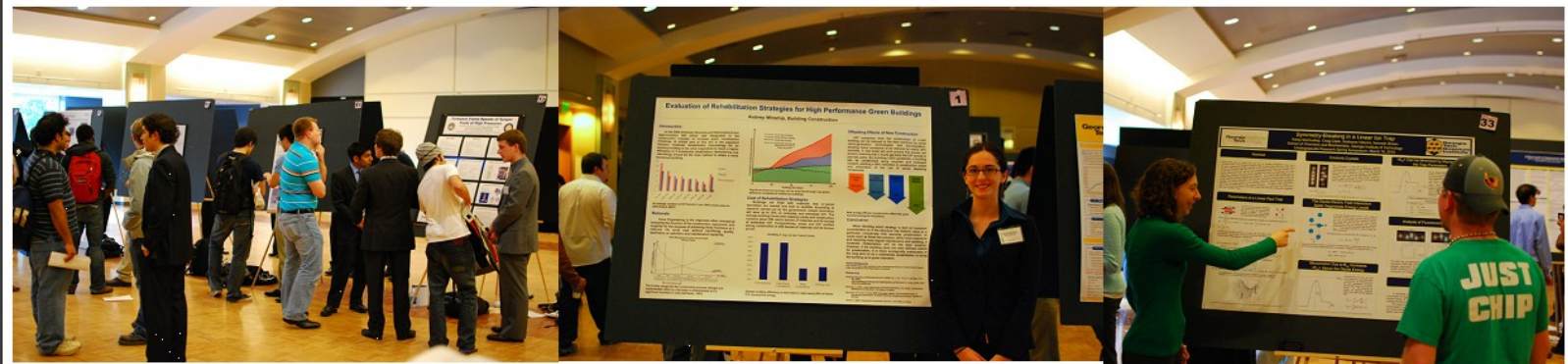


# Welcome to the 6th Annual Undergraduate Research Spring Symposium & Awards



***Tuesday, April 5th, 2011***



Time: 1:00 - 6:00 pm

Location: Student Center Ballroom and  
Surrounding Rooms

# 6th Annual Undergraduate Research Spring Symposium

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## Schedule of Events

<b>Events</b>	<b>Times</b>
Oral Presentations:	1:00 - 4:30 pm
Poster Session:	3:00 - 4:30 pm
Reception:	4:30 - 5:15pm
Awards Ceremony:	5:15 pm

# Oral Presentations

## Student Center, 3rd Floor

### Session A: International Affairs, Economy and Industry Student Center Room 301

**Moderator:** Ms. Jennifer Kimble, Office of Pre-Health Advising

- 1:00**    **Designing for Music Consumption in an Internet Age**  
Bethany Sumner, CS  
Mentor: Dr. Rebecca Grinter, CS
- 1:20**    **WMD Terrorism in the Middle East**  
Lucia Bird, INTA  
Mentor: Dr. Margaret E. Kosal, INTA
- 1:40**    **WMD in Gaming**  
Jared Fry, INTA  
Mentor: Dr. Margaret E. Kosal, INTA
- 2:00**    **Have the Diversification Benefits of International Investing Declined Due to Global and Regional Macroeconomic Integration?**  
Stephen Brincks, Econ  
Mentor: Dr. Christine Ries, Econ

### Session B: People, Society and Culture Student Center Room 301

**Moderator:** Ms. Jennifer Kimble, Office of Pre-Health Advising

- 2:40**    **Dynamic Families: Media Representations and Lesbian Motherhood**  
Nicole Turner, STC  
Mentor: Dr. Anne Pollock, STC
- 3:00**    **Navajo Wind**  
Della Hall, HTS  
Mentor: Dr. Douglas Flaming, HTS
- 3:20**    **Determining the Implications of Resegregation in the Atlanta Public School System and its Affect on Student Achievement**  
Denise Bringslid, HTS  
Mentor: Dr. Ronald Bayor, HTS

**Session C: Neuroscience and Osteology**  
**Student Center Room 319**  
**Moderator: Ms. Sandi Bramblett, IRP**

- 1:00 The Effect of Oxygen Tension on Vitamin D3 Signaling in Growth Plate Chondrocytes**  
Kelsie Riemenschneider, BME  
Mentor: Dr. Barbara Boyan, BME
- 1:20 Mapping Anatomical Connectivity of the Cerebral Cortex and Its Applications in Evolution of Aging in Primates**  
Frederick Damen, BME  
Mentor: Dr. David Hu, BME
- 1:40 The Neural Correlates of Within Category Competition for Visual Representation**  
Andy Chung, Psychology  
Mentor: Dr. Paul Corballis, Psychology

