

# Schedule



Friday, November 11<sup>th</sup>, 2011

# From the Chairs

On behalf of the Symposium Committee, we would like to welcome you to the website of the 6th annual Engineering Graduate Symposium (EGS '11). The EGS '11 will be held on Friday, November 11, 2011, across the College of Engineering (CoE) campus. This year's theme is "Engineering the Michigan Difference." This is an exciting gathering of engineering graduate students, prospective students, faculty members, entrepreneurs, and industrial sponsors.

The Engineering Graduate Symposium is a unique one-day event that is organized to boost the spirit of innovation, collaboration, and communication among graduate students in an interdisciplinary environment. The EGS '11 will consist of keynote lectures, invited talks from industry, research poster sessions presented by graduate students from across the College of Engineering, and an awards ceremony. The symposium will enable graduate students to share their research accomplishments as well as review breakthrough research done by their peers. In addition to the rich technical program, the symposium hosts special sessions and tours for prospective graduate students invited from top schools nationwide, introducing them to the research activities at University of Michigan College of Engineering.

Also, we cordially invite you to participate in this exciting symposium as organizers, presenters, prospective students, and/or sponsors. The symposium offers an ideal setting to share time and talent in a friendly environment, which will make a truly memorable experience for all participants.

Please do not hesitate to e-mail us at [SymposiumInfo@umich.edu](mailto:SymposiumInfo@umich.edu) if you have any questions, comments or would like to get involved. We greatly appreciate your interest and contribution to EGS '11.

Best Regards,

*Mathieu Davis and Aaron Tan*

Co-Chairs, Engineering Graduate Symposium 2011

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# POSTER PRESENTATIONS

## POSTER SESSION I

11:00-12:30pm

### *Duderstadt*

Design and Manufacturing	18
Earth Sciences and Remote Sensing	19
Engineering in Medicine	20
IOE and Financial Engineering	22
Material and Chemical Technology	23
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### *EECS Atrium*

Photonics and Applied Physics	25
Power and Control	26
RF and Applied Electromagnetics	27
Software and Intelligent Systems	28
Solid-State Materials, Devices, and Physics	29
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## POSTER SESSION II

3:30-5:00pm

### *Duderstadt*

Civil and Environmental Engineering	33
Engineering in Biological Systems	35
Space Research and Aerospace Engineering	37
Thermal Sciences, Fluids, Acoustics and Vibrations	38

### *EECS Atrium*

Energy	39
MEMS and Mechatronics	40
Signal Processing and Computer Vision	42

**Richard and Eleanor Towner Prize for Outstanding  
Ph.D. Research Poster Competition**

44

*Duderstadt Gallery*

3:30-5:00pm

## EGS 2011 Organizing Committee and Volunteers

Michael Allison	EE:Systems , Systems Engineering & Communication and Signal Processing & Computer Vision Session Chair
Derya Ayrall	CEE, Civil & Environmental Engineering Session Chair
Iverson Bell	EECS, Prospective Student Committee
Andy Boucher	NERS, Award Ceremony Coordinator
Cindy Cerna	BME, Prospective Student Committee
Tizoc Cruz-Gonzalez	ME, Prospective Student Committee
<b>Mathieu Davis</b>	<b>ME, EGS Planning Committee Chair</b>
Jivan Deglise-Hawkinson	IOE, Industrial Operations Engineering and Financial Engineering Session Chair
Chen Feng	CEE, Civil & Environmental Engineering Session Chair
John Hennessy	BME, Photographer
Jessandra Hough	ME, Prospective Student Committee
Jessica Jones	Aero, Prospective Student Committee
Jinyong Kim	ME, Engineering in Medicine Session Chair
Liduina Kimbu	NAME, Photographer
Michael Kimiecik	MS&E, EGS Committee Member
Brittany Lancaster	ChE, Material and Chemical Technology Session Chair
Maria Lang	Aero, Prospective Student Committee
Dongkyoung Lee	ME, Design and Manufacturing Session Chair
Seungchul Lee	ME, Design and Manufacturing Session Chair

Sha (Lisa) Li	ME, Energy Session Chair
Jing Liu	ChE, Energy Session Chair
Avishay Livne	CSE, Intelligent Systems & Software Systems Session Chair
Nishant Mahajan	CEE, Award Ceremony Coordinator
James McCullagh	EE, MEMS and Microfluids Session Chair
Thomas McKenney	NAME, EGS Committee Member
Rohan Morajkar	Aero, Automotive Engineering Session Chair
Mahta Mousavi	EE:Systems, Engineering in Biological Systems Session Chair
Mike Nazareth	Associate Director for Graduate Education
Christopher Ngigi	Aero, Fluid Dynamics & Heat Transfer and Thermodynamics & Combustion Session Chair
Ryan Oliver	ME, MEMS and Microfluids & Mechatronics and Robotics Session Chair
Dibyadeep Paul	ME, SLA & SOAS Coordinator
Bruce Pierson	NERS, Nuclear Engineering, Science and Engineering Session Chair
Brandon Pitts	IOE, Prospective Student Committee
Ines Pons-Siepermann	ChE, Prospective Student Committee
Andria Rose	Coordinator for Graduate Education Programs
Swapna Potluri	EE:Sys, RF and Applied Electromagnetics Session Chair
Andrew Pottebaum	ME&E, Solid-State Materials and Physics Session Chair

C Davis Powell	CEE, Prospective Student Committee
Sahar Rahmani	BME, Engineering in Medicine Session Chair
Aswath Rangarajan	Editor, EGS Abstract Book
Amirreza Rastegari	ME, Fluid Dynamics and Heat Transfer Session Chair
Azarias Reda	CSE, Software Systems Session Chair
Sara Rimer	CEE, Prospective Student Committee
Gregg Schell	IOE, Industrial Operations Engineering and Financial Engineering Session Chair
Aayush Shah	Macro, Sponsor Recruiter
Bhawana Sharma	IOE, Photographer
Ashish Singh	Aero, Mechatronics and Robotics Session Chair
Zohar Strinka	IOE, Sponsor Recruiter
Sanat Talmaki	CEE, Civil and Environmental Engineering Session Chair
<b>Aaron Tan</b>	<b>MS&amp;E, EGS Planning Committee Chair</b>
Kathryn Tippey	IOE, EGS Planning Committee
Catherine Walker	AOSS, Space Research and Aerospace Engineering Session Chair
Shira Washington	Coordinator for Graduate Education Programs
Cheng Zhang	EE, Solid-State Circuits & Photonics and Applied Physics Session Chair
Yilan Zhang	CEE, EGS Planning Committee
Kan Zhou	EE:Sys, Power and Control Session Chair

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- Physics
- Materials Science
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- Mathematics, Information Systems

We also offer exciting internship, co-op, post-doctoral, and graduate fellowship programs.

**Stop by our booth at the Engineering Grad Symposium  
on November 11th from 10am-4pm!**

We would like to meet graduate students at all stages of their academic career. If you are ready to graduate, please bring your resume.

*Sandia will be located in the connector between the Duderstadt and Pierpont Commons.*

**[sandia.gov/careers](http://sandia.gov/careers)**



**Sandia National Laboratories**

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Sandia is an equal opportunity employer. We maintain a drug-free workplace.

