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# RESEARCH EXPO

**April 12, 2012**

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Jacobs School of Engineering
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# AGENDA

| 1:00 p.m. | REGISTRATION |
|---|---|
| Price Center Foyer | |

| 1:30-4:30 p.m. | POSTER SESSION |
|---|---|
| Price Center West Ballroom A and B | 230+ Graduate students display their research results |

| 2:30-4:30 p.m. | FACULTY PRESENTATIONS |
|---|---|
| Price Center Forum (4th Floor) | Ten-minute faculty talks |
| 2:30 p.m. | "Research on Earthquake Performance of Large-Scale Geotechnical Structures" Patrick J. Fox |
| 2:50 p.m. | "CitiSense – A Participatory Air Quality Sensing System for Real-Time User Feedback" William G. Griswold |
| 3:10 p.m. | "Master of Advanced Study in Medical Device Engineering" Juan C. Lasheras |
| 3:30 p.m. | "Tattoo Electronics for Biomedical Applications" Todd P. Coleman |
| 3:50 p.m. | "Biomolecular Architectures and Systems for Nanoengineering Thin Film Devices" Jennifer N. Cha |
| 4:10 p.m. | "Music Search and Recommendation" Gert Lanckriet |

| 4:30-6:00 p.m. | NETWORKING RECEPTION |
|---|---|
| Price Center East Ballroom | Meet faculty, students and industry professionals<br>Best poster awards |

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| Computer Science and Engineering | 40-77 | Page 12-14 |
| Electrical and Computer Engineering | 78-129 | Page 15-18 |
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# FACULTY PRESENTATIONS
## 2:30-4:30 p.m.
## Price Center Forum (4TH Floor)

## Structural Engineering — 2:30 p.m.

**Patrick J. Fox, Professor**
"Research on Earthquake Performance of Large-Scale Geotechnical Structures"
Earthquakes pose a serious hazard to many areas of the U.S., including Southern California. Professor Fox will present an overview of current research efforts to better understand the seismic performance and survivability of geotechnical structures, such as retaining walls and bridge foundations, through large-scale testing at the UC San Diego Englekirk Structural Engineering Center.

## Computer Science and Engineering — 2:50 p.m.

**William G. Griswold, Professor**
"CitiSense – A Participatory Air Quality Sensing System for Real-Time User Feedback"
Government pollution monitoring is sparse, reporting regional measures, not individual exposure. CitiSense consists of a body-worn low-power board, a back-end server for machine learning and sharing, and a smartphone application that relays sensor readings from board to server, and displays exposure information. Studies show effects on user awareness and behavior.

## Mechanical and Aerospace Engineering — 3:10 p.m.

**Juan C. Lasheras, Professor**
"Master of Advanced Study in Medical Device Engineering"
The new Master of Advanced Study in Medical Device Engineering is aimed at professional engineers who plan to become technical leaders in the field of biomedical instrumentation and devices. Specialized coursework includes clinical needs assessment, mechanics and transport, modern life science technologies, anatomy and physiology, biomaterials, wireless embedded controls, and computer aided design. The program includes a design and prototype option as well as a focus on relevant business issues.

## Bioengineering 3:30 p.m.

**Todd P. Coleman, Associate Professor**
"Tattoo Electronics for Biomedical Applications"
Thin, flexible, invisible electronics that can be embedded in temporary tattoos, can sense multiple modalities of biological signals, and can wirelessly transmit them to a mobile device, show great promise for transforming the practice of medicine from periodic monitoring of signals with bulky, wired sensors in hospital settings to continuous monitoring of health with invisible wireless sensors in natural environments.

## NanoEngineering 3:50 p.m.

**Jennifer N. Cha, Associate Professor**
"Biomolecular Architectures and Systems for Nanoengineering Thin Film Devices"
While nanomaterials have shown great potential for electronic and photonic applications, their organization onto surfaces for incorporation into functional devices has remained difficult. To address some of these challenges, Professor Cha will describe recent efforts to self-assemble nanoscale materials on surfaces with control over material location and crystallographic orientation.

## Electrical and Computer Engineering 4:10 p.m.

**Gert Lanckriet, Associate Professor**
"Music Search and Recommendation"
Thanks to a revolution in music production and distribution, unprecedented amounts of new music proliferate the web from every corner of the world. By developing novel music recommendation algorithms and search technologies, Professor Lanckriet's work is poised to have a broad societal impact by helping millions of users find and organize musical content.

# GRADUATE STUDENT POSTERS

## BIOENGINEERING

1. **Ephrin-A1 Induces Cell Contraction to Exert Three-Dimensional Traction Force on the Substrate Via a PI3K-Dependent Pathway**
   Student: Min-Shu Chan; Professor: Shu Chien

2. **Biomaterial Delivery Leads to Epicardial Activation Delays Acutely After Injection in Viable LV Myocardium as Assessed by Optical Mapping**
   Student: Aboli A Rane; Professor: Karen Christman

3. **Fibroblasts Influence Muscle Progenitor Differentiation and Alignment in Contact Independent and Dependent Manners in Organized Co-Culture Devices**
   Student: Nikhil Rao; Professor: Karen Christman

4. **Injectable Extracellular Matrix Derived Hydrogel Enhances Retention and Delivery of a Heparin Binding Growth Factor in Ischemic Myocardium**
   Student: Sonya B Seif-Naraghi; Professor: Karen Christman

5. **Extracellular Matrix Proteins are Necessary for Mouse Embryonic Stem Cell Differentiation and May Guide Stem Cell Fate**
   Student: Hermes Alexander Taylor-Weiner; Professor: Adam J Engler

6. **Human Mesenchymal Stem Cells Migration on Matrices with Distinct Elasticity Gradient Magnitudes**
   Students: Ludovic Guillaume Vincent, Yu Suk Choi; Professor: Adam J Engler

7. **Regulatory Mechanisms of Age-Related Diastolic Dysfunction**
   Student: Gaurav Kaushik; Professor: Adam J Engler

8. **Stem Cell Differentiation can be Directed by Scaffolds with Adhesive Domains**
   Student: Somyot Chirasatitsin; Professor: Adam J Engler

9. **Ultrasound Ruptured Liposomes for Local Delivery of Therapeutic Biomolecules**
   Student: Michael Jerome Benchimol; Professor: Sadik Esener

10. **Genetic Assessment of Glioblastoma Primary Tumors and Matched Patient-Derived Pre-Clinical Models Using Whole Exome Sequencing**
    Student: Shawn E Yost; Professor: Kelly Frazer