**Session D: Robotics and Biomedical Engineering**  
**Student Center Room 319**  
**Moderator: Mr. Rob Rogers, DOPP**

- 2:40 Passive In-Situ Sample Protection Systems**  
Richard Zappulla, AE  
Kevin Reilley, AE  
Ryan Cornell, AE  
Mentor: Dr. Narayanan Komerath, AE
- 3:00 Bio-Inspired Robot Arm**  
Trey Davenport, ME  
Mentor: Dr. Jun Ueda, ME
- 3:20 Determination of Glutathionylation of IKK in Different Oxidative Stress Conditions**  
Debika Mitra, BME  
Mentor: Dr. Melissa Kemp, BME

**Session E: Energy Efficiency and Quantum Mechanics  
Student Center Room 320**

**Moderator:** Dr. Caroline Noyes, Office of Assessment

- 1:00 Space Power Grid**  
Brendan Dessanti, AE  
Nicholas Picon, AE  
Chris Gilbert, AE  
Shaan Shah, AE  
Mentor: Dr. Narayanan Komerath, AE
- 1:20 Carbon Dioxide Capture from Coal-Fired Power Plants Using Reservable Ionic Liquids**  
Sean Faltermeier, ChemE  
Mentor: Dr. Charles Eckert, ChemE
- 1:40 Effect of C-PAM on the Thermal Processing Behavior of Cornstarch**  
Alison Krantz, ChemE  
Mentor: Dr. Sujit Banerjee, ChemE
- 2:00 Long-lived Interacting Neutral Atom Quantum Memories**  
Anastasia Marchenkova, Physics  
Mentor: Dr. Alex Kuzmich, Physics

**Session F: Oncology Research and Biomedical and Mechanical Engineering  
Student Center Room 320**

**Moderator:** Dr. Caroline Noyes, Office of Assessment

- 2:40 Multiplex Cathepsin Zymography Captures Stage-specific Activity Profiles of Cathepsins K, L, and S in Human Breast, Lung, and Cervical Tumors**  
Binbin Chen, BME  
Mentor: Dr. Manu O Platt, BME
- 3:20 Mechanical Diagnostics of Ovarian Cancer**  
Byung Kyu Kim, BME  
Mentor: Dr. Todd Sulchek, ME

**Session G: Mechanical and Chemical Engineering**  
**Student Center Room 321**  
**Moderator: Dr. Tris Utschig, CETL**

- 1:00 Nonionic Surfactants for Charge Control in Nonpolar Liquids**  
Crystal Clemmons, ChemE  
Mentor: Dr. Sven Behrens, ChemE
- 1:20 Thermoelectric Coolers for Hotspot Thermal Management of Stacked 3D Stacked Chips**  
Redmond Matthew, ME  
Mentor: Dr. Satish Kumar, ME
- 1:40 Mechanical and Electrical Properties of BaTiO<sub>3</sub> and Carbon Epoxy Composites**  
Gloria Wu, ME  
Mentor: Dr. Kyriaki Kalaitzidou, ME

**Session H: Aerospace Engineering: Combustion and Propulsion**  
**Student Center Room 321**  
**Moderator: Dr. Paul Hurst, Fellowship Communication Program**

- 2:20 Numerical and Experimental Studies of Flame Stability in a Cavity Stabilized Hydrocarbon-Fueled Scramjet**  
Jagannath Pranatharthikaran, AE  
Chaitanya Ghodke, ME  
Ghislain Retaureau, AE  
Mentors: Dr. Suresh Menon, AE
- 2:40 Effects of Flame Temperature Ratio on Bluff Body Wakes**  
Julia Lundrigan, AE  
Mentor: Dr. Tim Lieuwen, AE
- 3:00 Combustion Instability Mitigation through Dissipation of Acoustic Energy Using Perforated Plates**  
Charles Lu, ME  
Mentor: Dr. Tim Lieuwen, AE
- 3:20 Utilization of Lunar Resources for Human Mars Missions**  
Chase Brown, AE  
Mentor: Dr. Alan Wilhite, AE

**Session I: Biomedical Engineering and the Cardio Vascular System  
Student Center Room 343**

**Moderator:** Ms. Lori Critz, Library

- 1:20 Anatomical Analysis of Optiflo Geometries**  
Kalpi Desai, BME  
Mentor: Dr. Ajit Yoganathan, BME
- 1:40 Measurement of Strut Chordal Forces of the Tricuspid Valve using Miniature C Rings**  
Lauren Troxler, BME  
Mentor: Dr. Ajit Yoganathan, BME