# Soar Technology, Inc



Soar Technology, Inc. (SoarTech) is a leader in the research and development of knowledge-rich intelligent systems that automate complex tasks, simplify human-system interaction, and model human behavior for military and civilian applications. We apply this technology in three main business areas:

## ***Intelligent Training***

SoarTech is a world leader in the development of intelligent behavior models to support simulation-based and immersive training applications. Our intelligent behavior models cover the full spectrum from socially and culturally focused for SSTR training to tactically focused for MCO training. SoarTech also develops serious games that integrate our advanced behavior models and our recent research in pedagogic experience tailoring and intelligent tutoring

## ***Autonomous Platforms***

The same technologies that have enabled SoarTech to bring human level intelligence and natural, multi-modal interfaces to simulation systems are now being used to build intelligent, autonomous, and collaborative robotic systems. Robotic intelligence frees humans from being “tethered” to a robot – and makes the robot a true “teammate” instead of a piece of equipment.

## ***Intelligence, Surveillance, and Reconnaissance***

The most complex thing humans do is decide. A single decision requires that you accumulate evidence from diverse sensory inputs, associate past memories, integrate knowledge from repositories, collaborate, address uncertainty, learn, convert raw information to symbols, reason and, finally, decide. Deciding is a natural part of cognition, and we do it easily and naturally. At SoarTech, we build software to mimic this process with incredible possibilities every day.

Soar Technology has openings for Principal Investigators, Software Engineers, and Artificial Intelligence Engineers. For more information visit our website at [www.soartech.com](http://www.soartech.com).

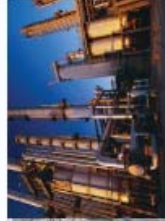
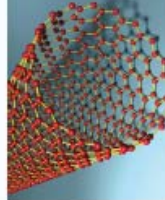
# Exponent®

Engineering and Scientific Consulting

Exponent is a leading engineering and scientific consulting firm. Exponent has approximately 600 consultants, including more than 350 that have earned a doctorate. We currently have over 35 consultants with degrees from Michigan!

## Exponent provides engineering and scientific consulting services in the following major areas:

- Biomechanics
- Biomedical Engineering
- Buildings & Structures
- Chemical Regulation & Food Safety
- Civil Engineering
- Construction Consulting
- Defense Technology Development
- Ecological & Biological Sciences
- Electrical & Semiconductors
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- Environmental & Earth Sciences
- Epidemiology & Computational Biology
- Exposure Assessment
- Human Factors
- Materials & Corrosion Engineering
- Mechanical Engineering
- Occupational & Environmental Health
- Polymer Science & Materials Chemistry
- Statistical & Data Sciences
- Thermal Sciences
- Toxicology & Mechanistic Biology
- Vehicle Engineering



## Stop by our booth at the Engineering Grad Symposium

We will be hosting an Information Session on 11/11 from 1:00–2:00pm in Pierpont Commons — Boulevard Room

[www.exponent.com/careers](http://www.exponent.com/careers)



**This is the info session you don't want to miss...**

***Come hear about the intern and new grad opportunities we have available for graduate students.***

**Event:** Info Session

**Location:** Pierpont Commons

**Date:** Friday, 11/11

**Time:** 1:00 PM

Come join us to hear more about our intern and new grad programs and find out how you can land a job with us. You'll hear from Engineers from our Digital Design and Software Research and Development teams, who will talk about the work they do and the opportunities they have available for graduate students.

Can't make the Info Session? Come by our booth in the EECS Atrium from 10am-4pm to talk with a Qualcomm representative and drop off your resume.

**[qualcomm.com/careers](http://qualcomm.com/careers)**

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# Symposium Schedule

## Friday, November 11<sup>th</sup>

- 8:00 – 3:00      Registration & Information  
*Duderstadt Center Gallery*
- 9:00 – 10:00      Welcome and Keynote Speaker
- 2011 Engineering Graduate Symposium Co-Chairs, *Mathieu Davis and Aaron Tan*
  - Dr. Alec D. Gallimore, *Assoc. Dean for research and Graduate Education, College of Engineering*
  - Dr. Ronald Gibala, *Professor Emeritus of Materials and Metallurgical Engineering, Materials Science and Engineering, College of Engineering*
  - Dr. Vivek De, *Intel Fellow in Intel Labs and Director of the Circuits Research Lab in Hillsboro, Oregon*
- Chrysler Chesebrough Auditorium*
- 10:00 – 4:00      Corporate Sponsor Exhibits  
*Duderstadt Center Atrium and EECS Atrium*
- 10:30 – 11:30      Admissions/Funding Workshops
- Monique Washington, *Director of Admissions, Rackham*
  - Douglas Keasal, *Senior Fellowship Officer, Rackham*
- Stamps Auditorium*
- 11:00 – 12:30      Poster Session I  
*Duderstadt Center Atrium & Connector Hall, EECS Atrium*
- 12:00 – 1:30      Lunch  
*Duderstadt Center Gallery*
- 1:00 – 3:00      Corporate Sponsor Information Sessions  
*Pierpont Commons:*  
*Intel – East 1-2pm, 2-3pm*  
*Exponent – Boulevard 1-2pm*  
*Qualcomm – Center 1-2pm*  
*Sandia – Valley 1-2pm, 2-3pm*

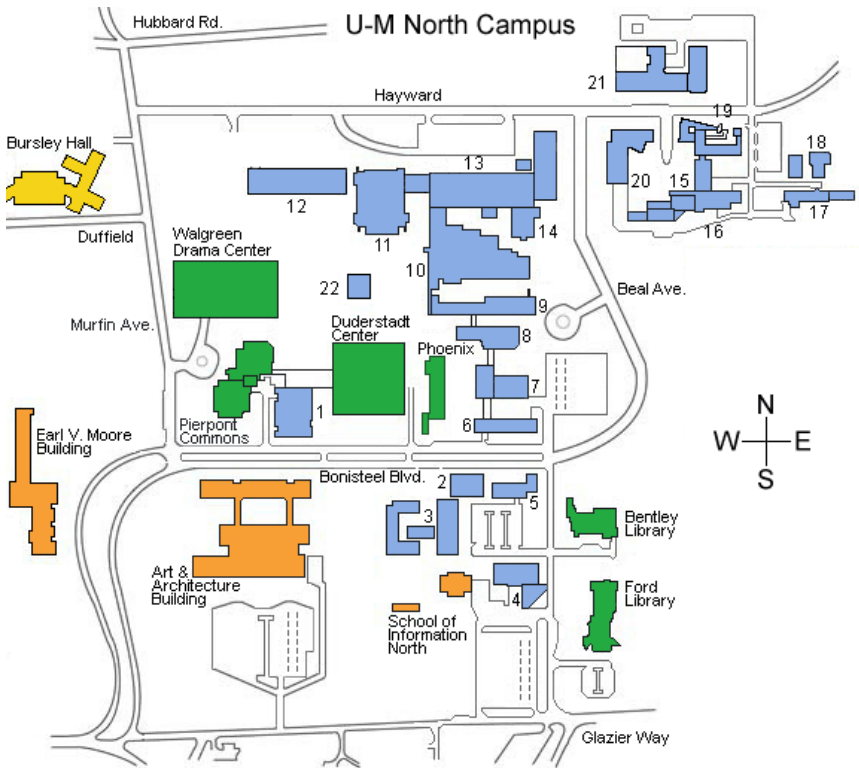
- 1:00 – 4:00      Engineering Department Visits  
*Department Locations*
- 3:00 – 4:00      Coffee Break  
*Duderstadt Center, EECS Atrium*
- 3:30 – 5:00      Poster Session II  
*Duderstadt Center Atrium & Connector Hall,  
EECS Atrium*
- 3:30 – 5:00      Richard and Eleanor Towner Prize for  
Outstanding Ph.D. Research Poster Competition  
*Duderstadt Center Gallery*
- 6:00 – 8:00      Awards Dinner  
*Winners of the graduate student poster presentations will be  
announced.*  
*Tishman Hall , CSE Atrium*