11. **Dynamic Environment Microchemostat for Evolutionary Experiments**
    Student: Ivan Alexandrovich Razinkov; Professor: Jeff Hasty

12. **Multiscale Platform for Coordinating Cellular Activity Using Synthetic Biology**
    Students: Arthur Benjamin Prindle, Phillip Samayoa; Professor: Jeff Hasty

13. **NF-KAPPAB Signaling in a Dynamic Microfluidic Environment**
    Student: Martin Kolnik; Professor: Jeff Hasty

14. **Tracing Macrophage Polarization Using Automated Tracking**
    Student: Brooks Edward Taylor; Professor: Jeff Hasty

15. **Detection of Thrombin and Other Protease Activities Directly in Whole Blood Samples**
    Students: Augusta Esmeralda Modestino, Johnson Yu, Mrudul Bhine
    Professor: Michael Heller

16. **Isolation and On-Chip PCR Amplification of Disease Related DNA Nanoparticulate Biomarkers: Seamless Sample-to-Answer Integrated Diagnostics**
    Student: Avery R Sonnenberg; Professor: Michael Heller

17. **A Microfluidic Device for Single-Cell Gene Expression Profiling**
    Students: Alexander Philip Hsiao, Matthew Walsh; Professor: Xiaohua Huang

18. **High-Throughput Single Cell Genomics on a Microfluidic Device**
    Students: Wai Keung Chu, Hosuk Lee
    Professors: Xiaohua Huang, Kun Zhang

19. **A Strategy for Analyzing High-Throughput Quantitative Genetic Interaction Data in Multi-Condition Experiments**
    Student: Gordon J Bean; Professor: Trey Ideker

20. **Challenges in Network Based Cancer Classification**
    Student: Sanath Kumar Ramesh; Professor: Trey Ideker

21. **Inferring Sparse Multivariate Models to Predict Disease Phenotype from Genotype**
    Student: Matan Hofri; Professor: Trey Ideker

22. **DNA-Based Dual-Spring Cross Shaped Nanoactuator**
    Students: Alexander Mo, Alan Gillman; Professor: Ratneshwar Lal

23. **The Role of the Scar/Wave Complex in Regulating the Traction Stresses During Amoeboid Motility**
    Student: Effie E Bastounis
    Professors: Juan Lasheras, Juan Carlos del Alamo

24. ***In Vivo* Two-Photon Microscopy for Imaging Leukocytes in Atherosclerotic Plaques**
    Student: Sara Ashley McArdle; Professor: Klaus Ley

25. **Patient Specific Models of Human Atrial Fibrillation**
    Student: Matthew James Gonzales; Professor: Andrew McCulloch

26. **Subcellular Modeling of PKA Activation and cAMP Diffusion in Localized Microdomains of Adult Cardiac Myocytes**
    Student: Britton Warren Boras; Professor: Andrew McCulloch

27. **Understanding Metabolic Function and Regulation in Stem Cells and Tumors**
    Students: Nathaniel Martin Vacanti, Seth Parker
    Professor: Christian Michael Metallo

28. **A Novel Role for Vinculin in Myocardial Fiber Mechanics**
    Student: Jared Rylan Tangney
    Professors: Jeffrey Omens, Andrew McCulloch

29. **Genome-Scale Modeling of Microbial Electrosynthesis for Electrofuel Production**
    Students: Harish Nagarajan, Juan Nogales, Merve Sahin, Ali Ebrahim, Adam Feist; Professors: Bernhard O. Palsson, Karsten Zengler

30. **Control of the Biophysical Properties of Osteoarthritic Synovial Fluid**
    Student: William J McCarty; Professor: Robert Sah

31. **Proximal Femoral Shape Variations in Legg-Calvé-Perthes Disease and Slipped Capital Femoral Epiphysis**
    Student: Elaine F Chan; Professor: Robert Sah

32. **The *In Vivo* Performance of Osteochondral Allografts in the Goat is Diminished with Extended Storage and Decreased Cartilage Cellularity**
    Student: Andrea L Pallante; Professor: Robert Sah

33. **Trypsin and MMP-9 Levels Increase in Plasma and Lung After Hemorrhagic Shock: Potential Mechanism for Membrane Receptor Damage**
    Student: Angelina Esther Altshuler; Professor: Geert Schmid-Schönbein

34. **At the Interface of Detail and Abstraction: Modeling Heterogeneous Dynamics and Plasticity in Cortical Pyramidals**
    Student: Helen G Saad; Professor: Gabriel Silva

35. **Doubly Penalized Lasso for Reconstruction of Biological Networks**
    Students: Behrang Asadi, Mano R. Maurya
    Professors: Shankar Subramaniam, Daniel Tartakovsky

36. **Quantitative Transcriptomics Using Designed Primer-Based Amplification**
    Student: Vipul Bhargava
    Professors: Shankar Subramaniam, Vineet Bafna, Shyni Varghese

37. **Rapid Self-Healing of Synthetic Hydrogels Via a PH-sensitive Reversible Mechanism**
    Student: Ameya M Phadke; Professor: Shyni Varghese

38. **Understanding the Physical Cues Necessary for ECM Degradation During Cancer Migration**
    Student: Aereas Aung; Professor: Shyni Varghese

39. **Massively Parallel Whole Genome Amplification of Single Cells**
    Student: Jeffrey A Gole; Professor: Kun Zhang

## COMPUTER SCIENCE AND ENGINEERING

40. **Characterizing the Variability in Power Consumption in Modern Computing Platforms**
    Student: Bharathan Balaji; Professors: Yuvraj Agarwal, Rajesh Gupta

41. **Duty-Cycling Control for the Energy Efficient Smart Building**
    Students: Thomas Lee Weng, Seemanta Dutta
    Professors: Yuvraj Agarwal, Rajesh Gupta

42. **Tettnang: Reducing Library Overheads Through Source-to-Source Translation**
    Student: Alden P King; Professor: Scott B Baden

43. **Translating MPI Applications to a Latency-Tolerant, Data-Driven Form**
    Student: Nhat Tan Nguyen Thanh; Professor: Scott B Baden

44. **Exploring MS Imaging Data in a Semi-Supervised and Interactive Manner**
    Student: Jocelyne Bruand; Professor: Vineet Bafna

45. **Beyond the Face Box: Incorporating Head Shape into Face Identification**
    Students: Eric M Christiansen, Iljung Sam Kwak, Andrew Ziegler
    Professors: Serge Belongie, David Kriegman

