to replace expensive testing methods. He said he enjoyed participating in the Academy because " It is a little different from most NASA internships as it includes travel time for visiting other NASA Centers along with cutting edge aerospace companies."

Michael currently holds a B.S. in Physics from State University of New York at Fredonia and a B.S. in Mechanical Engineering from Case Western Reserve University. He plans to continue his research of combustion in zero gravity space exploration environments throughout his graduate education. In his free time, Michael enjoys playing guitar in a band, jogging, cycling, photography, and high altitude ballooning.

SATELLITES Students Present "The Changing Permafrost" At White House Science Fair!

Toledo Public School's Woodward High School students Tiffine Guindon, Tazhianna Dean, Alexandria Carey, and teacher, Melody Tspranis were invited to the White House Science Fair to present "The Changing Permafrost." The students are part of SATELLITES, a K-12 outreach program that provides students with an opportunity to work with scientists on real projects and observations, as well as completing an inquiry based research project for presentation at a conference. Developed at The University of Toledo (UT), SATELLITES is sponsored by NASA, OhioView Remote Sensing Consortium, the Ohio Board of Regents, and the Ohio Space Grant Consortium.

Dr. Kevin Czajkowski, UT Professor of Geography and Planning, nominated six teams from a SATELLITES conference held at Penta Career Center in Perrysburg, Ohio, to be a part of the White House Science Fair. In April, a NASA official called Dr. Czajkowski to inform him that the students who participated in "The Changing Permafrost" had been selected to participate in the White House Science Fair on October 18, 2010.

The students analyzed frost depth and temperature data from Fairbanks, Alaska; concluding that permafrost in this area has risen nearly 3°C. The group also used the NASA website to research effects of melting permafrost, such as the release of additional carbon dioxide and methane gases into the atmosphere.

OSGC Scholar Success Story – Brittany M. M. Studmire
Cleveland State University

In 2008, Brittany M. M. Studmire was awarded her first OSGC Scholarship as a freshman Bridge Scholar in Chemical Engineering at Cleveland State University. As an additional component of the scholarship award, she received an OSGC-supported 10-week internship in the Lewis' Educational and Research Collaborative Internship Project (LERCIP) program researching Stormwater Management at NASA Glenn Research Center for both her freshman and sophomore years. Brittany then received a Junior Scholarship in 2009 and continued with the program throughout her senior year while developing her research on Optimization of Algae Lipid Measurements under the direction of her Advisor, Dr. Joanne Belovich.

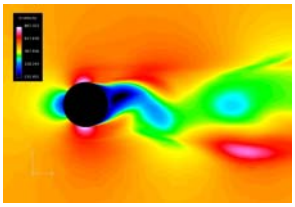
Brittany's academic excellence earned her a spot in OSGC's highly competitive Fellowship program. She began her studies this Fall at Cleveland State University towards her Master's in Degree Chemical/ Biomedical Engineering.

Computational Study of Cylinder Heating
Ohio Northern University

By Dr. Jed E. Marquart

Undergraduate research in the College of Engineering at Ohio Northern University (ONU) is exploding in popularity, including modeling work using Computational Fluid Dynamics (CFD) and Finite Element Analysis (FEA) techniques. A project currently underway in the Mechanical Engineering Department obtained funding through an OSGC Student-Innovative-Creative-Hands-on Project (SICHOP) grant to fund a senior Mechanical Engineering student during the Summer of 2011 to perform CFD research. The student, Derick Endicott from Belle Center, Ohio, is working under the supervision of Dr. Jed E. Marquart, Professor of Mechanical Engineering at ONU. The focus of the research project is to attempt to control boundary layer separation on a cylinder in crossflow using surface heating of the cylinder. Grid studies were performed to evaluate the best type of CFD grid for the application (unstructured, structured, hexahedra cells, tetrahedral cells, prism cells, etc.), as well as the grid density and configuration necessary to capture the flow effects. CFD runs were then made to establish the baseline (unheated) case and validate the results against accepted experimental and computational values. The next step is to continue the work by heating all or part of the cylinder to control and delay the flow separation, thus reduce the form drag on the cylinder.