# Engineering Department Visit Rooms

1:00 – 4:00 PM

<b>Department</b>	<b>Room</b>	<b>Dept Contact Name/Number</b>
<b>AERO</b>	Aero Student Lounge, 1st Floor, FXB Building	Christy Byks-Jazayeri, 734-764-3311
<b>AP</b>	267 West Hall	Charles Sutton, 734-764-4595
<b>AOSS</b>	2204 SRB	Margaret Reid, 734-936-0482
<b>BME</b>	2203 LBME	Maria Steele, 734-647-1091
<b>ChE</b>	3158 Dow (Podbielniak Room)	Susan Hamlin, 734-763-1148
<b>CEE</b>	1371 GGB	Jessica Taylor, 734-764-8405
<b>CSE</b>	3725 CSE	Dawn Freysinger, 734-647-1807
<b>EE &amp; EE:S</b>	EECS 3316	Amy Wicklund, 734-764-2390
<b>IOE</b>	IOE 1602	Matt Irelan, 734-764-6480
<b>InterPro</b>	2287 SI-North	Patti Mackmiller, 734-764-3071
<b>Macro</b>	3062C HH Dow	Nonna Hamilton, 734-763-2316
<b>MSE</b>	1504 GG Brown	Jeanette Johnson 734-763-2445
<b>ME</b>	IOE 1680	Michele Mahler 734-763-4277
<b>NAME</b>	Room 232 Conference Room, NAME Bldg	Nathalie Fiveland, 734-936-0566
<b>NERS</b>	1916 Cooley	Cherilyn Davis, 734- 615-7139

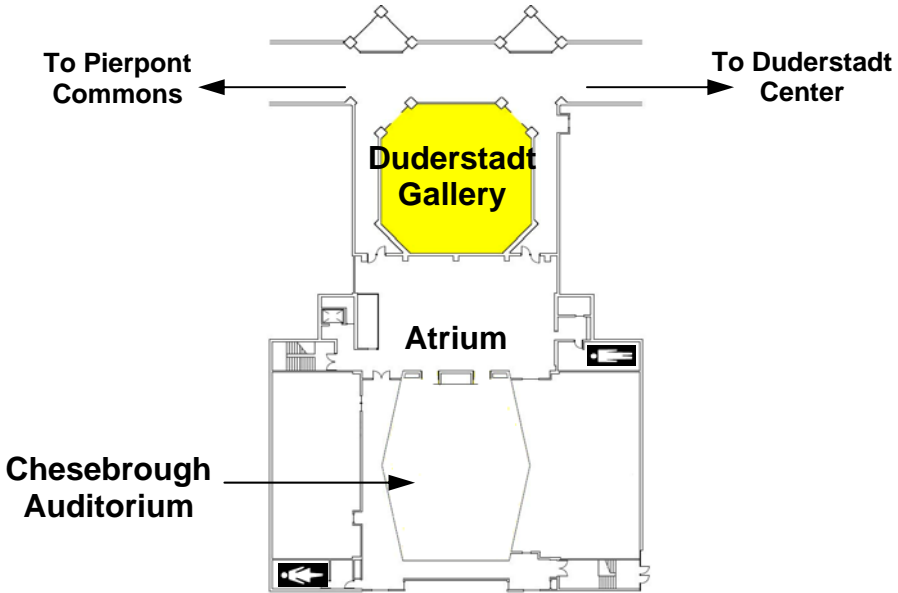
# Maps



**University of Michigan – North Campus**

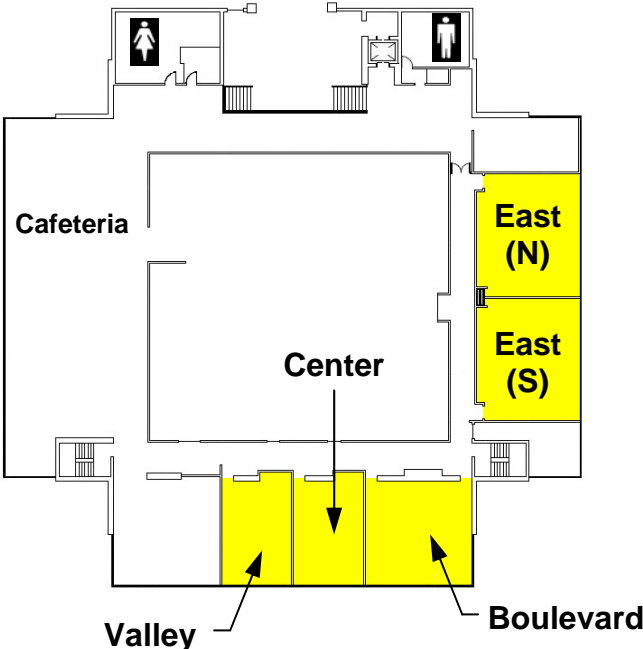
1. Chrysler Center
2. Gerstacker Building
3. Engineering Research (ERB)
4. Lurie Biomedical Engineering
5. Interdisciplinary Research (IRB)
6. Cooley Building
7. Industrial Operations (IOE)
8. Lurie Center (LEC)
9. Lay Automotive Lab
10. Electrical Engineering and Computer Science (EECS)
11. HH DOW Building
12. Computer Science and Engineering (CSE)
13. GG Brown Laboratory
14. Environmental & Water Research Engineering (EWRE)
15. Engineering Programs Building
16. Wilson Student Team Center
17. Naval Architecture & Marine Engineering (NAME)
18. Radiation Sciences Lab
19. Wind Tunnel
20. François-Xavier Bagnoud Building (FXB)
21. Space Research (SRB)
22. Ann and Robert H. Lurie Tower