46. **Interactive Image Based Geolocation**
    Students: Mohammad Moghimi Najafabadi, Tsung-Yi Lin
    Professor: Serge Belongie

47. **Non-Rigid Surface Detection for Gestural Interaction with Applicable Surfaces**
    Student: Andrew Moore Ziegler; Professor: Serge Belongie

48. **Recommendation for Chinese Microblogs**
    Student: Chen Xie; Professor: Charles Elkan

49. **Weighted Aggregation of Classifiers for Active Learning**
    Student: Akshay Balsubramani: Professor: Yoav Freund

50. **CodeSpells: Encouraging and Empowering More People to Learn Computer Science Through an Explorative Video Game**
    Students: Sarah Marie Esper, Stephen Foster
    Professors: William Griswold, Beth Simon

51. **Fitbit+: a Behavior-Based Intervention System to Reduce Sedentary Behavior**
    Students: Laura R Pina, Ernesto Ramirez
    Professors: William Griswold, Gregory Norman

52. **Personal Air Quality and Social Networks**
    Students: Elizabeth S Bales, Nichole Quick, Nima Nikzad, Celal Ziftci, Thomas Barbour, Piero Zappi
    Professors: William Griswold, Ingolf Krueger, Tajana Simunic-Rosing

53. **WitchDoctor: Clairvoyant Refactoring Support for IDEs**
    Student: Stephen Ryan Foster; Professors: William Griswold, Sorin Lerner

54. **Dynamic Deferral of Workload for Capacity Provisioning in Data Centers**
Student: Muhammad Abdullah Adnan; Professor: Rajesh Gupta

55. **Minerva: a Compute Capable SSD Architecture for Next-Generation Non-Volatile Memories**
Student: Arup De; Professors: Rajesh Gupta, Steven Swanson

56. **Lifetime Margin Reduction by Exploiting Non-Uniform Effects of Electromigration**
Student: Siddhartha Nath
Professors: Andrew B. Kahng, Tajana Simunic-Rosing

57. **A Hardware Approach to Information Flow Security**
Student: Jason Kaipo Oberg; Professor: Ryan Kastner

58. **Designing an Adaptive Acoustic Modem for Underwater Sensor Networks**
Students: Jennifer Nicole Trezzo, Lingjuan Wu; Professor: Ryan Kastner

59. **Detection and Classification of Mine Like Objects in Side Scan Sonar Imagery**
Student: Christopher M Barngrover; Professors: Ryan Kastner, Serge Belongie

60. **Distributed Tracking for Underwater Networked Swarms**
Student: Karl Magnus Delight; Professor: Ryan Kastner

61. **Real-Time High Content Optical Mapping System**
Student: Pingfan Meng; Professor: Ryan Kastner

62. **RIFFA: a Reusable Integration Framework for FPGA Accelerators**
Student: Matthew D Jacobsen; Professor: Ryan Kastner

63. **Trimmed VLIW: Moving Application Specific Processors Towards High Level Synthesis**
Student: Janarbek Matai; Professor: Ryan Kastner

64. **Policy Driven Development: Flexible Policy Insertion for Large Scale Systems**
Student: Barry Demchak; Professor: Ingolf Krueger

65. **The Natural Language of Playlists**
Student: Brian R McFee; Professor: Gert Lanckriet

66. **Addressing Temperature Variability in Heterogeneous Processors with Accelerators**
Student: Yen-Kuan Wu; Professor: Tajana Simunic-Rosing

67. **Benefits of Green Energy and Proportionality in High Speed Wide Area Networks Connecting Data Centers**
Student: Baris Aksanli; Professor: Tajana Simunic-Rosing

68. **Latent Variables Based Data Estimation for Sensing Applications**
Students: Nakul Verma, Piero Zappi; Professor: Tajana Simunic-Rosing

69. **Temperature and Cooling Management in Servers**
Student: Christine Shun Yee Chan; Professor: Tajana Simunic-Rosing

70. **Themis: Energy Management in Virtualized Environments**
Students: Liuyi Zhang, Gaurav Dhiman, Vasileios Kontorinis
Professor: Tajana Simunic-Rosing

71. **User-Centric Data Collection Application with Adaptive Broadcast Rate in WSN without Routing**
Student: Jinseok Yang; Professor: Tajana Simunic-Rosing

72. **Utilizing Green Energy Prediction to Schedule Mixed Batch and Service Jobs in Data Centers**
Student: Jagannathan Venkatesh; Professor: Tajana Simunic-Rosing

73. **Redesigning Transaction Mechanisms for Fast, Solid-State Disks**
Students: Trevor Scott Bunker, Joel Coburn; Professor: Steven Swanson

74. **Manycore Architecture Augmented for Multiprogrammed Data Centers**
Student: Anshuman Gupta; Professor: Michael Taylor

75. **Investigating Pedal Errors and Multi-Modal Effects: Novel Driving Testbeds and Experimental Analysis**
Student: Cuong Tran; Professor: Mohan Trivedi

76. **Managing Distributed Ups Energy for Effective Power Capping in Data Centers**
Students: Vasileios Kontorinis, Baris Aksanli
Professors: Dean M. Tullsen, Tajana Simunic-Rosing

77. **Distributed Storage and Interactive Analytics for Graph-Structured Data**
Student: Michael Mihn-Jong Lee; Professor: Yuanyuan Zhou

78. **InGaN/GaN High Q, High Voltage and High Linearity Microwave Varactor Diodes**
Student: Wei Lu; Professors: Peter M Asbeck, Paul K.L. Yu

79. **Stacked FET Q-Band Amplifier in 45-nm CMOS with Saturated Output Power above 21 dBm**
Students: Hayg-Taniel Dabag, Bassel Hanafi, Fatih Golcuk
Professors: Peter M Asbeck, James Buckwalter, Larry Larson

80. **A BiFET Constructive Wave Power Amplifier for a Multi-Band, Bidirectional Millimeter-Wave Front-End**
Student: Tissana Kijsanayotin; Professor: James Buckwalter

81. **An Integrate-and-Dump Receiver for High Dynamic Range Photonic Analog-to-Digital Conversion**
Student: Timothy D Gathman; Professor: James Buckwalter

82. **Q Band Circuits on Silicon on Insulator for Satellite Applications**
Student: Mehmet Parlak; Professor: James Buckwalter

83. **H.264/AVC Video Packet Aggregation and Unequal Error Protection for Noisy Channels**
Student: Kashyap K Kambhatla; Professors: Pamela Cosman, Sunil Kumar

