

## Upcoming Events

### Seventeenth Annual Student Research Symposium

April 17th

The Ohio Space Grant Consortium will be holding its seventeenth annual Student Research Symposium on Friday, April 17th at the Ohio Aerospace Institute. Junior, Education, and Community College Scholars will be presenting posters showcasing current research projects. Senior and Fellow recipients will be presenting Power Point presentation of current developments in their projects. We look forward to meeting with all of this year's students, and are excited to see the progression of their projects!

### Great Midwest Region Space Grant Director's Meeting

September 24 & 25th

The Great Midwest Space Grant Directors' Region meeting is coming to Cleveland this year! It will be held at the Ohio Aerospace Institute, on September 24th and 25th. Current plans for the event include a tour of NASA Glenn Research Center, student presentations, as well as speakers from NASA GRC and the Air Force Research Laboratory.



NASA Glenn Research Center in Cleveland, Ohio.

#### Affiliate Members

- Air Force Institute of Technology
- Case Western Reserve University
- Cedarville University
- Central State University
- Cleveland State 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

#### Participating Institutions

- Marietta College
- Miami University
- Youngstown State University

#### Community Colleges

- Columbus State Community College
- Cuyahoga Community College
- Lakeland Community College
- Lorain Community College
- Owens Community College
- Terra Community College

#### Community Liaisons

- Drake Science Center
- Walter R. Schuele Planetarium

#### Government Liaisons

- NASA Glenn Research Center
- Air Force Research Laboratory

#### Lead Institution

- Ohio Aerospace Institute (OAI)



#### Inside this issue:

Newton's Second Law of Motion	2
Kinetic Analysis of the Deposition Processes	3
Green Power	4
The Moon and Beyond	4
After Graduation	5
Scholarship and Fellowship Awards	6



# Featured Students

Education Scholar

Hallee Palmer

Cedarville University

## Newton's Second Law Of Motion

Currently in her junior year at Cedarville University, Hallee Palmer has loved math since the day she learned to add. After graduation in 2010, Hallee hopes to share her passion with students to help them see the everyday use and beauty of logical mathematics.

Hallee's current project focuses on helping students develop practical skills of

measuring and experimenting while learning formulas that relate to motion. Newton's second law of motion states that there must be an equal or opposite reaction to cause movement in an object at rest. The students will each design a car made from a block of wood and three dowels protruding from the top. The car is propelled by rubber bands which launch objects of varying weights from the vehicle.

Throughout the experiment, students will change variables such as weight, force, number of rubber bands, or the distance between the straws. They will make graphs of their results, fit a line to the points graphed, and find its equation. They will also be asked to summarize the relationship between the variables and distance. Students will be challenged to think of modifications that could maximize the distance travelled, and to change the experimental conditions for comparison results.

$$F_{\text{net}} = \frac{d(mv)}{dt}$$

After receiving her Bachelor's of Science in Mathematics, Hallee plans to head to China as a student teacher to complete licensure for Secondary Mathematics Education. After graduation she may pursue a PhD in mathematics, or continue teaching overseas.

We wish Hallee the best of luck in all her future pursuits, and know that the next generation will benefit from her dedicated work as an educator.

We were also excited to have Hallee here at the Ohio Aerospace Institute last year for a Teacher's workshop.

Winter 2009



*The dream begins with a teacher who believes in you, who tugs and pushes and leads you to the next plateau, sometimes poking you with a sharp stick called "truth."*

*-Dan Rather*

# Featured Students

Senior Scholar

**Andrew Snell**

**Cleveland State University**

*"Science can amuse and fascinate us all, but it is engineering that changes the world."*

-ISAAC ASIMOV

Corrosion resistance and energy efficiency have long been driving forces to substitute low-carbon steels by more advanced materials. In the automotive and aerospace industries, structural materials commonly require a complex sequence for processing. Most structural materials require machining and the application of surface layers before ulterior processing. Some coatings might be required to be resistant to corrosion or act as chemically resistant coatings. One step that has proven to be an engineering challenge is surface pre-treatment process. With newfound environmentally friendly processes, chromates-based technology traditionally used as surface pre-treatment processes, have become a target for elimination by the United States Environmental Protection Agency (EPA).