## Maps

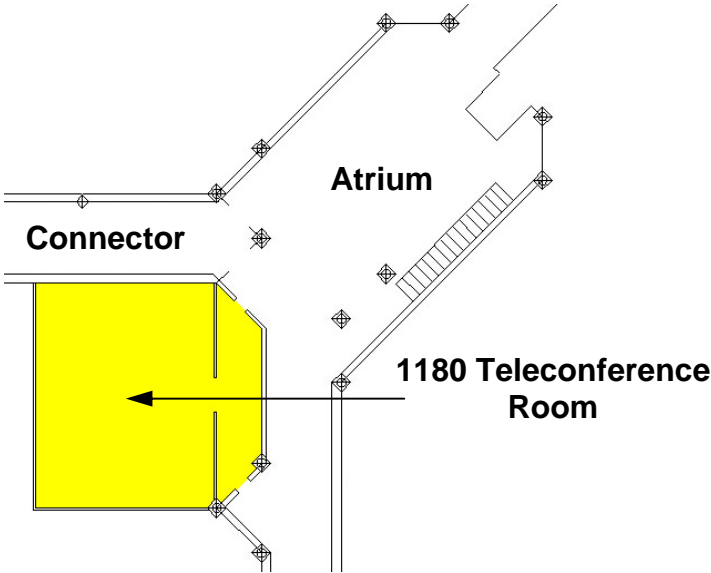


**Chrysler Center – 2<sup>nd</sup> Floor**

# Maps



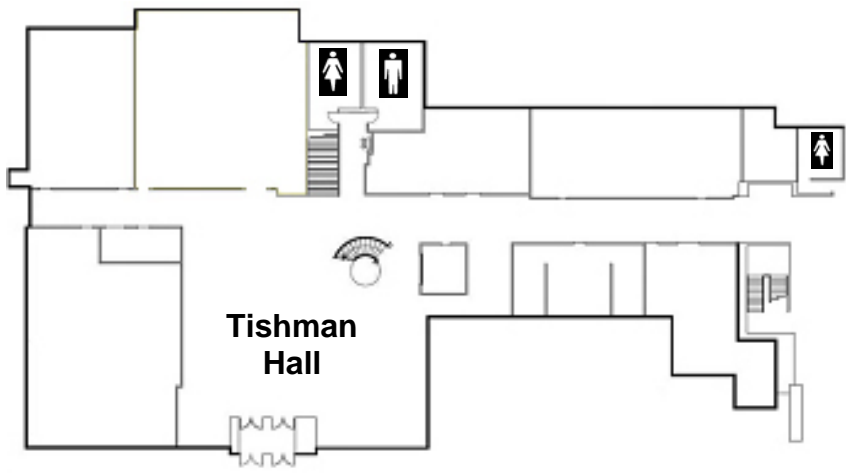
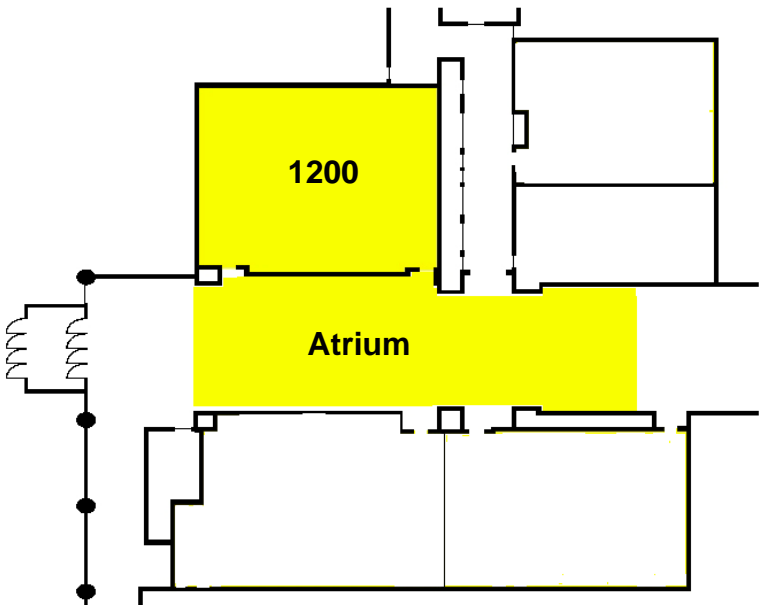
**Pierpont Commons – 2<sup>nd</sup> Floor**



**Duderstadt Center – 1<sup>st</sup> Floor**

# Maps

## EECS Building – 1<sup>st</sup> Floor



## CSE Building – 1<sup>st</sup> Floor

**POSTER**  
**PRESENTATIONS**

**Session I**

**11:00 AM – 12:30 PM**

*Duderstadt 11:00am-12:30pm*

## **Design and Manufacturing (DMF)**

**Session Chairs: Seungchul Lee, Dongkyoung Lee**

DMF1 – Dongkyoung Lee

**Modeling of Laser Cutting of an Anode Material for Lithium-ion Batteries**

DMF2 – Guang Dong

**An efficient optimal design methodology for nonlinear multibody dynamics systems with application to vehicle occupant restraint systems**

DMF3 – Rakesh Patil

**A Framework for the Integrated Optimization of Charging and Power Management in Plug-in Hybrid Electric Vehicles**

DMF4 – Sarang Supekar

**Environmentally benign high-performance metalworking fluids based on supercritical carbon dioxide**

DMF5 – Steven Hoffenson

**The Impact of the NCAP Frontal Crash Test Speed on Optimal Vehicle Design and Road Traffic Injuries**

DMF6 – WonHee Kim

**Model-Based Multi-Stage Design Tool for Shape Memory Alloy Devices**

DMF7 – Zhiwei Shan

**Advanced Lithium-Ion Battery Thermal Management with a Smart-Design Liquid-Cooled Heat Exchanger**

*Duderstadt 11:00am-12:30pm*

## **Earth Sciences and Remote Sensing (ERS)**

**Session Chair: Catherine Walker**

ERS1 - Michael Benson

**Forest Structure Estimation Using SAR, LiDAR, and Optical Data in the Canadian Boreal Forest**

ERS2 - Alexander Bryan

**In-canopy gas-phase chemistry during the 2009 CABINEX field campaign: Sensitivity to isoprene chemistry and vertical mixing**

ERS3 - Manjunath Ganesh

**Aquarius Early On-orbit commissioning**

ERS4 - Lingli He

**Effects of fine-scale canopy and soil moisture heterogeneity on domain-scale energy fluxes and soil water fluxes in a temperate mixed forest**

ERS5 - Catherine Colello Walker

**Simulations of Mechanical Failure in Ice: Implications of terrestrial fracture models as applied to the icy satellites of the outer solar system**

ERS6 - Melissa Zagorski

**Where Aeropalynology and Climatology Meet**

*Duderstadt 11:00am-12:30pm*

## **Engineering in Medicine (EMS)**

**Session Chairs: Jinyong Kim, Sahar Rahmani**

EMS1 - Tayte Askelsen

**Feasibility of Muscle Stiffness Measurements Using Ultrasound Elastography**

EMS2 - Omer Aydin

**Synthesis of Hybrid Micelles for Targeted Delivery of Chemotherapeutic Agents for Advanced Prostate Cancer Therapy**

EMS3 - Eugene Dariush Daneshvar

**Articulating Neural Interfaces**

EMS4 - Yasemin Yuksel Durmaz

**Degradable, pH-Sensitive, Star Vectors for Cytoplasmic Delivery of Nucleic Acids**

EMS5 - Sakib Elahi

**Targeted imaging of colorectal dysplasia in living mice with fluorescence microendoscopy**

EMS6 - Rosemarie Figueroa

**Function Before and After Tendon Transfer for Lateral Pinch and Finger Flexion in Tetraplegic Patient**

EMS7 - Michael Friedman

**Calcium- and Phosphorus-Supplemented Diet Increases Bone Mass and Structural Strength in Exercising Mice**

EMS8 - Nicholas Groeneweg

**Towards a Test for Assessing the Impact Resistance of Commercial Skylights to Human Falls**

EMS9 - Jinyong Kim

**Identification of the mechanism of the maternal birth injury by an analogy to a conventional mechanical scarf joint**

EMS10 - Yen-Ling Lin

**Development of "smart" particles for effective gene silencing in epithelial cancer cells**

EMS 11- David Benjamin Lipps

**Knee Morphology Helps Explain the Gender Difference in Anterior Cruciate Ligament Strain**

*Duderstadt 11:00am-12:30pm*

EMS12 - Jing Liu

**A novel adaptive two dimensional micro gas chromatography system featuring motionless Knudsen pump and on-column optical detector**