Derick Endicott works on grid studies at the Ohio Northern University.



Since this work is an involved process, Derick has elected to continue working on the project as a special topics course for both the fall and spring semesters. He will be presenting preliminary results at the Pointwise Users Group Meeting in November and will write and submit a conference paper for an AIAA conference to be held during the Summer of 2012. Partially as a result of his involvement with this project, Derick has decided to pursue a graduate degree, and a career in research. Funding from the OSGC made this project possible.

Visit http://www.osgc.org/Minigrant.html for more information about OSGC Mini-grants.

Congratulations 2011-2012 OSGC Scholarship and Fellowship Recipients!

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Courtney A. Gras, Junior
Usaaman Taugir, Junior

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Eric K. Mayhew, Senior
Nicholas S. Szczecinski, Senior
Victoria A. Webster, Senior
Chung Y. (CY) Wo, Senior
Carmen Z. Kakish, Junior

Cedarville University
Michelle M. Mitchener, Senior
Benjamin D. Yeh, Senior
Justin S. Nichols, Junior
Erkai L. Watson, Junior

Central State University
Kristen D. Edwards, Senior
Nathaniel J. Morris, Senior
Chellvie L. Brooks, Junior
Beatrice M. Burse-Wooten, Junior
Dominique N. Roberts, Junior

University of Cincinnati
Krista M. Kirievich, Senior
Nathan A. Wukie, Senior
Tyler J. Vick, Junior
Alex R. Walker, Junior

Cleveland State University
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Ciara C. Seitz, Senior
Charles F. Tillie, Senior

University of Dayton
Robert W. Davidoff, Senior
Evan R. Kemp, Senior
Winston L. Black, II, Junior
Leslie A. Sollmann, Junior

Marietta College
Aaron M. Balderson, Senior
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Matthew C. Boothe, Junior
James P. Houck, Junior

Miami University
Stephan E. Lai, Senior
Robert A. Sinko, Senior
Harrison W. Bourne, Junior
Michael P. Karnes, Junior

Ohio Northern University
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Matthew G. Smith, Senior
Nicholas S. Jones, Junior
Logan M. Kingen, Junior

Ohio University
Joseph M. DiBenedetto, Senior

The University of Toledo
Joseph P. Montion, Junior

Wilberforce University
Tanisha M. Brinson, Senior
Malcolm X. Haraway, Senior
Michael D. Williams, Senior
Christopher A. Adams, Junior
Mahogany M. Williams, Junior

Wright State University
Rachel L. Bryant, Senior
Matthan B. Sink, Senior
Benita I. Gowker, Junior
Kevin M. Hatcher, Junior

Youngstown State University
Aubrey A. Garland, Junior
Garrick M. Brant, Junior

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Case Western Reserve University
Brian J. Stahl, MS 1

Cleveland State University
Brittany M. M. Studmire, MS 1

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Adam R. Gerlach, PhD 2
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Robert C. Charvat, MS 2
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Daniel R. E. Foster, PhD 3
Nicole D. Guzman, PhD 2

Ohio University
Desireé Cotto-Figuera, PhD 1

Ohio Space Grant Consortium Membership

Affiliate Members:

- Air Force Institute of Technology
- Case Western Reserve University
- Cedarville University
- Central State University
- Cleveland State University
- Miami University
- Ohio Northern University
- The Ohio State University
- Ohio University
- The University of Akron
- University of Cincinnati
- University of Dayton
- The University of Toledo
- Wilberforce University
- Wright State University

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- Youngstown State University

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- Columbus State Community College
- Cuyahoga Community College
- Lakeland Community College
- Lorain Community College
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- Drake Planetarium and Science Center
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- NASA Glenn Research Center
- Air Force Research Laboratory

Lead Institution:

- Ohio Aerospace Institute

Ohio Space Grant Consortium
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