In his senior year at Cleveland State University, Andrew Snell is currently participating in a research project aimed at characterizing solutions of aryl phosphates and inter-metallic acetates as precursors for conversion and protective coatings.

## Kinetic Analysis of the Deposition Processes

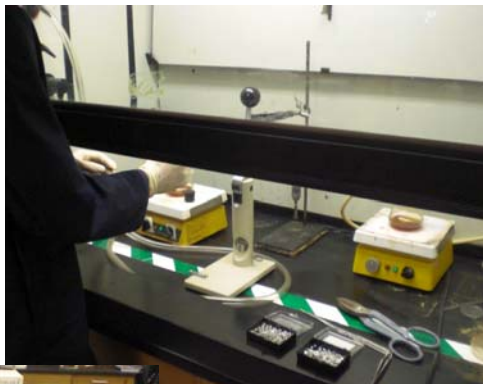
His goal is to develop a protocol for kinetic analysis of the deposition processes. Current research is being conducted using known formulation to run controlled decompositions reactions, while observing kinetics with a Differential Scanning Calorimeter.

Last summer, Andy received training in experimental protocols using samples with known thermal characteristics. This semester he is using new samples, which have shown promising results in enabling kinetic characterization of film deposition process.

In addition to his research, Andy is also an active participant in CSU and community activities including membership in several honor societies such as the Tau Beta Pi Engineering Honors Fraternity and Golden Key International Honors Society. He is also a captain of Cleveland State University's Division I NCAA fencing team and a member of the Cleveland State University Orchestra.

After graduating in May, Andy plans to pursue a Master's Degree in Chemical Engineering from Cleveland State.

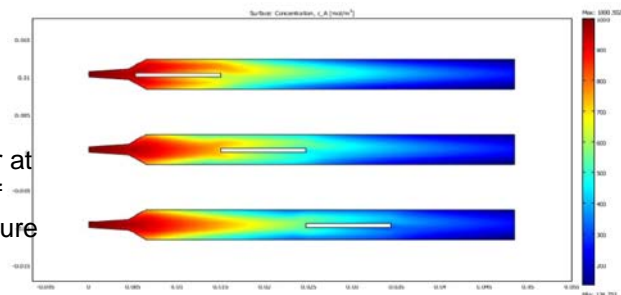
We encourage Andy to continue his research pursuits, and applaud his efforts towards the sustainability and protection of our planet.



Andy working with samples in the lab at Cleveland State University.



The Differential Scanning Calorimeter at CSU, used to determine the amount of heat required to increase the temperature of a sample.



Thermal and flow fields for a deposition furnace where coatings are produced in a larger scale



# Featured Students

Doctoral Fellowship

**Kristina Kecskemety**

**The Ohio State University**



## Green Power

The increasing demand for an environmentally friendly, renewable energy source has brought the development and improvement of wind turbines to the forefront of research.

Krista Kecskemety is part of a team of researchers from the Ohio State University who are working to adapt turbomachinery code, TURBO, to accurately compute wind turbine aerodynamics.

Krista obtained a Bachelor of Science in Aeronautical and



Astronautical Engineering in 2006 from The Ohio State University. In 2007, she received a Master of Science Degree and is currently pursuing a Ph. D. in Aeroelasticity.

Her research focuses on incorporating a nonlinear finite element procedure into the code and developing a fluid-structural coupling scheme to accommodate blade deformations.

We commend Krista and her team for their efforts and are excited to see what developments the future holds!



## The Moon and Beyond

### *An Ohio Space Grant Consortium Mini-grant Award awarded to Kathleen Carpenter*

Nineteen gifted and advanced reading students from Fredericktown Middle School were trained as crew specialists at the Challenger Learning Center in Oregon, Ohio. The goal was to develop critical thinking and problem-solving skills while training for a Moon Mission. The students received training in communication, data, probe, isolation, medicine and navigation in space. Under the guidance of a flight commander and director, students worked in teams to solve problems in the space ship as well as in mission control. Students agreed that although the Moon Mission was fun, it was very challenging. Enthusiasm from students prompted a program for the 2009-10 school year where 8<sup>th</sup> graders will learn about aviation and Catherine Wright. Thank you to Ms. Kathleen Carpenter and all other teachers who help guide the next generation of scientists, teachers, researchers, and astronauts!