84. **Query-Based Models and Algorithms for Distributed Information Dissemination**
Student: Efecan Poyraz; Professor: Rene L. Cruz

85. **Adaptation of Video Encoding to Address Dynamic Thermal Management Effects**
Student: Seyed Ali Mirtar; Professor: Sujit Dey

86. **Dynamic Base Station Reconfiguration for Battery Efficient Video Download**
Student: Ranjini B Guruprasad; Professor: Sujit Dey

87. **Modeling, Characterizing, and Enhancing User Experience in Cloud Mobile Rendering**
Student: Yao Liu; Professor: Sujit Dey

88. **User Interest Estimation Based on Video Webpage Classification**
Student: Chetan Kumar Verma; Professor: Sujit Dey

89. **Video Caching in the Wireless Cloud: Algorithms and Impact on Delay and Capacity**
Student: Hasti Ahlehagh; Professor: Sujit Dey

90. **Optofluidics**
Students: Lindsay Michelle Freeman, Lin Pang, Matthew Chen
Professor: Yeshaiahu (Shaya) Fainman

91. **Room-Temperature Sub-Wavelength Scale Metallo-Dielectric Lasers**
Students: Brett David Wingad, Qing Gu, Olesya Bondarenko
Professor: Yeshaiahu (Shaya) Fainman

92. **Platform Motion Blur Image Restoration System**
Student: Stephen Joseph Olivas; Professor: Joseph Ford

93. **Reactive Self-Tracking Solar Concentration**
Student: Katherine A Baker; Professor: Joseph Ford

94. **Composite Structures for Bit Patterned Media (BPM)**
Student: Nasim Eibagi; Professor: Eric Fullerton

95. **Electrical Manipulation of Nanoscale Magnetism**
Student: Jonathan J Sapan; Professor: Eric Fullerton

96. **Convex Combination of Sparse Control Policies in Fast Human Movements**
Student: Mehrdad Yazdani
Professors: Robert Hecht-Nielsen, Clark C Guest

97. **Nanofabrication on a Silicon Wafer Size Electric Field Assembler Synergy of Top-Down and Bottom-Up Technologies**
Student: Youngjun Song; Professor: Michael Heller

98. **A Tunable Sensor for Adaptive Voltage Scaling**
Student: Tuck Boon Chan; Professor: Andrew B Kahng

99. **Accuracy-Configurable Adder for Approximate Arithmetic Designs**
Student: Seok Hyeong Kang; Professor: Andrew B Kahng

100. **Memory Interface Exploration with CACTI'S Power-Area-Timing Models**
Student: Vaishnav Srinivas; Professor: Andrew B Kahng

101. **Pixel-by-Pixel Contrast-Enhanced Ultrasound Time-Intensity Curve Analysis for Automatic Tumor Diagnosis**
Student: Casey Nghia Ta; Professor: Andrew Kummel

102. **Optimizing Graded Relevance Rankings in Mulitmedia Data**
Students: Janani Kalyanam, Emanuele Coviello, Brian McFee
Professor: Gert Lanckriet

103. **Searching Music with Trees. Fast Indexing of Musical Codebooks for Efficient Semantic Annotation.**
Students: Emanuele Coviello, Katherine Ellis; Professor: Gert Lanckriet

104. **Strongly Enhanced Fluorescence Decay Rates on Multilayered Plasmonic Metamaterials**
Student: Danyong Lu; Professors: Zhaowei Liu, Eric Fullerton

105. **Jacobian-Enhanced Nudged Elastic Band Solver for Micromagnetics**
Student: Marco Antonio Escobar Acevedo; Professor: Vitaliy Lomakin

106. **Micromagnetic Nanoparticle Array Simulator**
Students: Javier Espigares Martin, Marko Lubarda, Marco Escobar, Shaojing Li; Professor: Vitaliy Lomakin

**107. Stereo Ego-Motion Estimation for a Long Noisy Sequence**
Student: Haleh Azartash; Professor: Truong Q Nguyen

**108. Selective Decision Directed Channel Estimation for OFDM Communications Over Multipath Rician Fading Channels**
Student: Andreja Radosevic; Professor: John Proakis

**109. An Efficient Full Digital Frequency Hopping Modem Based on Polyphase Filter Banks**
Students: Xiaofei Chen, Elettra Venosa
Professors: Bhaskar Rao, Fredric Harris

**110. An ICA-Based PHD Filter Approach for Tracking of Unknown Time-Varying Number of Sources**
Student: Alireza Masnadi-Shirazi; Professor: Bhaskar Rao

**111. Compressed Sensing and Sparse Signal Recovery by Sparse Bayesian Learning: Models, Algorithms, and Applications**
Student: Zhilin Zhang; Professor: Bhaskar Rao

**112. Multicell Network Duality with Instantaneous and Statistical Channel Information: a Nonlinear Perron-Frobenius Characterization**
Student: Yichao Huang; Professor: Bhaskar Rao

**113. On the Benefits of the Block-Sparsity Structure in Sparse Signal Recovery**
Student: Hwan Joon Kwon; Professor: Bhaskar Rao

**114. 16 Element 110 GHZ Phased Array Tansmitter with Wafer-Scale Integration**
Student: Woorim Shin; Professor: Gabriel Rebeiz

**115. A Miniature RF MEMS Metal-Contact Switch with High Biaxial and Stress-Gradient Tolerance**
Student: Chenhui Niu; Professor: Gabriel Rebeiz

**116. High Power, High Q, High Reliability RF MEMS Switches**
Student: Hosein Zareie; Professor: Gabriel Rebeiz

**117. Analysis and Application of Stochastic Decoding of LDPC Codes**
Student: Aman Bhatia; Professor: Paul Siegel

**118. Optimized Cell Programming for Flash Memories with Quantizers**
Student: Minghai Qin; Professor: Paul Siegel

**119. Quantized Min-Sum Decoders with Low Error Floor for LDPC Codes**
Student: Xiaojie Zhang; Professor: Paul Siegel

**120. Modelling the Effect of Allergen Exposure on Sensitization in Relation to Atopy During Childhood: a Machine Learning Approach**
Student: Tejaswini Narayanan; Professor: Shankar Subramaniam

**121. Detection of U.S. Traffic Signs Using Computer Vision**
Student: Andreas Moegelmose; Professors: Mohan Trivedi, Thomas Moeslund

