

# Welcome to the 7th Annual Undergraduate Research Spring Symposium & Awards



**Tuesday April 10th, 2012**

**Time: 1:00 - 6:00 pm**

**Location: Student Center Ballroom  
and Surrounding Rooms**



# 7th 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: Interactive Computing and Biochemistry Student Center Room 301

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

- 1:00 Simon: Color Perception**  
Jasmine Lawrence, CS  
Mentor: Dr. Andrea Thomaz, Interactive Computing
- 1:20 Crystal Structure of 5-Nitroanthranilic Acid Deaminase Determination**  
James Rives, Biochemistry  
Mentor: Dr. Raquel Lieberman, Biochemistry
- 1:40 Helping Households Understand and Control their Home Network**  
Bethany Sumner, CS  
Mentor: Dr. W. Keith Edwards, Interactive Computing
- 2:00 Crystallization of Signal Peptide Peptidase using Fab Antibody Fragments as Crystallization Chaperones**  
Aly M. Sheppard, Biochemistry  
Mentor: Dr. Raquel Lieberman, Biochemistry

### Session B: Biomedical Engineering Student Center Room 320

**Moderator:** Dr. Tris Utschig, CETL

- 1:40 The effect of hypoxia on growth plate chondrocytes and osteoblast differentiation**  
Kelsie Riemenschneider, BME  
Mentor: Dr. Barbara Boyan, BME
- 2:00 Constant Tip-Surface Distance with Atomic Force Microscopy via Quality Factor Feedback**  
Lin Fan, ME  
Mentor: Dr. Todd Sulcheck, BME
- 2:20 A Framework to Derive and Analyze Anatomical Brain Networks in Chimpanzees using Diffusion Tractography**  
Frederick W. Damen, BME  
Mentor: Dr. Xiaoping Hu, BME
- 2:40 Decellularized Shark Cartilage for Promotion of Chondrogenesis**  
Olivia Burnsed, BC  
Mentor: Dr. Barbara Boyan, BME

**Session C: Biomedical Engineering**  
**Student Center Room 320**  
**Moderator: Ms. Sandi Bramblett, IRP**

- 3:20    Engineering the Microenvironment of Embryoid Bodies via Heparin-modified Gelatin Microparticle Incorporation**  
Katy Hammersmith, BME  
Mentor: Dr. Todd McDevitt, BME
- 3:40    Cellular remodeling under chronic oxidative stress via long term, low level application of reactive oxygen species (ROS)**  
Willa Ni, BME  
Mentor: Dr. Melissa Kemp, BME
- 4:00    ER $\alpha$ 36: A Novel Therapeutic Target in Treating Breast Cancer**  
Agreen Hadadi, Biology  
Mentor: Dr. Barbara Boyan, BME

**Session D: International Affairs and Interactive Media**  
**Student Center Room 319**  
**Moderator: Ms. Jennifer Kimble, Pre-Health Advising**

- 1:00    Interdisciplinary Problem Solving in Science Fiction Video Games**  
Paul Zaitsev, Computational Media  
Mentor: Lisa Yaszek, STC
- 1:20    South Korea's Objective in Beginning the "Low-Carbon Green Growth" Program in 2009**  
Jeehoon M. Choi, INTA  
Mentor: Dr. Brian Woodall, INTA
- 1:40    Al Qaeda in the Arabian Peninsula: A Trend Towards Unconventional Weapons**  
Ryan G. Forman, Public Policy  
Mentor: Dr. Margaret Kosal, INTA
- 2:00    Perceptions of Weapons of Mass Destruction and Nuclear Trafficking in Emerging Media**  
Daniel A. Thigpen, Econ, INTA  
Mentor: Dr. Margaret Kosal, INTA

