

# Theses Awarded

## S.B.

- **Roberto Brenes** (V. BULOVIĆ)  
Low-Power Biomedical Sensors and Machine Learning
- **Andrew Mullen** (A. P. CHANDRAKASAN)  
Low-Power Biomedical Sensors and Machine Learning
- **Francisco Garcia** (P. ANIKEEVA)  
Synthesis and Characterization of Magnetic Nanorings for Neuronal Stimulation
- **Ayrton D. Muñoz** (T. PALACIOS)
- **Daniel Richman** (A. P. CHANDRAKASAN)
- **Liz Schell** (A. I. AKINWANDE)

## M.ENG.

- **Stephanie Chen** (J. H. LANG)  
Tactile Sensors Based on Soft Polymers
- **Felipe Garza** (J. H. LANG)  
A Power-Electronic Approach to Improved Dual-Frequency Vibration Energy Harvesting
- **Christopher Ilic Lang** (D. S. BONING)  
Dielectric Spin Coating Characterization, Modeling, and Planarization using Fill Patterns for Advanced Packaging Technologies
- **Elaine McVay** (T. PALACIOS)  
Large Scale Applications of 2D Materials for Sensing and Energy Harvesting
- **Nathan Monroe** (J. H. LANG)  
Broadband Acoustic Energy Harvesting via Synthesized Electrical Loading
- **Robert Radway** (T. PALACIOS)  
Near Junction Thermal Management of GaN HEMTs via Wafer Bonding
- **Alex Sloboda** (C. G. SODINI)  
Ultra-Low Power Chopper Stabilized Amplifier
- **Chad Uyehara** (C. G. SODINI)  
High Voltage Sampling Scheme Independent of Capacitor Voltage Coefficient for a Delta Sigma Modulator
- **Jason Yang** (C. G. SODINI)  
Wearable and Long-Term Subdermal Implantable Electroencephalograms

## S.M.

- **Mohamed Abdelhamid** (A. P. CHANDRAKASAN)  
Ultra Low Power, High Sensitivity Secure Wake-Up Receiver for the Internet of Things
- **Nicha Apichitsopa** (J. VOLDMAN)  
Intrinsic Cytometry based on Computational Microscopy
- **Utsav Banerjee** (A. P. CHANDRAKASAN)  
Energy-Efficient Protocols and Hardware Architectures for Transport Layer Security
- **Matthew Byrd** (M. WATTS)  
Advanced Silicon Photonics for Microwave Frequency Down-Conversion
- **Dongsung Choi** (J. A. DEL ALAMO)  
Analysis of Mo Sidewall Ohmic Contacts to InGaAs Fins
- **Hongge Chen** (D. S. BONING)  
Novel Machine Learning Approaches for Modeling Variations in Semiconductor Manufacturing
- **Bianca Datta** (V. M. BOVE)  
Emotive Materials: Toward a Shared Language of the Meaning of Materials
- **Cody Dennett** (M. SHORT)  
In-Situ Quantification of Oxidation using Transient Grating Spectroscopy
- **Joseph Finley** (M. BALDO/L. LIU)  
Spin-Orbit Torque Switching of Compensated Ferrimagnetic Cobalt-Terbium Alloys
- **Matthew Flavin** (J. HAN/D. FREEMAN, DRAPER)  
Electrochemical Neuromodulation using Electrodes Modified with Ion-Selective Materials, Based on the Physical Process of Ion Concentration Polarization
- **Taecheon Jeong** (H. LEE/ A. P. CHANDRAKASAN)  
A Pipelined Analog-to-Digital Converter with Low-Gain, Low-bandwidth Op-Amps
- **Rakesh Kumar** (J. H. LANG)  
Towards High-Bandwidth Scanning Impedance Imaging
- **Jelena Notaros** (M. WATTS)  
Fresnel-Focusing and Bessel-Beam Integrated Optical Phased Arrays for Optical Trapping Applications
- **Jay Sircar** (E. N. WANG)  
Fabrication of a Nanoporous Membrane Device for High Heat Flux Evaporative Cooling
- **Reid Tanaka** (M. SHORT)  
Quantifying the Adhesion of Noble Metal Foulants on Structural Materials in a Molten Salt Reactor