**Session J: Biomedical Engineering and Biochemistry in the Life Sciences  
Student Center Room 343**

**Moderator:** Mr. Jarett Lafleur, SSDL

- 2:20 Temporal Changes in Gene Expression Regulating Mouse Posterior Frontal Suture Fusion**  
Regina Chang, BME  
Mentor: Dr. Barbara D. Boyan, BME
- 2:40 Biological Response of Lymphatic Endothelial Cells to Mechanical Loads**  
Arina Korneva, BME  
Mentor: Dr. Brandon J. Dixon, ME
- 3:00 Application of SYPRO® Orange, a Fluorescent Hydrophobic Dye, for a High-Throughput Ligand Binding Assay for Proteins of Unknown Structure and/or Function**  
Pamela Chi, Biochemistry  
Mentor: Dr. Raquel Lieberman, Biochemistry
- 3:20 Hfq as a Destabilizer for DsrA Hairpin Stems: Permutations of Short sRNA Segments for RNA-RNA Interaction Study**  
Kanav Jain, BME  
Mentor: Dr. Roger Wartell, Biology
- 3:40 Engineering the Microenvironment of Embryoid Bodies via Heparin-Modified Gelatin Microparticle Incorporation**  
Katy Hammersmith, BME  
Mentor: Dr. Todd McDevitt, BME

# Poster Session

## Student Center Ballroom 3:00 - 4:30 PM

- 1 Vertical-Axis Wind Turbine (VAWT)**  
Ryan McGowan, AE  
Akshay Pendharkar, AE  
Alexander Forbes.,AE  
Julian Forero, AE  
Sorin Pirau, AE  
Cristian Salguiero, AE  
Raymond Chan, IsyE  
Mentor: Dr. Narayanan Komerath, AE
  
- 2 Analysis on Flow Circumferential Uniformity with Bellmouth Inlet**  
Chun Kit Chung, AE  
Mentor: Dr. Yuan Liu, AE
  
- 3 Computation-Experiment Interface to Understand Complex Aerodynamic Systems**  
Christopher Duffy, AE  
David Miculescu, AE  
Mentor: Dr. Narayanan Komerath, AE
  
- 4 A New Look at Hydrogen Powered Supersonic Airliners**  
Alex Forbes, AE  
Mentor: Dr. Narayanan Komerath, AE
  
- 5 Collection Efficiency of a Helicopter Rotor Using an Eulerian Approach – Validation**  
Dennis Garza, AE  
Mentor: Dr. Lakshmi Sankar, AE
  
- 6 Shell Furnace Testing**  
Sean Hwang, AE  
Mike MacMillan, AE  
Ross Cooper, AE  
Nico Stockwell, AE  
George H. Bergmark, AE  
Mentor: Dr. Tim Lieuwen, AE
  
- 7 A Transfer Function Approach to Analyzing Flame Response to Transverse Acoustic Excitation for Gas Turbine Applications**  
Jared Mannino, AE  
Colin Vanatta, AE  
Mentor: Dr. Tim Lieuwen



- 9 Chemical Analysis of Exhaust For After-Injection Combustion Chamber in Response to Quench Section Passthrough**  
Timothy Nevius, AE  
Mentor: Dr. Tim Lieuwen, AE
- 10 Energy Harvesting Using a Rocking Chair**  
William Peirsol, AE  
Mentor: Dr. Massimo Ruzzene, AE
- 11 Plasma Enhanced Chemical Vapor Deposition (PECVD) of Limonene**  
Kevin Reilley, AE  
Mentors: Dr. K.K Ahuja, AE
- 12 Testing the Effects of Harmful Algal Blooms, *Karenia Brevis* and *Alexandrium Fundyense* on the Escape Behavior of the Calanoid Copepod, *Temora longicornis***  
Aakanksha Angra, Applied Biology  
Mentor: Dr. Jeannette Yen, Applied Biology
- 13 Characterization of Quorum Sensing and Natural Competence in Environmental Isolates of *Vibrio cholerae***  
Eryn Bernardy, Applied Biology  
Mentor: Dr. Brian Hammer, Applied Biology
- 14 Translational Limitations and Features of Human Uricase**  
Christina Graves, Applied Biology  
Mentor: Dr. Eric Gaucher, Applied Biology
- 15 Inducing a Thermogenic Response to Cold Shock in *E. coli***  
Christina Graves, Applied Biology  
Mitesh Agrawal, BME  
Margo Clark, Biology  
Scott Holmes, BME  
Christian Mandrycky, BME  
Mentors: Dr. Eric Gaucher, Applied Biology  
Dr. Josh Weitz, Applied Biology
- 16 Krill Schooling as a Function of Time**  
Marlene Kanagawa, Applied Biology  
Mentor: Dr. Jeannette Yen, Applied Biology