**Session E: Sciences and Mathematics**  
**Student Center Room 319**  
**Moderator: Ms. Lori Critz, Library**

- 2:40 Hydrated Sulfates in the Southern High Latitudes of Mars**  
Sheridan E. Ackiss, Applied Math  
Mentor: Dr. James Wray, EAS
- 3:00 Improved RNA Secondary Structure Prediction Using Stochastic Context Free Grammars**  
David A. Esposito, Math  
Mentor: Dr. Christine Heitsch, Math
- 3:20 Effects of Volume Fraction on the Behavior of Avalanching Granular Media**  
Azeem Bande-Ali, Physics  
Mentor: Dr. Daniel Goldman, Physics
- 3:40 Spatial Variation in Nutrients, Pigments, Particles, and Phytoplankton Abundance in the Amazon River Plume**  
Sarah Weber, Biology  
Mentor: Dr. Joseph Montoya, Biology

**Session F: Material Science Engineering and Aerospace Engineering**  
**Student Center Room 321**  
**Moderator: Mr. Paul Hurts, Office of Fellowships**

- 2:20 Rare-earth Activated Glass-Ceramic for Neutron Detection**  
Wei Dai, MSE  
Mentor: Dr. Zhitao Kang, MSE
- 2:40 Vertically Aligned Carbon Nanotubes as Active Electrodes for Metal Substrate Supercapacitors**  
Radu Reit, MSE  
Justin Nguyen, ME  
Mentor: Dr. Jud Ready, BME
- 3:00 Layer by Layer Assembly For Indium Tin Oxide (ITO) Nanoparticles on Pet Substrate**  
Min Sung Jeong, ME  
Mentor: Dr. Rosario Gerhardt, MSE
- 3:20 Hardware Implementation of Peak-Seeking Control of a DC Motor Driving a Variable Pitch Propeller**  
Keenan I. Jones, AE  
Mentor: Dr. Eric Feron, AE
- 3:40 Extraction of Flame Characteristics in a Lifted, Premixed Swirling Flame for Low Emission Combustion Applications**  
Travis Smith, AE  
Mentor: Dr. Tim Lieuwen, AE

# Poster Session

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

- 1 Cellular Baseband Security**  
Andrew Thomas Davis, CS  
Mentor: Dr. Jon Giffin, CS
  
- 2 Web Users Beware: Online Personalization Can Be Manipulated**  
Daniel P. Doozan, CS  
Mentor: Dr. Nick Feamster, CS
  
- 3 Georgia Tech Night Rover**  
David A. Esposito, Math  
Farzon Lotfi, CS  
Mentor: Dr. Jay Summet, CS
  
- 4 Efficient Molecular Dynamics: Profiling and Optimizing LAMMPS Particle Simulations Using GPGPU**  
Farzon Lotfi, CS  
Baris Arin, CS  
Mentor: Dr. Hyesoon Kim, CS
  
- 5 Detecting Malicious Algorithms Using a Mathematical Metric**  
Krista Palmer, CS  
Mentor: Dr. Nick Feamster, CS
  
- 6 What does the laboratory contribute to science? A case study in Intergrative Systems Biology**  
Joshua Aurigemma, ID  
Mentor: Nancy Nersessian, Interactive Computing
  
- 7 Anode Flame Tests**  
Chase P. Brown, AE  
Mentor: Dr. Mitchell Walker, AE
  
- 8 Wave Drag Estimation of Supersonic Airliners**  
Alexander Forbes, AE  
Mentor: Dr. Narayanan Komerath, AE
  
- 9 Thermal Analysis of Solenoid in Vacuum Environment**  
Joshua Goldstein, AE  
John Patrick (J.P.) Shivanandan, AE  
Louis Dressel, AE  
Mentor: Dr. Mitchell Walker, AE