EMS13 - Jiajia Luo

**A 3D MR-Based Geometric Analysis for Deciding Whether a Hysterectomy Is Necessary**

EMS14 - Carl McGill

**Investigation of Precision Needle Insertion for Prostate Brachytherapy**

EMS15 – Asish Misra

**Multicompartmental Anisotropic Composite Nanocarriers for Cancer Therapy**

EMS16 – Astin Ross

**Microparticle Characterization for Cochlear Drug Delivery: A Preliminary Study**

EMS17 – Huanan Zhang

**Implantation and Imaging Methods for Flexible CNT Electrode**

EMS18 – Quan Zhou

**Development of a Cost-Effective Mobil Telemedicine Framework with LabVIEW User Interface for Integrated Vital Sign Recording and Analysis**

*Duderstadt 11:00am-12:30pm*

## **IOE and Financial Engineering (IOE)**

**Session Chairs: Jivan Deglise-Hawkinson, Gregg Schell**

IOE1 - Vernnaliz Carrasquillo

**Work Variations and Musculoskeletal Disorders in Paced Production Work**

IOE2 - Jivan Deglise-Hawkinson

**Operational Planning Models with Service Pathways**

IOE3 - Weihong Guo

**Maintenance Resources Allocation in Mixed Model Assembly Systems**

IOE4 - Huiyang Li

**Supporting Space Teleoperation through Tactile Display**

IOE5 - Troy Long

**Sensitivity Analysis for Lexicographic Optimization in Radiation Therapy Treatment Planning**

IOE6 - Nadine Moacdieh

**Eye tracking based measurement of clutter in visual displays**

IOE7 - Fei Peng

**Incorporating Heterogeneous Fleets in the Vehicle Routing Problem: Algorithms and Implications**

IOE8 - Gregory Schell

**Analysis of Repeated Measures Data for Glaucoma Progression Classification**

IOE9 - Zohar Strinka

**Exact and Heuristic Solutions to the Multi-period Selective Newsvendor Problem**

IOE10 - Denny Yu

**Standardizing surgeon technique: finding critical variations for training and assessment**

IOE11 - Wei Zhou

**Influence of Object Weight on Upper Limb Postures during Grasping, Holding, and Placing Cylindrical Object**

*Duderstadt 11:00am-12:30pm*

## **Material and Chemical Technology (MCT)**

**Session Chair: Brittany Lancaster**

MCT1 – Riddhiman Bhattacharya

**Hysteresis and Rate Dependent Deformation Mechanisms in Mn+1 AX<sub>n</sub> Phase Materials**

MCT2 - Jacob Davidson

**Multi-scale modeling and simulations of rubber elastomers**

MCT3 - Xiaopei Deng

**Bio-Orthogonal Chemistry Based on Multifunctional Coatings**

MCT4 - Jeremy Feldblyum

**Discovering Defects in Microporous Coordination Polymers using an Antimatter Probe**

MCT5 - Joseph Furgal

**The Chemistry and Photophysical Properties of Conjugated Organic Functionalized T10/12 Silsesquioxanes**

MCT6 - Michael Hoepfner

**Nanoaggregation and Precipitation of Petroleum Fractions Investigated by Small-Angle Neutron Scattering**

MCT7 - JongDoo Ju

**An Atomically Quantized Hierarchy of Shear Transformation Zones in a Metallic Glass**

MCT8 - Kanako Okada

**Electrochemical Conversion of Glycerol in a Solid Polymer Electrolyte System Running on Carbides-supported Electrocatalysts**