## S.M. & M. B. A.

- **Jordan Hoffman** (D. S. BONING)  
Preventing Avoidable Admissions Through the Emergency Department at Massachusetts General Hospital
- **Molly McLaughlin** (D. S. BONING)  
New Product Introduction at a Technology Company
- **Jeremy Rautenback** (D. S. BONING)  
Improving Production Yields in Bio-pharmaceutical Filter Media

## PH.D.

- **Brian Allen** (E. BOYDEN)  
Ground Truth in Ultra-Dense Neural Recording
- **Ahmed Al-Obeidi** (C. THOMPSON)  
Stress Evolution of Lithium Alloying Electrodes during Cycling
- **Grant Anderson** (C. G. SODINI)  
Body Coupled Communication: The Channel and Implementation
- **Kevin Bagnall** (E. N. WANG)  
Multiphysics Characterization of GaN HEMTs via Micro-Raman Spectroscopy
- **Francesco Bellei** (K. K. BERGGREN)  
Superconducting Nanowire Single Photon Detectors for Infrared Communications
- **Jacob Bernstein** (E. BOYDEN)  
Development of Extracellular Electrophysiology Methods for Scalable Neural Recording
- **Andres Canales** (P. ANIKEEVA)  
Development of Neural Probes Using Thermal Drawing
- **Wendi Chang** (V. BULOVIĆ)  
Modification of Exciton Energies and Dynamics for Thin Film Optoelectronics
- **Fei Chen** (E. BOYDEN)  
Expansion Microscopy: Scalable and Multiplexed Nanoscale Imaging
- **Winston Chern** (D. A. ANTONIADIS)  
Prospects of Germanium-Based MOSFETs and Tunnel Transistors for Low Power Digital Logic
- **Siwon Choi** (R. HAN)  
Microfluidic Engineering of Water Purification
- **Michael Christiansen** (P. ANIKEEVA)  
Magnetothermal Multiplexing for Biomedical Applications
- **Chase Coffman** (P. LOZANO)  
Electrically-Assisted Evaporation of Charged Fluids: Modeling

- **Matthew D'Asaro** (J. H. LANG)  
Flexible and Stretchable Tactile Sensing Skins using Microwave Transmission Lines and Piezoresistive Rubber
- **Nachiket Desai** (A. P. CHANDRAKASAN)  
Circuits for Efficient and Secure Power Delivery in Distributed Applications
- **Ittinop Dumnerchanvanit** (M. SHORT)  
Characterization and Mitigation of Porous Crud Deposits in Light Water Reactors
- **Sumit Dutta** (M. BALDO)  
Magnetic Logic Circuits with High Bit Resolution for Hardware Acceleration
- **Alex Guo** (J. A. DEL ALAMO)  
Bias Temperature Instability (BTI) in GaN MOSFETs
- **Whitney Hess** (M. G. BAWENDI)  
Exploring the Versatility of Lead Sulfide Quantum Dots in Low-Temperature, Solution-Processed Solar Cells
- **Shengxi Huang** (J. KONG)  
Light-Matter Interactions of Two-Dimensional Materials and the Coupled Nanostructures
- **Joel Jean** (V. BULOVIĆ)  
Performance Limits for Colloidal Quantum Dot and Emerging Thin-Film Solar Cells
- **Sameer Joglekar** (T. PALACIOS)  
Surface and Mechanical Stress Effects in AlGaIn/GaN High Electron Mobility Transistors
- **Gye Hyun Kim** (C. THOMPSON)  
Study of Phenomenologies During Templated Solid-State Dewetting of Thin Single Crystal Films
- **Bonnie Lam** (A. P. CHANDRAKASAN)  
Energy Scalable Systems for 2D and 3D Low-Power Ultrasound Beamforming
- **Chi Lu** (P. ANIKEEVA)  
Flexible Fibers for Optoelectronic Probing of Spinal Cord Circuits
- **Qiong Ma** (P. JARILLO-HERRERO)  
Optoelectronics of Graphene-Based van der Waals Heterostructures