- 10 Effects of Flame Temperature Ratio on Bluff Body Wakes**  
Julia Lundrigan, AE  
Mentor: Dr. Tim Lieuwen, AE
- 11 3 ft Diameter Vertical Axis Wind Turbine**  
Ryan McGowan, AE  
Kevin Morillas, AE  
Akshay Pendharkar, AE  
Mark Pinder, AE  
Mentors: Dr. Narayanan Komerath, AE
- 12 Flame Stabilization Characterization in Low-Emissions Gas Turbine Combustors**  
Daniel Miranda, ME  
Mentor: Dr. Tim Lieuwen, AE
- 13 Design of Full Scale Combustor Nozzle Test Rig**  
Kelvin Murphy, ME  
Adam Kolojejchick-Kotch, ME  
Ben Kingsley, ME  
Mentor: Dr. Tim Lieuwen, AE
- 14 Design of Thermoelectric Edu-Kitchen System**  
Akshaya Srivastava, AE  
Mark Pinder, AE  
Raj Desai, AE  
Mentor: Narayanan Komerath, AE
- 15 Experimental Method for Finding Aerodynamic Characteristics of a Double Pendulum Airfoil**  
Daniel Sun, AE  
Sorin Pirau, AE  
Mentors: Dr. Narayanan Komerath, AE
- 16 Determining the Mechanism of Action of a Novel Cancer Therapeutic**  
Mona M. Ahmad, Biology  
Mentor: Dr. Ravi Bellamkonda, BME
- 17 Characterization of Smad Localization Under Redox Perturbation of TGF $\beta$  Signaling**  
Michael R. Butler, BME  
Mentor: Dr. Melissa Kemp, BME
- 18 Inhibition of BMP Antagonists Enhances HMSC into Osteoblastic Differentiation on Microstructured Titanium Surfaces**  
Caitlin A. Cundiff, Biology  
Mentor: Dr. Rene Olivares-Navarrete, BME

- 19 Intracranial Pressure Differences in Rats With and Without Bone Replacement After Injury**  
John L. Edwards, BME  
Mentor: Dr. Michelle LaPlaca, BME
- 20 Expanded Polytetrafluoroethylene (e-PTFE) Aortic Valve Substitute Device with Bulging Sinuses**  
Brent Howard Foster, BME  
Mentor: Dr. Shiva Arjunon, BME
- 21 Accelerated Suture Fusion and Synchondrosis Mineralization in a Murine Model of Craniosynostosis**  
Siddharth Gadepalli, BME  
Mentor: Dr. Barbara Boyan, BME
- 22 Role of Normal and Altered Shear on Aortic Valve Remodeling**  
Harika Gorti, Biology  
Swetha Rathan, ChBE  
Anita Rajamani, BME  
Mentor: Dr. Ajit Yoganathan, BME
- 23 Chitosan and PAMAM-GalNac Nanoparticles for Delivery of mRNA**  
Sara J. Kutbay, BME  
Mentor: Dr. Ravi Bellamkonda, BME
- 24 The Ratio of Excitatory and Inhibitory Neurons in Plated Rat Cortical Cultures**  
Rachel Law, BME  
Mentor: Dr. Steve Potter, BME
- 25 Analysis of Signaling to Direct Embryonic Stem Cell Differentiation a Microfluidic Co-Culture**  
Lu Ling, BME  
Mentor: Dr. Todd McDevitt, BME
- 26 Design of vortex generators for implementation in the St. Jude Medical® Regent™ Bileaflet Mechanical Heart Valve to reduce b-datum line shear stress**  
Shalv P. Madhani, BME  
Mentor: Dr. Shiva Arjunon, BME
- 27 The Effects of Nitric Oxide on Aortic Valve Calcification in the presence of Cyclic Stretch**  
Arjun Meka, Biology  
Mentor: Dr. Ajit Yoganathan, BME



