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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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-Nitroantrhanilic 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 ERα36: 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
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 Integrative 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 Kolojechick-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 TGFβ 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 Gadeepalli, BME
   Mentor: Dr. Barbara Boyan, BME

22 Role of Normal and Altered Shear on Aortic Valve Remodeling
   Harika Gorti, Biology
   Swetha Rathn, 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
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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
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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
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49 Simulated Electrophysiology Experiments on Sparse Coding Models of Sensory Processing
Allison Del Giorno, EE
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50 Preparation of Ionically Conducive Li2S-P2S5 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
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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 β Fibril Structure interacting with a Novel Alzheimer’s Disease
Euisun Pyo, Biochemistry
Deborah Ku, MSE
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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
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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
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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
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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
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66 Jacobian Sensitivity of Functional Leg Length in Respect to Variation of Lower Limb Segment Angles  
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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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71 Isolation and Identification of Freshwater Red Algae Chemical Defenses: Batrachospermum sp.  
John F. Nahabedian III, Biology  
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72 Immuno-Informative Transcripts Define Seven Common Axes of Peripheral Blood Gene Expression  
Marcela K. Preininger, Biology  
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73 The Effect of Host Food Quality on Parasite Fitness in an Invertebrate-Parasite System  
Sara Jeanne Snell, Applied Biology  
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74 Population Genetic Structure of Vespula Pensylvanica Based on RFLPs of Mitochondrial DNA  
Ariel Thompson, Biology  
Mentor: Dr. Michael Goodisman, Biology  

76 Synthesis of Flinderole C  
Paul Grzybowski, Chem  
Dadasaheb Patil, Chem  
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77 Ion Mobility-Mass Spectrometric Study of Gas-Phase Cyclodextrin-Lipid Inclusion Complexes.  
Kenneth J. Laszlo, Chem  
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78 Synthesis of Triaryl-substituted Pyrazoline Fluorophores  
Vishwa B. Ravleker, Chem  
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79 High-contrast metal-responsive fluorescent Probes Based on Synergistic Electronic and Conformational Switching  
Mysha Sarwar, Chem  
Mentor: Dr. Christoph Fahrni, Chem

80 Measuring Present-Day Strain Rates along the Fish Lake Valley Fault System, Pacific-North America Plate Boundary  
Christopher W. Johnson, EAS  
Mentor: Dr. Andrew Newman, EAS

81 The Effects of FeCl3 Intercalation on the Optical Properties of Multilayer Epitaxial Graphene  
Christine Johnson, Physics  
Mentor: Dr. Edward Conrad, Physics

82 Exploring the Principles of Sandswimming  
Andrew Masse, Applied Physics  
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83 Source Memory Improves in Contexts that are Consistent with Cultural Values  
Robert Colin Blenis, Psych  
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84 Effects of Acute Physical Stress on Long-Term Memory for Emotional Images  
Anita A. Hasni, Psych  
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85 Assessing the Relationship between Math Ability and Health Numeracy for Younger and Older Adults  
Minsun Park, IE  
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86 Effect of Attention on Source Memory for Emotional Stimuli in Adults with Asperger’s Syndrome  
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87  The Effect of Retrocues on CDA and Long-term Item-Location Associations
    Yusuf M. Uddin, Biology
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88  Motion Prediction and Its Potential to Predict Driving Performance
    Alison Williams, Psych
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89  Conflict and its Impact on Education Accumulation and Enrollment in Colombia: What We Can Learn from IDPs
    Kate Wharton, Econ, INTA
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    Basheer Tome, ID
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91  Digital Gaming and Weapons of Mass Destruction
    Sapphire Liu, INTA
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Special Thanks to our UROP staff and volunteers!

Fadrika Prather, UROP Project Coordinator

Maya Oren, UROP Student Assistant

Aswin Natarajan, UROP Student Assistant

Georgia Tech Student Ambassadors

Sue Woolard, Office of Assessment

Dustin Shiflett, OIT

Natasha Hackley Lawson, Undergraduate Studies

Nicole Leonard, Honors Program

Brandon Ford, Facilities

Thank you for all of your hard work!
Special Thanks to our Session Moderators!
Sandi Bramblett, IRP
Lori Critz, Library
Paul Hurst, Fellowship Communication Program
Caroline Noyes, Office of Assessment
Tris Utschig, CETL
Jennifer Steffen Kimble, Pre-Health Advising

Special Thanks to our Sponsors!
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