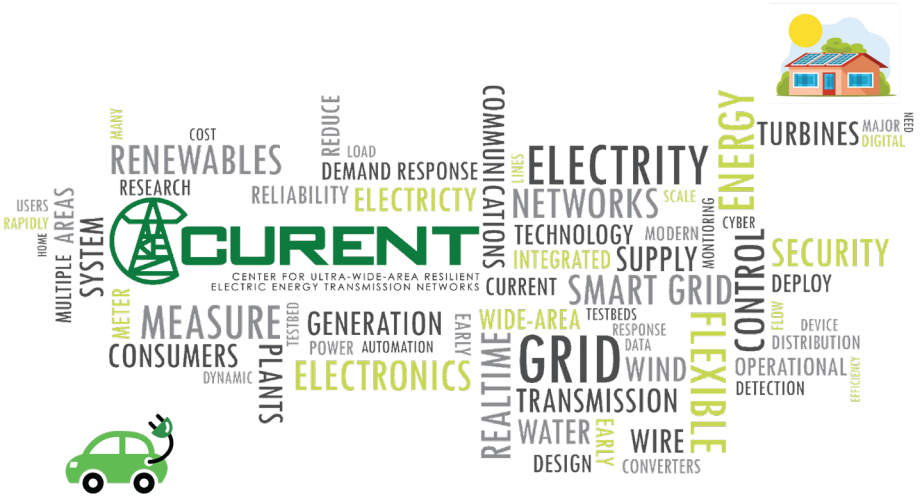
CURENT



EVENT GUIDE

8th Annual Industry Conference & NSF/DOE Site Visit

Nov. 5-7, 2019
Knoxville, TN

a National Science Foundation & Department of Energy Engineering Research Center

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Partner Institutions:

THE UNIVERSITY OF TENNESSEE KNOXVILLE

Northeastern

Rensselaer

TUSKEGEE

ABOUT CURENT

CURENT envisions a nation-wide or continent-wide transmission grid that is fully monitored and dynamically (real-time) controlled for high efficiency, high reliability, low cost, better accommodation of renewable sources, full utilization of storage, and responsive load.

A companion component of this vision is to educate a new generation of electric power and energy systems engineering leaders with a global perspective coming from diverse backgrounds.

ABOUT CURENT

CURENT was established by a grant from the National Science Foundation and the Department of Energy in August 2011 under the prestigious Engineering Research Program (ERC). CURENT is the first ERC awarded to the University of Tennessee (UTK), the first ERC headquartered in Tennessee and the only ERC focused on large-scale power systems.

The Center occupies over 16,000 sq. ft. of lab space in one of UT's newest facilities, the Min H. Kao Electrical Engineering & Computer Science Building. Partner Institutions are Northeastern University (NEU), Rensselaer Polytechnic Institute (RPI) and Tuskegee University (TU).

Additionally, the CURENT industry consortium has over 35 members consisting of electric utilities, ISOs/RTOs, vendors, service groups, national labs and research consortia.

Above: Min H. Kao Building and CURENT Headquarters in Knoxville, TN

SPEAKERS

We are proud to welcome the following speakers to our Annual Industy Conference.

Emanuel Bernadeau

Director Applied Innovation & Analytics
PJM

Dr. Emanuel E. Bernabeu leads the Applied Innovation & Analytics department at PJM; a cross silo team that focuses on Research & Development, Special Studies, Analytics and Market Surveillance. His team embraces innovation and fosters collaboration with PJM's members, national laboratories, industry and universities to operationalize emerging technologies; for example: synchrophasors, enhanced situational awareness, cascading outages analysis, etc. The team also conducts Special Studies that require advanced modeling techniques: fuel security, EMP, GMD, physical attacks, carbon pricing, etc.

Prior to joining PJM, Dr. Bernabeu spent 5 years with Dominion Virginia Power in Richmond, VA, holding a consultant engineering position.

Hao Huang

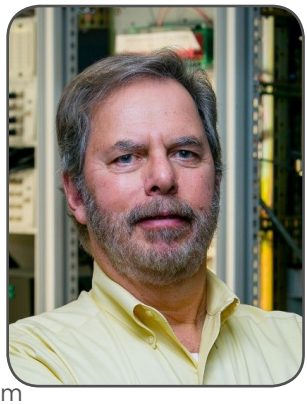
Technology Chief
GE Aviation

Dr. Hao Huang is the Technology Chief of GE Aviation—Electrical Power. He is responsible for generating the technical directions, innovation strategies and multi-generation product roadmaps for the GE aircraft electrical power division. He has been consistantly leading and contributing to innovations and inventions of aircraft electrical power technologies.