MCT9 - Leonid Pavlovsky

**Effects of Salt on the Mechanical Properties of Staphylococcus epidermidis Bacterial Biofilms**

MCT10 - Aayush Shah

**Anisotropic Particle Assembly**

MCT11 - Sameh Tawfick

**Functional carbon nanotube surfaces and yarns**

MCT12 - Jaewon Yoon

**Dynamic Shape Control of Anisotropic Particles**

*Duderstadt 11:00am-12:30pm*

## **Nuclear Energy, Science and Engineering (NEE)**

**Session Chair: Bruce Pierson**

NEE1 - Manhee Jeong

**Fabrication and signal readout of the delay line detectors for the gamma-ray imaging**

NEE2 - Jeffrey Katalenich

**Fabrication of Sol Gel Microspheres for Space Nuclear Power Applications**

NEE3 - Wei Tian

**Plasma Discharge in Water with Pre-existing Bubbles and Electric Field Rarefaction**

NEE4 - Michael Vargas

**Focusing Laser Wakefield Produced Synchrotron Radiation with a Spherically Curved Crystal**

NEE5 - Matthew Weis

**Anisotropy and feedthrough in the magneto-Rayleigh-Taylor Instability**

## **Photonics, and Applied Physics (PAP)**

**Session Chair: Cheng Zhang**

PAP1 - Neranga Ishan Abeyasinghe

**Near Field Surface Imaging of Monolayer Protected Gold Nanoclusters (MPCs)**

PAP2 - Justin Foley

**Broadband Long-Wavelength Infrared Si/SiO<sub>2</sub> Subwavelength Grating Reflector**

PAP3 - Brett Kuprel

**Tensor Metamaterials from Eigenvector Field Traces**

PAP4 - Vasudev Lal

**Optical Spectroscopy of Single-Walled Carbon Nanotubes**

PAP5 - Jeremy Moore

**Continuous-Wave Ultraviolet Emission through Fourth Harmonic Generation in a Whispering Gallery Resonator**

PAP6 - Chu-hsiang Teng

**Zero-mode Waveguide Fabrication By Electrodeposition Nanoaperture Formation**

PAP7 - Matthew Tomes

**Brillouin Cooling Theory**

PAP8 - Leslie Upton

**Entangled Photon Fluorescence with Organic Conjugated Molecules**

PAP9 - Sung Hei Yau

**Fluorescence from Metal Nano Clusters: Spectroscopy and Mechanism**

PAP10 - Chao Zhang

**Simultaneous Passive Coherent Combining and Mode Locking in Fiber Laser Arrays**

PAP11 - Cheng Zhang

**Fiber Optic Probe Hydrophone**

PAP12 - Jin Zhang

**Non-linear optical time-resolved studies on light harvesting dendritic oligothiophene-erylene bisimide hybrids**

*EECS Atrium 11:00am-12:30pm*

## **Power and Control (PCR)**

**Session Chair: Kan Zhou**

PCR1 - Mads Almassalkhi

**Incentive-based Coordinated Charging Control of Plug-in Electric Vehicles at the Distribution-Transformer Level**

PCR2 - Sina Sadeghi Baghsorkhi

**Tools to Analyze Wind Power Impact on Voltage Magnitude and Transformer Tap Position**

PCR3 - Eric Dallal

**Supervisory Control for Collision Avoidance in Vehicular Networks Using Discrete Event Abstractions**

PCR4 - Hamid-Reza Ossareh

**Quasilinear Control: The Case of Asymmetric Actuators**

PCR5 - Jong Jin Park

**A Kinematic Control Law and a Trajectory Planning Framework for Smooth and Comfortable Motion of Mobile Robots**

PCR6 - Yi-Chin Wu

**Enforcement of Opacity Properties in Discrete Event Systems**

PCR7 - Kan Zhou

**Computationally-Efficient Finite-Element-Based Thermal Models of Electric Machines**

## **RF and Applied Electromagnetics (RFE)**

**Session Chair: Swapna Potluri**

RFE1 - Waleed Alomar

**A High Voltage High Power (HiVP) Class-E Power Amplifier at VHF**

RFE2 - Onur Bakir

**Stochastic Characterization of Wave Propagation in Mine Environments**

RFE3 - Christopher Berry

**Plasmonic Gratings for Photoconductive Terahertz Sources**

RFE4 - Seyedmohammadreza Faghieh Imani

**Generating evanescent Bessel beams using near-field plates**

RFE5 - Yang Liu

**GPU-accelerated PWTB solver for large scale electromagnetic scattering**

RFE6 - Meysam Moallem

**A Single-layer Metamaterial-based Polarizer and Bandpass Frequency Selective Surface with an Adjacent Transmission Zero**

RFE7 - Jungsuek Oh

**A Topology-Based Miniaturization of Circularly Polarized Patch Antenna**

RFE8 - Carl Pfeiffer

**Novel Methods to Analyze and Fabricate Electrically Small Antennas**

RFE9 - Young Jun Song

**Miniaturized Radio Repeater for Enhanced Wireless Connectivity and Improved Channel Capacity**

RFE10 - Felipe Andreas Valdes-Valenzuela

**High-Order Single Source Integral Equations for Analyzing Scattering from Homogeneous Penetrable Objects In Time- and Frequency-Domain**

RFE11 - Abdulkadir Yucel

**Fast Electromagnetic Optimization Using HDMR-Generated Surrogate Models**

*EECS Atrium 11:00am-12:30pm*

## **Software and Intelligent Systems (SIS)**

*Sponsored by Soar Technology*

**Session Chairs: Avishay Livne, Azarias Reda**

SIS1 – Quang Duong

**Learning and Predicting Dynamic Behavior with Graphical Multiagent Models**

SIS2 – Collin Johnson

**Hierarchical Robotic Mapping**

SIS3 – Yue Liu

**The Mason Test: A Defense Against Sybil Attacks in Wireless Networks Without Trusted Authorities**

SIS4 – Avishay Livne

**The Party is Over Here: Structure and Content in the 2010 Election**

SIS5 – Feng Qian

**Profiling Resource Usage for Mobile Applications: A Cross-layer Approach**

## **Solid-State Materials, Devices and Physics (SMP)**

**Session Chairs: Andrew Pottebaum, Cheng Zhang**

SMP1 – Ting Chang

**Bio-Mimicking Short-Term Memory to Long-Term Memory Transition in a Nanoscale Memristor**

SMP2 – Wayne Fung

**Esaki tunnel diodes based on vertical Si-Ge nanowire heterojunctions**

SMP3 - Siddharth Gaba

**Resistive switching characteristics of a-Si based nanoscale nonvolatile memory devices**

SMP4 - Kevin Grossklaus

**Focused Ion Beam Creation and Electrical Characterization III-V Semiconductor Nanospikes**

SMP5 - Wenbing Hu

**Solution-Processed Zinc Tin Oxide Thin Film Transistors**

SMP6 – Jinyoung Hwang

**Admittance spectroscopy of hole states in GaSb/GaAs quantum dots with type-II band alignment**

SMP7 - Anne Itsuno

**MBE Grown HgCdTe nBn Infrared Detectors**

SMP8 - Bor-Chau Juang

**Photoluminescence and Thermal Carrier Activation in Type-II ZnTe/ZnSe Quantum Dots**

SMP9 - Geehyun Kim

**Development of Lead Chalcogenide Nanocrystalline (NC) Semiconductor / Conductive Polymer Composite Assembly Nuclear Radiation Detectors**

SMP10 - Girish Shrinivas Kulkarni

**Carbon Nanotube Field Effect Transistor based High Frequency Biosensors**

SMP11 - Michael Kuo

**Nitride Semiconductor Nanostructures for Photovoltaic Applications**

SMP12 - Leung Kway Lee

**Site-Controlled III-Nitride Quantum Dots**

*EECS Atrium 11:00am-12:30pm*

SMP13 - Shiwei Sheng

**A Compact Model of Resistive Random Accessible Memory**

SMP14 - Chung-Chiang Wu

**Parametric amplification in single-walled carbon nanotube  
nanoelectromechanical resonators**

## **Systems Engineering, Control and Communication (SCC)**

**Session Chair: Michael Allison**

SCC1 - Parinaz Naghizadeh Ardabili

**Network Reputations Mechanisms for Enhanced Security**

SCC2 - Ali Kakhbod

**An Efficient Game Form for Multirate Multicast Service Provisioning**

SCC3 - Yang Liu

**Is Diversity Gain Worth the Pain**

SCC4 - Chun Lo

**Distributed Reference-free Fault Detection in Wireless Sensor Networks**

SCC5 - Arun Padakandla

**Nested coset codes for channel coding**

SCC6 - Aria Ghasemian Sahebi

**Multilevel Polarization of Polar Codes over Discrete Memoryless channels**

SCC7 - Shang-Pin Sheng

**A Stochastic Differential Equation Model for Spectrum Utilization**

SCC8 - Cem Tekin

**Approximately Optimal Adaptive Learning in Opportunistic Spectrum Access**

SCC9 - Qingsi Wang

**Throughput Optimal Switching in Multi-channel WLANs**

**POSTER**  
**PRESENTATIONS**

**Session II**

**3:30 – 5:00 PM**

*Duderstadt 3:30-5:00pm*

## **Civil and Environmental Engineering (CEE)**

**Session Chairs: Derya Ayrar, Chen Feng, Sanat Talmaki**

CEE1 - Marina Ines Acevedo

**Characterization of Mixing Between Water and Biofuels**

CEE2 - Seungjun Ahn

**Cultivation of Positive Organizational Culture Within Construction Projects, Given an Awareness of Path Dependence**

CEE3 – Kyle Anderson

**Energy modeling system using building information modeling technology**

CEE4 – Yuqiang Bi

**The double role of iron sulfide minerals in remediation of uranium-contaminated groundwater**

CEE5 – Erica Green

**Characterization of Mixing Between Water and Biofuels**

CEE6 – Qianru Guo

**Stochastic Methods for Structural Safety Evaluation in Fire**

CEE7 – Chunxia Li

**Detection and 3D reconstruction of Construction Worker Skeleton for Automated Ergonomics Analysis**

CEE8 – Honghao Li

**Role of Floor Systems in Collapse Resistance of Steel Frames**

CEE9 – Angelica Perez-De La Rosa

**Point-of-Use Devices as Incubators of Halogenated Phenol-Mediated Antibiotic Resistant Bacteria**

CEE10 – Ravi Ranade

**Advanced Cementitious Composite Development for Resilient and Sustainable Infrastructure**

CEE11 - Sara Rimer

**Sustainable Development in Post-Conflict Countries - Educating and Empowering the Next Generation of Engineers and Agriculturalists in Liberia to Advance their Country Toward Prosperity**