**122. Distributed Multisensory Signals Acquisition and Analysis in Dyadic Interactions**
Student: Ashish K Tawari; Professor: Mohan Trivedi

**123. Improving Driver Safety Through Smartphone-Based Intelligent Vehicle Applications**
Students: Derick Arnold Johnson, Minh Van Ly; Professor: Mohan Trivedi

**124. Probabilistic Active Learning-Based Detection of Vehicles by Parts**
Student: Sayanan Vinoth Sivaraman; Professor: Mohan Trivedi

**125. Role of Head Dynamics in Human-Centered Active Safety Systems: Comparative Analysis of Vision Based Approaches**
Student: Sujitha Catherine Martin; Professor: Mohan Trivedi

**126. Intermediate Band Solar Cell Material GaNAsP**
Student: Yanjin Kuang; Professor: Charles Tu

**127. Self-Catalyzed GaP/GaNP Core/Shell Nanowires on Si(111) by GSMBE**
Student: Supanee Sukrittanon; Professor: Charles Tu

**128. Beyond Visual Semantics: Using Cross-Modal Context for Image Classification**
Student: Mandar Dilip Dixit; Professor: Nuno Vasconcelos

**129. Efficient Photoelectrochemical Solar Cells with 3D Metal-Oxide/Si Branched Nanowire Heterostructures**
Students: Alireza Kargar, Soheil Seena Partokia, Chulmin Choi, Ke Sun, Yi Jing; Professors: Deli Wang, Sungho Jin

130. **Laser Cut X-pinches**
Student: Joohwan Kim; Professor: Farhat Beg

131. **Transport of Magnetic Field in Planar Wire Arrays**
Student: Derek A Mariscal; Professor: Farhat Beg

132. **Modeling of AL/W Granular Porous Composites During Dynamic Deformation**
Student: Karl Liberty Olney; Professors: David Benson,Vitali Nesterenko

133. **RAPID: Reconfigurable Automated Parameter-Identifying Dynamometer**
Student: Nicholas Jenkins Morozovsky; Professor: Thomas Bewley

134. **Stability of Gas-Fluidized Beds**
Student: Kevin Matthew Mandich; Professor: Robert J. Cattolica

135. **Mechanical Properties and Microscopic Structure of Vegetable Ivory**
Student: Yinghao Chu; Professors: Carlos Coimbra, Marc A Meyers

136. **Power Load Forecasting for High Solar Penetration Communities and Its Applications**
Student: Amanpreet Kaur; Professor: Carlos Coimbra

137. **Solar Resource Forecasting: from Instrumentation to Real Time Forecasting**
Student: Lukas Nonnenmacher; Professor: Carlos Coimbra

138. **Estimation of Ocean Wave Parameters from Inter-Drogue Distance Measurements**
Student: Michael Ouimet; Professor: Jorge Cortes

139. **Robust Optimal Investment Policies for Servicing Targets in Acyclic Digraphs**
Student: Cameron Nowzari; Professor: Jorge Cortes

140. **Block-Oriented Nonlinear System Identification via Semidefinite Programming**
Student: Younghee Han; Professor: Raymond de Callafon

141. **Data-Based Modeling of a LiFePO4 Battery as an Energy Storage System**
Student: Xin Zhao; Professor: Raymond de Callafon

142. **Identification and Modeling of Turbine Engine Components for Fault Detection and Health Monitoring**
Student: Chad M. Holcomb
Professors: Raymond de Callafon, Robert Bitmead

143. **Modelling and Estimation of Servo Actuator Dynamic Variability with Application to LTO-Drives**
Student: Longhao Wang; Professor: Raymond de Callafon

144. **Robust Identification for Networked Control Systems with Uncertainties**
Students: Huazhen Fang, Jia Wang; Professor: Raymond de Callafon

145. **System Identification with Eigenvalue Constraints Applied to the Thermal Analysis of an Integrated Circuit**
Student: Daniel N Miller; Professor: Raymond de Callafon

146. **Mechanical Properties of Vascular Endothelial Cells Exposed to Stretch**
Students: Kathryn Elizabeth Osterday, Thomas Chew, Phillip Loury, Manuel Gomez-Gonzalez; Professor: Juan Carlos del Alamo

147. **Smell-o-Vision: Remotely On-Off Switchable Odor-Releasing Capsules**
Students: Calvin James Gardner, Hyunsu Kim; Professor: Sungho Jin

148. **An Indoor-Outdoor Building Energy Simulator to Study Urban Modification Effects on Building Energy Use**
Student: Neda Yaghoobian; Professor: Jan Kleissl

149. **Sky Imager Forecasting for Microgrid Optimization**
Students: Chi Wai Chow, Bryant Urquhart, Anders Nottrot, Jenny Luoma
Professor: Jan Kleissl

150. **3D Plasma Blob Modeling**
Student: Justin R Angus; Professor: Sergei Krasheninnikov

151. **Modeling of Hydrogen Retention in the Bulk of Metallic Plasma Facing Components**
Student: Jerome Guterl; Professors: Sergei Krasheninnikov, Roman Smirnov

152. **A Quantized-Input Control Lyapunov Approach for Motor Drives**
Student: Gideon Andrew Prior
Professors: Miroslav Krstic, Massimo Franceschetti

153. **Air Cushion Adaptive Disturbance Cancellation for the Reduction of Wave Induced Motion of Ramp-Connected Ships**
Student: Halil I Basturk; Professor: Miroslav Krstic

154. **Compensation of State-Dependent Input Delay for Nonlinear Systems**
Student: Nikolaos Bekiaris Liberis
Professor: Miroslav Krstic

155. **Nonlinear Dynamics and Control**
Student: Alex Scheinker; Professor: Miroslav Krstic

156. **Power Optimization for Photovoltaic Micro-Converters Using Multivariable Gradient-Based Extremum-Seeking**
Student: Azad Ghaffari; Professors: Miroslav Krstic, Sridhar Seshagiri

157. **Stackelberg Equilibrium Seeking in Noncooperative Games**
Student: Paul A Frihauf; Professor: Miroslav Krstic

158. **Atomic Study of Reversible and Irreversible Sensing Response of NO2 Dosing on CuPc Layer**
Students: Jun Hong Park, James Royer, Tyler Kent
Professor: Andrew Kummel

159. **Alzheimer's Disease and Toxic Amyloid Channels: Unraveling Therapeutic Targets by Atomic Force Microscopy, Electrophysiology, MD Simulation, and Protein Engineering**
Student: Laura S Connelly; Professors: Ratneshwar Lal, Sungho Jin