- 28 Combinatorial Stimulatory Cues for Growth Factor Synthesis within an Embryoid Body via Hypoxia and Heparin Gelatin Microparticles**  
Mohamad Ali T. Najia, BME  
Mentor: Dr. Todd McDevitt, BME
- 29 Development of A Tissue-Reactive Hydrogel to Prevent Brain Tumor Migration**  
Mahtab M. Parham, MGT  
Mentor: Dr. Ravi Bellamkonda, BME
- 30 Animal Model of Concussion: Identifying the Effects of Location on Brain Function**  
Martin Park, BME  
Mentor: Dr. Michelle LaPlaca, BME
- 31 Characterization of Glutaraldehyde Crosslinked Gelatin Microparticles for Controlled Release**  
Gopi Patel, BME  
Mentor: Dr. Julia Babensee, BME
- 32 The Effects of Aging on Calcium Signaling and ROS Metabolism in Primary CD8+ T-Cells**  
Anish S. Potnis, BME  
Catherine Rivet BME  
Mentor: Dr. Melissa Kemp, BME
- 33 A removable PDMS Culture Chambering System for Muti-Well Multi-Electrode Arrays**  
Marc Powell, BME  
Mentor: Dr. Steve Potter, BME
- 34 Side Specific Responses of Aortic Valve Exposed to Altered Shear**  
Anita Rajamani, BME  
Mentor: Dr. Ajit Yoganathan, BME
- 35 The Neuroimmunological Response to Chondroitinase ABC Treatment of the Rat Barrel Cortex**  
Gazi M. Rashid, BME  
Mentor: Dr. Ravi Bellamkonda, BME
- 36 Selective Tuning of Sensory and Motor Neuron Growth in vitro with Drug Agents**  
James William Schwoebel, BioE  
Mentor: Dr. Ravi Bellamkonda, BME

- 37 Studies of a Novel Drug Designed to Prevent Tumor Invasion and Metastasis**  
Audrey Slutsky, BME  
Mentor: Dr. Ravi Bellamkonda, BME
- 38 Imbalance of Cystatin C and Cathepsin K and V in Arterial Remodeling of Sickle Cell Disease**  
Sindhuja Surapaneni, Psych  
Mentor: Dr. Manu Platt, BME
- 39 De Novo Adaption of Streptococcus Thermophilus CRISPR1 in Escherichia Coli**  
Mitesh Agrawal, BME  
Kettner Griswold, MSE  
Mentor: Dr. Mark Styczynski, ChBE
- 40 Finding a Neutral Substrate for PS-b-PMMA in Directed Self-Assembly**  
Minae Ahn, ChemE  
Mentor: Cliff Henderson, ChBE
- 41 Investigation of  $\gamma$ -Alumina Supported Catalyst Systems in Aqueous Solution**  
Fatoumata Diallo, ChBE  
Mentor: Dr. Carsten Sievers, ChBE
- 42 Advanced Mixed Matrix Membranes for Biofuel Separations**  
Michelle E. Dose, ChBE  
Mentor: Dr. William Koros, ChBE
- 43 Reduction of Nitroaromatics to Amines With Nitroreductase**  
Kyle L. Ferguson, Chem  
Jonathan Park, ChBe  
Mentor: Dr. Andreas Bommarius, ChBE
- 44 Controlled Twining Superstructure in Al-catalyzed Si Nanowires**  
Miao He, ChBE  
Mentor: Dr. Michael Filler, ChBE
- 45 Effect of Promoter Variation on Transgene Expression in Transfected Primary Bone Marrow Isolated Mesenchymal Stem Cells and Swiss 3T3 Fibroblasts**  
Cecilia A. Pantoja, BME  
Mentor: Dr. Michelle Dawson, ChBE
- 46 Understanding the Role of Soluble Growth Factors and Substrate Rigidity on Human Mesenchymal Stem Cell's Osteogenesis**  
Nhat Quach, Biochemistry  
Mentor: Dr. Michelle Dawson, ChBE