Top Right: Molly Shoewalter, Katie Ruhl, Emily Roberts

Bottom Right: Nick Iams, Brody Styers, Ben McClay, Aaron Dickerson, Kevin Williams

# After Graduation

An Ohio Space Grant Fellowship Recipient in 2001 and 2002, Jeremy Daily has continued to pursue his passion for education and mechanical engineering into his current career. As an Ohio Space Grant student, his research focused on Plastic Dissipation Energy in Fatigue Crack Growth. While attending Wright State University he maintained electronic navigation systems at the Wright-Patterson Air Force Base. He graduated from Wright State University in 2006 with a Ph.D. in Mechanical Engineering. Currently, Jeremy holds a tenure-track position with the University of Tulsa. He teaches instrumentation, mechanisms, finite element analysis, machine dynamics, probabilistic dynamics, and CAD/CAM.

Jeremy has an interest in traffic crash reconstruction, and has co-authored a text book titled "Fundamentals of Traffic Crash Reconstruction." He also continues research with the Air Force on fatigue and fracture issues related to turbine engines.



In his spare time, Jeremy coaches men's rugby at the University of Tulsa, and enjoys water skiing. He is pictured above with his wife of seven years, Lisa, their daughter Sarah, who is turning two, and Naya, their dog.

# Sixteenth Annual Symposium



**April, 2008**



## Congratulations to All 2008-2009 Scholarship and Fellowship Recipients!

Change will not come if we wait for some other person or some other time. We are the ones we've been waiting for. We are the change that we seek."

-Barack Obama

**The University of Akron**

Osama M. Elbulunk  
Karin E. Bodnar  
Eileen N. Boyd  
Thomas V. Vo  
Marguerite J. Hudak

**Cedarville University**

Jonathan F. Juhl  
Garret J. Noble  
Bethany G. Harpole  
John T. Weston  
Amy. J Greenfield  
Jaclyn K. Hilderbrand  
Hallee M. Palmer  
Mark A. Ratliff  
Jarrod C. Steinmetz

**Owens Community College**

Michele M. Martin  
Jaclynn E. Powers

**Wright State University**

Caleb J. Barnes  
Nathaniel J. Herrman  
Matthew D. Rippl  
Peter I. Heinig  
David N. Neff  
Michael. A Jonell

**Central State University**

Makeba A. Anderson  
Joseph F. Betten  
Michael E. Burba  
Monica A. Porche  
Robyn L. Bradford

**Cleveland State University**

Richard F. Bozak  
Andrew J.R. Snell  
John L. Tatarko  
Aimee Lee McConnell  
Brittany M. Studmire  
Jimetric Y. Johnson

**Wilberforce University**

Kenya P. Carrington  
Dwight P. Cass  
D'Nita M. Howard  
Joshua E. Allen  
Royel S. Bridges

**Youngstown State University**

Megan E. Geneske

**The Ohio State University**

Eshan Sadeghipour  
Christian D. Austin  
Krista Kecskemety  
Katrina J. Altman

**The University of Toledo**

Miranda L. Steinberger  
Emily E. Roth  
Jonathan J. Guernsey  
Mike Orra

**University of Cincinnati**

Robert D. Knape  
Ashley M. Verhoff  
Robert C. Charvat  
Danielle L. Grage  
Maisha M. Murry  
Adam R. Gerlach

**University of Dayton**

Kevin E. Fisher  
Andrew P. Huelsman  
Julian S. Frias  
Jennifer M. Lukens

**Miami University**

Alex D Harrington  
Holly N. Slonecker

**Marietta College**

Michael Wes Casto  
Paul M. Paslay

**Case Western Reserve**

Alexander J. Hunt  
Alexander Lee Rivera

**Columbus State**

**Community College**  
Martin Edjoho  
Christopher D. Mallory

David M. Smith

**Ohio Northern University**

Amy N. Friedlein  
Douglas J. Hoersten  
Bailey M Blake  
Sean P. Lemke  
John M. Rader

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

Dr. Paul C. Lam, Director  
Dr. Gerald T. Noel, Sr., Associate Director  
Laura A. Stacko, Program Manager  
Arela B. Leidy, Program Assistant