## PH.D. (CONTINUED)

- **Kento Masuyama** (P. LOZANO)  
Electrochemistry in Electrospray Thrusters and Double Layer Modeling
- **Karan Mehta** (R. RAM)  
Integrated Optical Quantum Manipulation and Measurement of Trapped Ions
- **Fernando Mier-Hicks** (P. LOZANO)  
Charging Phenomena on Spacecraft using Bipolar Sources
- **Caroline Moore-Kochlacs** (E. BOYDEN)  
Extracellular Electrophysiology with Close-Packed Recording Sites: Spike Sorting and Characterization
- **Heena Mutha** (E. N. WANG)  
The Characterization and Performance of Vertically-Aligned Carbon Nanotubes in Capacitive Deionization Systems
- **Phillip Nadeau** (A. P. CHANDRAKASAN)  
Ultra-Low Energy electronics for Synthetic Biological Sensors
- **Kendall Nowocin** (J. L. KIRTLEY)  
Microgrid Risk Reduction for Design and Validation Using Controller Hardware in the Loop Platforms
- **Carla Perez-Martinez** (P. LOZANO)  
Focused Ion Beam with Ionic Liquid Ion Sources
- **Sabino Pietrangelo** (H. LEE/ C. G. SODINI)  
A Wearable Transcranial Doppler Ultrasound Phased Array System
- **Daniel Preston** (E. N. WANG)  
Enhanced Condensation Heat Transfer for Water and Low Surface Tension Fluids
- **Evelina Polyzoeva** (J. L. HOYT/ J. A. DEL ALAMO)  
Tradeoffs of the use of SiGe Buffer Layers in Tandem GaAsP/Si Solar Cells
- **Paul Rekemeyer** (S. GRADECAK)  
Nanostructured Photovoltaics: Improving Device Efficiency and Measuring Carrier Transport
- **Katherine Smyth** (G. CHEN)  
Piezoelectric Micro-Machined Ultrasonic Transducers for Medical Imaging
- **Min Sun** (T. PALACIOS)  
Vertical Gallium Nitride Power Devices on Bulk Native Substrates
- **Yi Song** (J. KONG)  
Graphene as Transparent Electrodes for Solar Cells
- **Zhan Su** (M. WATTS)  
Advanced Silicon Photonics Microcavities for Routing, Detection and Lasing Applications
- **Sarvesh Varma** (J. VOLDMAN)  
Cell-Based Sensors for Quantifying Cell Health and Disease Progression in Engineered Systems
- **Shireen Warnock** (J. A. DEL ALAMO)  
Dielectric Reliability in High-Voltage GaN Metal-Insulator-Semiconductor High Electron Mobility Transistors
- **Yufei Wu** (J. A. DEL ALAMO)  
Reliability of W-Band InAlN/GaN HEMTs
- **Frank Yaul** (A. P. CHANDRAKASAN)  
Amplifier and Data Converter Techniques for Low Power Sensor Interfaces
- **Lili Yu** (T. PALACIOS)  
MoS<sub>2</sub> Electronics: Devices, High Yield Circuits and Applications
- **Xu Zhang** (T. PALACIOS)  
Two-Dimensional Materials: Spectroscopy and Electronic Applications
- **Yuhao Zhang** (T. PALACIOS)  
GaN-based Vertical Power Devices
- **Hangbo Zhao** (J. HART)  
Liquid Manipulation Using Engineered Carbon Nanotube Surfaces
- **Xin Zhao** (J. A. DEL ALAMO)  
III-V Vertical Nanowire Transistors for Ultra-Low Power Applications
- **Wen Zheng** (C. THOMPSON)  
Fabrication of Capacitors Based on Silicon Nanowire Arrays Generated by Metal-Assisted Wet Chemical Etching