- 47 Environmental Fate and Transport of Veterinary Antibiotics**  
Jonathan C. Callura, ECE  
Mentor: Dr. Ching-Hua Huang, CEE
- 48 A Comparative Analysis of Occupancy Data Collectors for the User Profile of the I-85 HOV-to-HOT Conversion**  
Douglas K. Edwards, CE  
Mentor: Dr. Randall Guensler, CEE
- 49 Simulated Electrophysiology Experiments on Sparse Coding Models of Sensory Processing**  
Allison Del Giorno, EE  
Mentor: Dr. Christopher Rozell, ECE
- 50 Preparation of Ionically Conductive Li<sub>2</sub>S-P<sub>2</sub>S<sub>5</sub> Glass-Ceramic Electrolyte through Glass Transition Heat Treatments**  
Kevin Bogaert, MSE  
Mentor: Dr. Faisal Alamgir, MSE
- 51 1:1 Ratio Mixture of DPPC and MPPC**  
Jun S. Park, BME  
Taedo Choi, BME  
Taewan Kim, BME  
Waseem Hussain, MSE  
Mentor: Dr. Seung Soon Jang, MSE
- 52 Computational Generation of Particulate Composites with Heterogeneities**  
Seth A. Parker, MSE  
Mentor: Dr. Sunil Dwivedi, MSE
- 53 Drug Development for Alzheimer's Disease: Molecular Dynamic Simulations of Amyloid  $\beta$  Fibril Structure interacting with a Novel Alzheimer's Disease**  
Euisun Pyo, Biochemistry  
Deborah Ku, MSE  
Mentor: Dr. Seung Soon Jang, MSE
- 54 Effects of Microstructure on the Susceptibility of Type 304 Stainless Steel To Pitting and Intergranular Corrosion in Chloride-Containing Environments**  
Tarun Sikri, MSE  
Mentors: Dr. Preet Singh, MSE
- 55 A Study on the Development and Characterization of PEEK for Improved Osseointegration**  
Daniel C. Whittingslow, BME  
Robert Carson, BME  
Mentor: Dr. Kenneth Gall, MSE

- 56 Using Actuated Synthetic Cilia to Enhance Microscale Heat Transport**  
Basat Aziz, ME  
Mentor: Dr. Alexander Alexeev, ME
- 57 How Eyelashes Filter Particles**  
Sayeh R. Diggs, ME  
Mentor: Dr. Alexander Alexeev, ME
- 58 High-Throughput Microfluidic Synthesis of Janus Particles of Sub-Micron Size**  
Venkat Goli, ChBE  
Mentor: Dr. Todd Sulcheck, ME
- 59 Modeling Electrical Conductivity of Nanocomposites**  
Robert Palmer, ME  
Kylie Alea, ME  
Johnny L. Worthy III, AE  
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- 60 Comparison of Murine Articular Cartilage Morphology Measured by Contrast-Based Micro-CT Imaging and Histomorphometry**  
Yazdan Raji, BME  
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- 61 Models for Analysis and Characterization Metal Matrix Nanocomposites**  
Nicole Wiesner, ME  
Johnny L. Worthy III, AE  
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- 62 Agonist Peptide Inhibition by Antagonist Peptide During T Cell Activation: Global or Local Effect on T Cell**  
Chad M. Williams, BME  
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- 63 GUI – Tools for Modeling Composites with Nanofillers**  
Johnny L. Worthy, AE  
Panayotis Markou, ME  
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- 64 Efficient Contact Algorithm for Modeling Nanocomposite Systems**  
Johnny L. Worthy, AE  
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- 65 Study of Vertical Leg Stiffness in Asymmetrical Running**  
Myong Joon Kim, BioE  
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- 66 Jacobian Sensitivity of Functional Leg Length in Respect to Variation of Lower Limb Segment Angles**  
 Young Suk Moon, BME  
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- 67 Wearable technology that Limits ankle motion preserves normal walking behavior**  
 Simisola O. Oludare, BME  
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- 68 An Experimental Study of the Nonconsumptive Effects of Chaoborus on Daphnia Dentifera**  
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- 69 sRNA-mRNA Interactions from a Thermodynamic Perspective and the role of Hfq**  
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- 70 Eurytemora affinis, Chemical Trackers?**  
 Grace Kim, Biology  
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- 72 Immuno-Informative Transcripts Define Seven Common Axes of Peripheral Blood Gene Expression**  
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Mysha Sarwar, Chem  
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Robert Colin Blenis, Psych  
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Anita A. Hasni, Psych  
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Minsun Park, IE  
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Alison Williams, Psych  
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Wharton, Kate	89	15
Whittingslow, Daniel C.	55	11
Wiesner, Nicole	61	12
Williams, Alison	88	15
Williams, Chad M.	62	12
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Worthy, Johnny L.	59, 61, 63, 64	12

# Recognitions

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

# Recognitions

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