*Duderstadt 3:30-5:00pm*

CEE12 - Yilan Zhang

**Long-Term Assessment of Wireless Structural Health Monitoring System on Large-Scale Bridges**

*Duderstadt 3:30-5:00pm*

## **Engineering in Biological Systems (EBS)**

**Session Chair: Mahta Mousavi**

EBS1 - Nicholas Cilfone

**Measuring Ex-Vivo Spatial Gradients of Tumor Necrosis Factor-alpha during M. tuberculosis Infection**

EBS2 - Travis Clark

**Nonlinear and time-resolved spectroscopic studies of GFP-type chromophore as probe for amyloid- $\beta$  folding dynamics**

EBS3 - Daniel Egert

**Chronic Recording Neural Probes with Post-Implant Self-Deployed Satellite Recording Sites**

EBS4 - Thomas William Eyster

**Biofunctionalized Surfaces via CVD for Tissue Engineering**

EBS5 - Alissa Kerner

**A tunable E. coli consortium for efficient co-utilization of hexose and pentose sugars**

EBS6 - Jeremy Minty

**New approaches for cellulosic isobutanol production: improving microbial tolerance and engineering synthetic consortia**

EBS7 - Michael Charles Nelson

**Microbial Utilization of Hydrothermally Treated Algae Biomass Aqueous Co-Product**

EBS8 - Aftin Ross

**Thiol-Bromo Click Chemistry with Chemical Vapor Deposition Substrates**

EBS9 - Yubing Sun

**Matrix rigidity regulate the fate of human embryonic stem cells**

EBS10 - Brent Utter

**Design and In Vivo Validation of an Implantable SMA Driven Bowel Extender for Correcting Short Bowel Syndrome**

EBS11 - Sriram Vaidyanathan

**Studying the Interaction of Detergents with Cell Membranes using Microfluidic Whole Cell Patch Clamp**

*Duderstadt 3:30-5:00pm*

EBS12 - Erik Yusko

**Developing Nanopores with Fluid Walls for Improved, Single-Molecule Biosensors**

*Duderstadt 3:30-5:00pm*

## **Space Research and Aerospace Engineering (SAE)**

**Session Chairs: Rohan Morajkar, Catherine Walker**

SAE1 - Iverson Bell III

**Investigating the Potential of Electrodynamic Tethers to Enhance Capability of Ultra-small Spacecraft**

SAE2 - Harvey Elliott

**Experimental Simulation of the Martian Polar Region**

SAE3 - Julie Ann Feldt

**Ionospheric Data Assimilation with GPS data: Slant versus Vertical TEC**

SAE4 - Nicolas Fougere

**Understanding Measured Rotational Temperatures in the Very Inner Coma of Comet 73P/Schwassmann-Wachmann 3**

SAE5 - Roxanne Katus

**Normalized superposed epoch analysis reveals two step main phase enhancement: evidence for potential and inductive convection during intense geomagnetic events**

SAE6 - David Liaw

**Simulation of Self- Neutralization Techniques for Charged Particle Thrusters**

SAE7 - Peter Zhoujie Lu

**Graph Partitioning-Based Coordination Methods for Multidisciplinary Design Optimization Problems**

SAE8 - Shang Sun

**Probabilistic modeling of microstructure**

SAE9 - Yong Sun

**Detailed Simulations of Incident Shock Wave Development and Boundary Layer Growth in Shock Tube Facilities**

SAE10 - Sean Torrez

**Design Refinement and Low-Order Modeling Methods for Highly-Integrated Hypersonic Vehicles**

SAE11 - Micah Weberg

**ACE/SWICS Observations of heavy Ion dropouts near fast-slow stream interfaces**

*Duderstadt 3:30-5:00pm*

## **Thermal Sciences, Fluids, Acoustics and Vibrations (TFV)**

**Session Chairs: Christopher Ngigi, Amirreza Rastegari, Ashish Singh**

TFV1 - Adrian Kemal Bayraktaroglu

**Frequency agile devices based on ferroelectric materials**

TFV2 - Brandon Scott Patterson

**Determining a Bioeffects Threshold for Ultrasound Induced Cavitation**

TFV3 - Ethan Eagle

**Three Dimensional Inlet - Shock Boundary Layer Interactions**

TFV4 - Fikadu Dagefu

**A Sub-wavelength RF Source Tracking System for GPS-denied Environments**

TFV5 - Louise Lu

**Evolution of boundary layers in internal combustion engines**

TFV6 - Pooya Movahed

**Low-dissipation hybrid schemes for simulations of compressible multicomponent flows**

TFV7 - Preeti Suzanne Abraham

**Cycle-to-Cycle Flow Variations in a Motored Spark Ignition Engine**

TFV8 - Seid Sadat

**Room Temperature Pico-Watt Calorimetry**

TFV9 - Ya Wang

**Simultaneous Energy Harvesting and Gust Alleviation for a Multifunctional Wing Spar Using Reduced Energy Control Laws via Piezoceramics**

TFV10 - Yuntao Chen

**Large-eddy Simulation of a Piloted Premixed Jet Burner**

*EECS Atrium 3:30-5:00pm*

## **Energy (EGY)**

**Session Chairs: Sha (Lisa) Li, Jing Liu**

EGY1 - Shujauddin Changi

**Hydrothermal Reactions of Algal Model Compounds**

EGY2 - Hao Chen

**Investigation of hydrogen storage properties on various adsorbents**

EGY3 - Lulu Ji

**Distribution Plan of Electric Vehicle Charging Stations in the power system**

EGY4 - Soumya Kundu

**Distributed Control of Reactive Power Dispatch from PV Inverters**

EGY5 - Chiao-Ting Li

**The Synergy of Plug-In Electric Vehicle and Wind Energy**

EGY6 - Ajay Varadharajan

**Dairy Fleet Smart tool - Reporting, benchmarking and reducing transportation emissions**

EGY7 - Xin Xiao

**High efficiency small-molecule photovoltaics based on blended functionalized squaraine donors**

EGY8 - Lohit Reddy Yerva

**Energy-Harvesting Sensor Nodes**

## **MEMS and Mechatronics (MEM)**

**Session Chairs: James McCullagh, Ryan Oliver**

MEM1 - Ethem Erkan Aktakka

**Bulk Piezoelectric MEMS Technology & Applications**

MEM2 - Ali Besharatian

**A Scalable, Modular, Multi-Stage Peristaltic Electrostatic Gas MicroPump**

MEM3 - Jae Yoong Cho

**Single-crystal-silicon vibratory cylindrical rate integrating gyroscope (CING)**

MEM4 - Niloufar Ghafouri

**Effect of Substrates on Co-evaporated Bi<sub>2</sub>Te<sub>3</sub> and Sb<sub>2</sub>Te<sub>3</sub> Thermoelectric Thin Films**