160. **Dynamic Deformation Between Tricuspid and Bicuspid Aortic Valves *In Vitro***
Student: Kai Wah Szeto; Professor: Juan Lasheras

161. **Three-Dimensional Traction Force Distribution in Migrating Amoeboid Cells**
Student: Begona Alvarez-Gonzalez
Professors: Juan Lasheras, Juan Carlos del Alamo

162. **Multiscale Airflow Model Representing Healthy and Emphysema Rat Lungs**
Student: Jessica M Oakes; Professors: Alison Marsden, Chantal Darquenne

163. **Advancements in Current Activated Tip-Based Sintering**
Student: Ahmed Mohamed El Desouky
Professors: Joanna McKittrick, Khaled Morsi

164. **Avian Wing Bones**
Students: James Huai Kiang, Hannah Walsh, Sara Bodde, Katya Novitskaya
Professors: Joanna McKittrick, Marc A Meyers

165. **Electrophoretic Deposition of Phosphors for White Light Emitting Diodes (LEDS)**
Student: Jae Ik Choi; Professors: Joanna McKittrick, Jan Talbot

166. **Microstructural Characterization of the Bony Plated Armor in the Prehensile Tail of Seahorses**
Student: Michael Martin Porter
Professors: Joanna McKittrick, Marc A Meyers

167. **Modeling of the Osteoporotic Degradation of Elastic Properties of Trabecular Bone**
Student: Ekaterina Evdokimenko
Professors: Joanna McKittrick, Vlado A Lubarda

168. **Phosphors for Near UV-Emitting LEDS for Efficacious Generation of White Light**
Student: Jinkyu Han; Professor: Joanna McKittrick

169. **Research and Application of Field Assisted Sintering Technique or Spark Plasma Sintering**
Student: Wei Li; Professors: Joanna McKittrick, Randall German

170. **Development of Instrumentation for Direct Observations of Air-Sea Interaction from Land- and Ship-Based Unmanned Airborne Systems**
Student: Benjamin Donald Reineman; Professor: W. Kendall Melville

171. **Micro-Channel Hydroxyapatite Components by Sequential Freeze Drying and Free Pressureless Spark-Plasma Sintering**
Student: Yen-Shan Lin; Professors: Marc A Meyers, Eugene Olevsky

172. **Dynamic Deformation of Strongly Nonlinear Toroidal Rubber Element**
Student: Chien-Wei Lee; Professor: Vitali Nesterenko

173. **Investigation of the Critical Strain Rate Parameter for Co-Rotating Vortex Pairs**
Student: Patrick J Folz; Professor: Keiko Nomura

174. **Investigation of a Stratified Barotropic Mixing Layer with Coordinate System Rotation**
Student: Eric M Arobone; Professor: Sutanu Sarkar

175. **Lagrangian Coherent Structures and Particle Transport in Turbulent Separated Flow**
Student: Daniel A Nelson; Professor: Sutanu Sarkar

176. **Simulation of Spatially Evolving Flow Past a Sphere in a Stratified Fluid**
Student: Matthew Bronson de Stadler; Professor: Sutanu Sarkar

177. **Turbulence Generation and Particle Dynamics in Shocked Particle-Laden Flow**
Student: Sean Lin Sheng Davis; Professor: Sutanu Sarkar

178. **Critical Limits of Extinction and Autoignition in Dimethyl Ether / Air Flames in the Counterflow Configuration**
Student: Ryan Kyle Gehmlich; Professor: Kalyanasundaram Seshadri

179. **Effect of Pressure on Combustion of Low Molecular Weight Fuels**
Student: Ulrich Niemann
Professors: Kalyanasundaram Seshadri, Forman A Williams

180. **Numerical and Experimental Investigation of Slider Disk Contact Effects on the Dimple/Gimbal Interface**
Students: Youyi Fu, Zhengqiang Tang, Pablo Salas; Professor: Frank E Talke

181. **Experimental and Numerical Investigation of Slider Disk Contact in Hard Disk Drives**
Students: Liane Manuela Matthes, Wenping Song, Deng Pan
Professor: Frank E Talke

182. **Information Theoretic-Based Approach for Data-Driven Biological Networks Reconstruction**
Student: Farzaneh Farhangmehr
Professors: Daniel Tartakovsky, Shankar Subramaniam

183. **Burning Behavior of Vertical Matchstick Arrays**
Student: Michael John Gollner; Professor: Forman A Williams

184. **Ignition and Flame Spread of Electrical Wires**
Student: Xinyan Huang; Professor: Forman A Williams

185. **The Structure, Extinction, and Autoignition of Nonpremixed Toluene Flames**
Student: Vaishali Amin
Professors: Forman A Williams, Kalyanasundaram Seshadri

## NANOENGINEERING

186. **Computational Modeling of Nucleosome Unraveling**
Student: Irina Vladinizovna Dobrovolskaia; Professor: Gaurav Arya

187. **Computational Modeling to Recover Higher-Order Chromatin Structure from Interaction Frequencies**
Student: Dario Meluzzi; Professor: Gaurav Arya

188. **Efficient Detection of Point Mutations Through Shear-Induced Unzipping of Hybridized DNA**
Student: David Szeto; Professor: Gaurav Arya

189. **Single-Molecule Investigation and Molecular Modeling of the Bacteriophage T4 Genome Packaging Motor**
Student: Amy L Davenport; Professors: Gaurav Arya, Doug Smith

190. **DNA Mediated 3D Assembly of Nanoparticles for Thin Film Solar Cell Fabrication**
Student: Hyunwoo Noh; Professor: Jennifer Cha

191. **DNA-Programmed Assembly of CdSe Nanorods**
Student: Sarah Sameera Chowdhury; Professor: Jennifer Cha

192. **Ligand Effects on Platinum Nanoparticle Synthesis and Catlaytic Activity**
Student: Lauren Marie Forbes; Professors: Jennifer Cha, Joseph Wang

193. **Protein Detection by Nanodumbbell Probes**
Student: Phyllis Xu; Professor: Jennifer Cha

194. **Light-Responsive Composite Biomaterials to Aid in Triggered Drug Delivery**
Student: Kolin C Hribar; Professor: Shaochen Chen

195. **Melting the Nanostructured Lipid Surface of Microbubbles to Increase Ultrasound-Modulated Fluorescence for Deep Tissue Optical Imaging**
Student: Carolyn Elizabeth Schutt; Professor: Sadik Esener