- 17 Investigating the Correlation Between rs3814113 and Ovarian Cancer**  
James Small, Applied Biology  
Mentor: Dr. John McDonald, Applied Biology
- 18 Insights into the Pathway of RNA-Templated DNA Repair and RNA-Driven DNA Modification**  
Matthew Taylor, Applied Biology  
Mentor: Dr. Francesca Storici, Applied Biology
- 19 Investigation of the Role of H19 Gene Expression in Ovarian Carcinoma**  
Nikita Wright, Applied Biology  
Mentor: Dr. Yuhong Fan, Applied Biology
- 20 Application of Physarum Polycephalum as an Urban Design Tool**  
David Zhu, Applied Biology  
Debayan Bhaumik, BME  
Michael Delvin, Applied Biology  
Azam Siddiqui, Applied Biology  
Mentor: Dr. Jeannette Yen, Applied Biology
- 21 Frontal Plane Kinematics and Kinetics of the Center of Mass of the Cat During Walking Along Paths of Different Widths**  
Juan Cave, BME  
Mentor: Dr. Boris Prilutsky, Applied Physiology
- 22 Macrophage inflammatory activation and inhibition**  
Thejas Hiremath, BME  
Mentor: Dr. Sheldon May, Biochemistry
- 23 Molecular beacon based selection of cells expressing a targeted gene correction**  
Benjamin Scott, BME  
Mentor: Dr. Brian Wile, BME
- 24 The Development of a Novel Anticoagulant Using PEGylated Fibrin 'A' Knob Peptides**  
Nader Aboujamous, BME  
Mentor: Dr. Thomas H. Barker, BME
- 25 Tactile Detection and Biomechanics**  
Bilal Bari, BME  
Mentor: Dr. Garrett Stanley, BME

- 26 Fluid Mechanical Analysis in Surgically Reconstructed Aortas**  
Laura Bracaglia, BME  
Mentor: Dr. Ajit Yoganathan, BME
- 27 Effects of Cyclic Stretch and Pressure on Aortic Valve Calcification**  
Harika Gorti, BME  
Mentor: Dr. Ajit Yoganathan, BME
- 28 Hemodynamic Assessment of Bicuspid Aortic Valves as a Clinical Diagnostic Tool**  
Shabnam Gupta, BME  
Mentor: Dr. Ajit Yoganathan, BME
- 29 Effects of Senescence on Signaling Dynamics and Redox Status of Cultured Primary T Cells**  
Abby Hill, BME  
Mentor: Dr. Melissa Kemp, BME
- 30 Comparison of Parameter Estimation Algorithms for Metabolic Pathway Models**  
Eric Huang, BME  
Mentor: Dr. May Wang, BME
- 31 Effects of Nitric Oxide Synthase and Reactive Oxygen Species in Cardiac Heart Valves**  
Samiya Hussain, Chemistry  
Mentor: Dr. Ajit Yoganathan, BME
- 32 Study of Hemodynamic Differences Between flow through Rigid and Flexible Aortic Sections**  
Nicole Milligan, BME  
Mentor: Dr. Ajit Yoganathan, BME
- 33 Low and Unsteady Shear Stresses Upregulate Calcification Response of the Aortic Valve Leaflets**  
Elizabeth Morris, BME  
Mentor: Dr. Ajit P. Yoganathan
- 34 Comparing Quantitative Models of Microtubule Dynamics for Cancer Drug Treatment**  
Sina Mostaghimi, BME  
Mentor: Dr. May Dongmei Wang, BME
- 35 Cellular Responses in Neural Degeneration: In vitro Analysis of Potential Neuronal Receptors for Chondroitin Sulfate Proteoglycans**  
Patricia Murphy, Applied Biology  
Mentor: Dr. Lohitash Karumbaiah, BME