MEM5 - Vikrant Gokhale

**High-Performance Bulk-Mode Gallium Nitride Resonators and Filters**

MEM6 - Jeffrey Gregory

**Characterization of High-Q, Low Frequency Resonators using an SDR System**

MEM7 - David Hiemstra

**A Moving Magnet Actuator for Large Range Nanopositioning**

MEM8 - Patrick Ingram

**Spheroid Cell Culture on PDMS Hydrophobic Surfaces and Integration into Microfluidic Devices**

MEM9 - Ayoung Kim

**Pose-graph Visual SLAM for Autonomous Hull Inspection using Monocular Camera**

MEM10 - Katherine Knisely

**Fully Implantable MEMS Cochlear Implant**

MEM11 - Karthik Kumar

**Modeling of a Multistage Vacuum Micropump**

MEM12 - Xia Lou

**Multi-Spectral Fluorescence Microscopy with Embedded Liquid Filters for Point-of-Care Applications**

*EECS Atrium 3:30-5:00pm*

MEM13 - Xin Luo

**A Fringe-Capacitance Based Planar Dielectric Sensor for Tissue Identification in Minimally-Invasive Surgery**

MEM14 – James John McCullagh

**A Vibration Harvesting System for Bridge Health Monitoring Applications**

MEM15 - Alireza Ramezani

**Feedback Control of A Bipedal Robot**

MEM16 - Mahdi Sadeghi

**Micro-Hydraulic Structure for High Performance Biomimetic Air Flow Sensor Arrays**

MEM17 - Jung Hwan Seo

**Microfabricated Passive Vapor Preconcentrator/Injector Designed for Microscale Gas Chromatography**

MEM18 – Seyit Ahmet Sis

**A DC Voltage Dependent Switchable Ferroelectric Based Composite FBAR**

MEM19 – Anurag Tripathi

**A White Blood Cell Counting Biochip for Monitoring HIV/AIDS in Resource Limited Settings**

MEM20 – Fan Wu

**A Flexible Fish-Bone-Shaped Neural Probe Strengthened by Biodegradable Silk Coating for Enhanced Biocompatibility**

MEM21 – Zhengzheng Wu

**Silicon-based Integrated Passive Devices and RF MEMS for Frequency Agile Radio Front-ends**

MEM22 – Seow Yuen Yee

**Micro-machined Acoustic Ejector for Micro Propulsion**

## **Signal Processing, and Computer Vision (SPV)**

**Session Chairs: Michael Allison**

SPV1 - Michael Allison

**Non-gridded Poisson Disk Sampling for Compressed Sensing Magnetic Resonance Image Reconstruction**

SPV2 - Gowtham Bellala

**A Coding-Theoretic Approach to Active Diagnosis**

SPV3 - Jang Hwan Cho

**Accelerating X-ray CT Image Reconstruction using Ordered-subsets with Double Surrogates**

SPV4 - Ko-Jen Hsiao

**Multicriteria anomaly detection using Pareto Depth Analysis**

SPV5 - Curtis Jin

**New methods for directing light propagation in highly scattering random media**

SPV6 - Byung-soo Kim

**Hierarchical Classification of Images by Sparse Approximation**

SPV7 - Donghwan Kim

**New optimization transfer methods for accelerated X-ray CT image reconstruction**

SPV8 - Joel LeBlanc

**Practical Methods for Radiometrically-Accurate System Identification**

SPV9 - Daniel John Lingenfelter

**Source Detection Performance Prediction for a CdZnTe Array**

SPV10 - Tzu-Yu Joyce Liu

**Reference-Based Classification**

SPV11 - Antonios Matakos

**Image Restoration Using Augmented Lagrangian with Variable Splitting**

SPV12 - Zhaoshi Meng

**Distributed Principal Component Analysis on Networks via Directed Graphical Models**

SPV13 - Paul Ozog

**Propagation of Camera Calibration Uncertainty in Two-View Sparse Bundle Adjustment**

SPV14 - Gaurav Pandey

**Automatic In-Situ Extrinsic Calibration of a 3D Lidar and Camera by Maximizing Mutual Information**

SPV15 - Se Un Park

**Bayesian Semi-blind Sparse Image Deconvolution**

SPV16 - Matthew Prelee

**A Sampling Theorem for Manhattan Grids**

SPV17 - Stephen Schmitt

**Fast Variance Prediction for 3D Axial CT with Quadratic Regularization**

SPV18 - Kallur Palli Kumar Sricharan

**Efficient anomaly detection using bipartite k-nearest neighbor graphs**

SPV19 - Min Sun

**Articulated Part-based Model for Joint Object Detection and Pose Estimation**

SPV20 - Raj Tejas Suryaprakash

**Hard SNR Limits of Denoising and Recovery of Noisy, Incomplete Matrices**

SPV21 - Jeffrey Walls

**Experimental comparison of synchronous-clock cooperative acoustic navigation algorithms**

SPV22 - Yu Xiang

**3D Pictorial Structures for Multi-View Object Parsing**

SPV23 - Kevin Shuai Xu

**Visualizing the Temporal Evolution of Dynamic Networks**

SPV24 - Yuanhao Zhai

**Matched Texture Image Coding**

**Richard and Eleanor**  
**Towner Prize for**  
**Outstanding Ph.D.**  
**Research**  
**Poster Competition**

**3:30 PM – 5:00 PM**

**Duderstadt Gallery**

*Duderstadt Gallery 3:30-5:00pm*

Sun-Il Chang

**BioBolt: A Minimally-Invasive Neural Interface for Wireless Epidural Recording by Intra-Skin Communication**

Anthony Mario D'Amato

**Minimal Modeling Input Reconstruction as an Enabling Technique for Model Refinement and Adaptive Control**

Mohammad Fallahi-Sichani

**Multi-scale systems biology approaches towards understanding the immune response to Mycobacterium tuberculosis**

Nia Rhodesia Harrison

**Thermal management of self-heated stamping tooling for warm forming applications**

Ariel Hecht

**Label-Acquired Magnetorotation: Magnetic Bead Assays for Biodetection Applications**

Bong -Gi Kim

**Energy Level Modulation in Conjugated Polymers: HOMO, LUMO and Band-Gap for Organic Photovoltaic Application**

Hongwei Liao

**Modeling, Analysis, and Control of a Class of Resource Allocation Systems Arising in Concurrent Software**

Srinivasa Nadukuru

**Time Effects in Sand**

Christopher Nelson

**The Nanoscale Structure and Dynamic Properties of Ferroelectric Films**

Soroush Saghafian

**Improving Patient Flow in Emergency Rooms**

Seungha Shin

**Interflake Thermal Conductance of Edge-Passivated Graphene**

Ahmed Tawfik

**Understanding the modeled ground-level ozone bias over the Southeastern U.S.**

Robert Wilson

**Novel Biophotonic Method Accurately Detects Pancreatic Cancer**

*Duderstadt Gallery 3:30-5:00pm*

Peng Zhang

**Scaling laws for Bulk and Thin Film Contact Resistance with Dissimilar Materials**



The logo for the Engineering Graduate Symposium (MEGS) features the letters 'M', 'E', 'G', and 'S' in a stylized font. The 'M' is yellow, while the 'E', 'G', and 'S' are blue. The 'E' and 'G' are overlapping, with the 'G' appearing to be in front of the 'E'. Below the letters, the text 'Engineering Graduate Symposium' is written in a blue, sans-serif font.

**M. EGS**  
Engineering Graduate Symposium