196. **Synthetic Hollow Enzyme Loaded Porous Nanoshells (SHELS) for Enzyme Based Therapies**
Student: Inanc Ortac; Professor: Sadik Esener

197. **Novel Peptide Synzyme Structures for Biomimetic Catalysis**
Students: Tsukasa Takahashi, Michelle Cheung; Professor: Michael Heller

198. **Solar Thermochemical Hydrogen Production Plant Design**
Student: Jesse Littlefield; Professors: Richard K Herz, Jan Talbot

199. **Organic Thin-Film Transistors for Selective Hydrogen Peroxide and Organic Peroxide Vapor Detection**
Student: James E Royer; Professor: Andrew Kummel

200. **Passivation of Indium Gallium Arsenide (2x4) Surface Using Trimethylaluminum**
Student: Tyler James Kent; Professor: Andrew Kummel

201. **Identifying Electrochemical, Structural, and Electronic Properties of Layered Nax[Ni1/3Mn2/3]O2 (0<x<2/3) Cathode Materials in Na-ion Batteries: a Combination of Computational and Experimental Study**
Student: Jing Xu; Professor: Ying Meng

202. **The Effect of Particle Size and Morphology on the Electrochemical and Physical Properties of Li-excess Li[Li2/12Ni3/12Mn7/12]O2 Cathode Material**
Student: Michael Gabriel Verde; Professor: Ying Meng

203. **Armadillo Armor: Mechanical Testing and Micro-Structural Evaluation**
Student: Irene Hsu Chen; Professor: Marc A Meyers

204. **Laser Compression of Nanocrystalline Tantalum**
Student: Chia-Hui Lu; Professor: Marc A Meyers

205. **T2 Tunable Porous Silicon Iron Oxide Nanocomposites for Monitoring Drug Release on MRI**
Student: Shalini Ananda Yogendran; Professor: Michael Sailor

206. **Single Element Force Sensing Transducers Based on Subwavelength Optical Waveguides**
Students: Joshua Tan Villanueva, Qian Huang; Professor: Donald J Sirbuly

207. **Tunable Energy Conversion Via Nanostructured Piezoelectric Arrays Embedded in an Environment-Responsive Matrix**
Student: Kanguk Kim; Professor: Donald J Sirbuly

208. **Effects of Chemical Additives on the Agglomeration and Zeta Potential of Alumina Nanoparticles**
Student: Neil A Brahma; Professor: Jan Talbot

209. **Self-Assembled Nanocrystal Coatings on AFM Probes for the Preparation of Tip-Enhanced Raman Spectroscopy Tips**
Student: Tyler Jamison Dill; Professor: Andrea Tao

210. **Shape-Dependent Localized Surface Plasmon Resonances of Cu2-xS Nanodisks**
Student: Su-Wen Hsu; Professor: Andrea Tao

211. **High Efficient Microrockets and Their Biomedical Applications**
Student: Wei Gao; Professor: Joseph Wang

212. **Gold Nanoparticle-Stabilized Liposomes for Bacterial Skin Infection Treatment**
Student: Soracha Thamphiwatana; Professor: Liangfang Zhang

## STRUCTURAL ENGINEERING

**213. Aerodynamics and Fluid-Structure Interaction Modeling of Wind Turbines**
Students: Ming-Chen Hsu, Artem Korobenko; Professor: Yuri Bazilevs

**214. Non Linear Aeroelastic Analysis of Joined Wing Configurations**
Student: Rauno Cavallaro; Professors: David Benson, Luciano Demasi

**215. System Identification and Nonlinear Finite Element Modeling of a Full-Scale 5-Story Reinforced Concrete Building Tested on the NEES-UCSD Shake Table**
Students: Rodrigo Renato Astroza, Xiang Wang, Hamed Ebrahimian
Professors: Joel Conte, Tara Hutchinson

**216. Seismic Responses of a Large Highway Exchange**
Student: Kyung Tae Kim; Professor: Ahmed Elgamal

**217. Experimental and Computational Investigation of Consolidation-Induced Contaminant Transport for High Water Content Geo-Materials**
Student: Hefu Pu; Professor: Patrick Joseph Fox

**218. BNCS: Full-Scale Structural and Nonstructural Building System Performance During Earthquakes**
Student: Michelle Carolyn Chen; Professor: Tara Hutchinson

**219. Full-Scale Structural and Nonstructural Building System Performance During Earthquake and Post-Earthquake Fire - Architectural Components**
Student: Xiang Wang; Professor: Tara Hutchinson

**220. Automatic Mesh Generation for Biomechanical Models Based on 3D Micro-CT Images**
Student: Poorya Mirkhosravi; Professor: Petr Krysl

**221. Extending Vibration and Wave Propagation Control Using Piezoelectric Materials and Resonant Shunts to Composite Wind Turbine Blades**
Student: Jeffery Dwayne Tippmann; Professor: Francesco Lanza di Scalea

**222. Measurement of Thermal Stresses in Rails by Electro Mechanical Impedance (EMI) Measurement**
Students: Xuan Zhu, Robert Phillips; Professor: Francesco Lanza di Scalea

**223. Non-Contact Ultrasonic System for Rail Flaw Detection and Surface Characterization**
Students: Stefano Mariani, Robert Phillips
Professor: Francesco Lanza di Scalea

**224. Nonlinear Semi-Analytical Finite Element Algorithm for Internal Resonance Analysis in Complex Waveguides - Application to Thermal Stress and Buckling Detection in Rails**
Student: Claudio Nucera; Professor: Francesco Lanza di Scalea

**225. Structural Health Monitoring of Wind Turbine Blades Using Advanced Infrared Thermography**
Student: Arun Manohar; Professor: Francesco Lanza di Scalea

**226. Full-Scale Structural and Nonstructural Building System Performance During Earthquake and Post-Earthquake Fire - MEP, FF&E and Contents**
Students: Elide Pantoli, Michelle Chen, Xiang Wang
Professors: Jose Restrepo,Tara Hutchinson, Joel Conte

**227. Statistically-Based Damage Detection in Geometrically-Complex Structures Using Ultrasonic Interrogation**
Student: Colin M Haynes; Professor: Michael Todd

**228. Ultra Low-Power Sensor Node for SHM Networks**
Student: Scott Anthony Ouellette; Professor: Michael Todd

**229. Uncertainty Quantification in Transmissibility-Derived Features Used for Fault Detection**
Student: Zhu Mao; Professor: Michael Todd