- 36 The Application of Long Term, Low Levels of Reactive Oxygen Species (ROS) to HeLa Cells: a Model of Chronic ROS**  
Willa Ni, BME  
Mentor: Dr. Melissa Kemp, BME
- 37 Disruption of Pdia3, a Mediator of Rapid Membrane Responses to 1 $\alpha$ ,25-Dihydroxyvitamin D3 Results in Embryonic Lethality in Homozygotes and Bone Abnormality in Heterozygotes**  
Alexandr Nizkorodov, BME  
Mentor: Dr. Barbara Boyan, BME
- 38 A Reliable Interface for Bi-directional Information Exchange with the Peripheral Nervous System**  
James Schwoebel, BME  
Anish Joseph, BME  
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- 39 Effect of Electrospun Titania Meshes on Osteoblast Growth and Differentiation**  
Rosemary Song, BME  
Mentor: Dr. Barbara Boyan, BME
- 40 Curing of Aqueous Base-Developable Photosensitive Polynorbornene Dielectric by Variable Frequency Microwave Processin**  
Christina Bins, ChemE  
Chris Hilgert, ChemE  
Layla Marshall, EE  
Jeremy Thompson, CompE  
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Jiawei Luo, ChemE  
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- 42 Biomaterial Degradation of Alginate-Based Encapsulation Systems**  
Chun Yong, BME  
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Alma Castaneda, Chemistry  
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Michael Chen, Chemistry  
Mentor: Dr. Nicholas Hud, Chemistry

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Mysha Sarwar, Chemistry  
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Jairo Zapata, Biochemistry  
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- 47 New Random Graphs Models and Algorithms**  
Antonia Blanca- Pimentel, CS  
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Michelle Delcourt, Discreet Math  
Mentor: Dr. Xingxing Yu, Discreet Math
- 49 Modeling Energetic-Charged Particles in the Europa-Jupiter Environment**  
Derek Podowitz, EAS  
Mentor: Dr. Carol Paty, EAS
- 50 Timing and Extent of Late Quaternary Glaciations near Lake Khovsgol, Mongolia: Implications for Climate Change in Central Asia**  
Afshan Shaikh, EAS  
Mentor: Dr. Kurt Frankel, EAS
- 51 Stream Terraces in the Critical Zone - Lower Gordon Gulch, Colorado**  
Kathleen Warrell, EAS  
Mentor: Dr. Kurt Frankel, EAS
- 52 Eliminating Bottlenecks in Clinic Redesign**  
Tiffany Adams, IE  
Mentor: Dr. David Cowan, IE
- 53 Decisions by Data: How Does an Organization Use Data for Planning, Management, and Decisions?**  
Melissa Nesbitt, IE  
Mentor: Dr. David Cowan, IE
- 54 Analysis of Diabetic Retinopathy Screening Methods**  
Jennifer Sisson, IE  
Mentors: Dr. Nicoleta Serban, IE  
Dr. Julie Swann, IE
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Gemma Buckler, International Affairs  
Katie Murphy, International Affairs  
Mentor: Dr. Vicki Birchfield, International Affairs

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Sapphire Liu, INTA  
Mentor: Dr. Margaret E. Kosal, INTA
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Samual Wilson, ChemE  
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Benjamin Bingham, ME  
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- 59 Minimization of Atomic Force Microscope Thermal Drift via Quality Factor Feedback**  
Lin Fan, ME  
Mentor: Dr. Todd Sulchek, ME
- 60 In-plane chip-to-chip microfluidic interconnects**  
Venkat Goli, ChemE  
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Natalie Haddad, Applied Biology  
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Alison Williams, Psychology  
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Ian Yamamoto, Public Policy  
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# Recognitions

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## **Special Thanks to our UROP staff and volunteers!**

Fadrika Prather, UROP Project Coordinator

Ivan Walker, UROP Graduate Student Assistant

Maya Oren, UROP Student Assistant

Natasha Hackley Lawson, Undergraduate Studies

Nicole Leonard, Honors Program

Donna Riley, VPFAD Office

Beth Spencer, Undergraduate Studies

Sue Woolard, Office of Assessment

Ken Poor, OIT

Ms. Alyceson Andrews, IBB

Brandon Ford, Facilities

**Thank you for all of your hard work!**

# Recognitions

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## **Special Thanks to our Session Moderators!**

Sandi Bramblett, IRP

Lori Critz, Library

Paul Hurst, Fellowship Communication Program

Caroline Noyes, Office of Assessment

Rob Rogers, DOPP

Tris Utschig, CETL

Jennifer Steffen Kimble, Undergraduate Studies

Jarett Lafleur, SSDL

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