**230. Dynamics of Offshore Floating Wind Turbines**
Student: Seyedeh Sara Salehyar; Professor: Qiang Zhu

# NOTES

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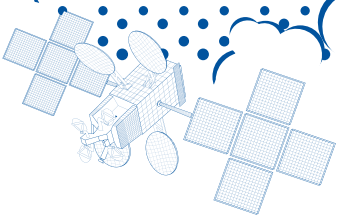

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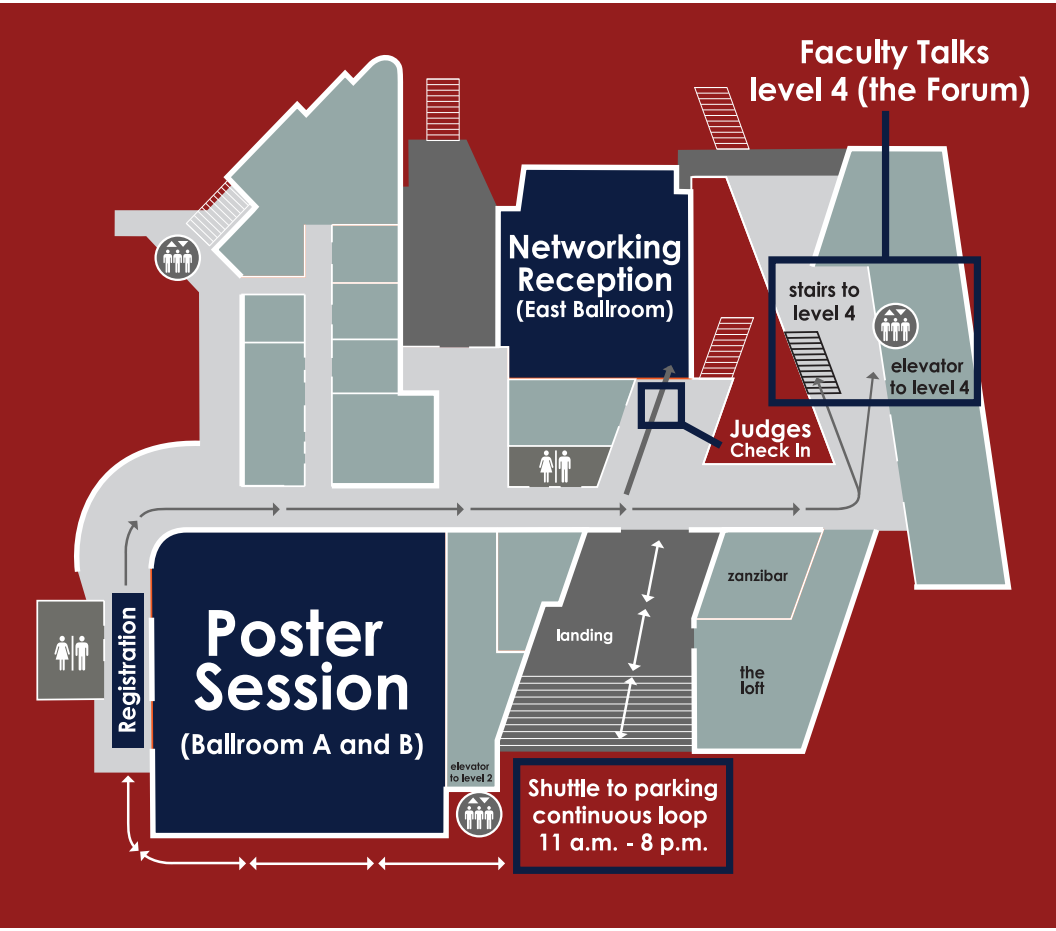
| Institute of Engineering in Medicine | iem.ucsd.edu |
| Powell Structural Research Labs | structures.ucsd.edu |
| San Diego Supercomputer Center | www.sdsc.edu |

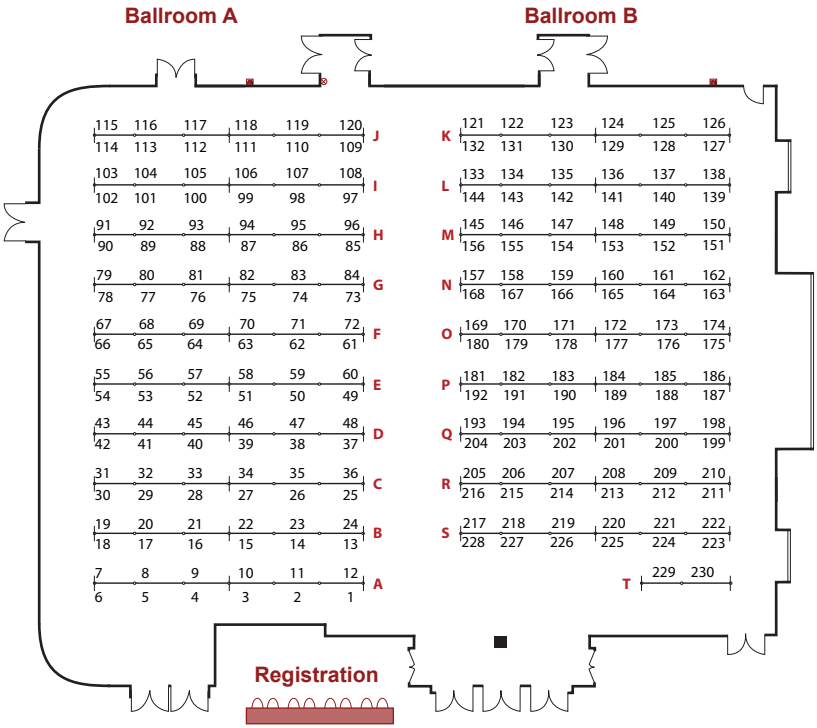
# RESEARCH EXPO MAP

**Poster Session:** level 2 (Ballroom A and B)
**Faculty Talks:** level 4 (the Forum)
**Networking Reception:** level 2 (East Ballroom)
**Parking Shuttle:** 11 a.m. - 8 p.m.



# GRADUATE STUDENT RESEARCH POSTERS

## Ballroom




| | |
|---|---|
| Bioengineering | 1 - 39 |
| Computer Science and Engineering | 40 - 77 |
| Electrical and Computer Engineering | 78 - 129 |
| Mechanical and Aerospace Engineering | 130 - 185 |
| NanoEngineering | 186 - 212 |
| Structural Engineering | 213 - 230 |