Dr. Huang is an IEEE fellow and SAE fellow. He received his Ph.D. Degree in Electrical Engineering from the University of Colorado at Boulder, Boulder, Colorado, USA in 1987. He has 30 years of experience in Aircraft Electrical Power Systems, Power Generations, Engine Starting, Power Electronics and Controls and Electric Vehicle Drives. He has 80 US patents including pending and multiple technical publications in the above-mentioned areas.

Dr. Hao Huang is the winner of 2019 IEEE Transportation Technologies Award.

Nick Miller



Principal
HickoryLedge LLC

Mr. Miller is a Principal with HickoryLedge LLC, a consultancy providing technical services. Nick is an internationally known power system engineer, with a specialty in integration of wind and solar power to bulk power systems. Mr. Miller spent 3/8 of a century with GE, finishing his final decade of practice in the role of Senior Technical Director for GE Energy Consulting. In the last 16 years at GE, he led analytical developments for system integration of GE Wind Turbine-Generators into power systems, leading efforts on applications, controls and systems for large-scale coordination of wind and solar generation with other system resources. He has lectured and provided consultation on wind and solar power integration to governments and institutions in more than three dozen countries. He worked with the North American Electric Reliability Corporation (NERC) on Essential Reliability Services. Additionally, he is a technical advisor to the Hawai'i Public Utilities Commission on renewables and energy storage.

Nick is an IEEE Fellow, a Licensed Professional Engineer in NY and a CIGRE member. He authored 20 US patents, published over 160 papers and articles. He has received many industry awards and is the 2017 recipient of the prestigious GE Edison Award for Advancements in Renewable Energy. He was awarded IEEE's highest renewable energy honor, the Ramakumar Family Renewable Energy Award in 2018. He was also the recipient of the 2018 Lifetime Achievement Award from the Energy Systems Integration Group.

SPEAKERS

Michael Pesin

Deputy Assistant Secretary
U.S. Department of Energy (DOE)

Michael Pesin is Deputy Assistant Secretary for the Advanced Grid Research and Development Division in the U.S. Department of Energy's Office of Electricity. Mr. Pesin has 30 years of experience in the electric utility industry, much of it directing development and execution of advanced technology programs. His most recent assignment was with Seattle City Light (SCL) where he developed the technology strategy, managed research and development projects and directed strategic programs to management demonstration projects. His subordinate strategic programs included substation automation, distributed automation, advanced metering infrastructure, enterprise OT communication networks, energy storage, microgrids, transactive energy management and distributed management systems

.

Mr. Pesin has numerous professional affiliations, publications and patents. He holds a Master of Science in Electrical Engineering from St. Petersburg State Polytechnic University, St. Petersburg (Leningrad), Russia, is a Licensed Professional Electrical Engineer in the State of Washington, a Certified Project Management Professional (PMP) and a Cisco Certified Design Associate (CCDA).

Burak Ozpineci

Group Leader - Power Electronics and Electric Machinery
Oak Ridge National Laboratory (ORNL)

Burak Ozpineci received the M.S. and Ph.D. degrees in electrical engineering from the University of Tennessee, Knoxville, TN, USA, in 1998 and 2002, respectively. He joined the Post-Masters Program with the Power Electronics and Electric Machinery Research Center, Oak Ridge National Laboratory (ORNL), Knoxville, TN, USA, in 2001 and became a Full-Time Research and Development Staff Member in 2002 and Group Leader of the Power and Energy Systems Group in 2008. He is currently leading the Power Electronics and Electric Machinery Group and managing the Electric Drive Technologies Program at ORNL. He also serves as a Joint Faculty Associate Professor at The University of Tennessee, Knoxville.

SPEAKERS

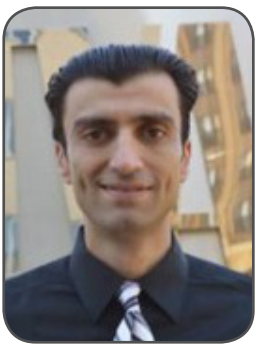
Jiuping Pan

Senior Principal Scientist
ABB

Dr. Jiuping Pan is a Senior Principal Scientist for ABB Corporate Research. He has been leading major research activities on innovative HVDC transmission and MVDC distribution system designs and applications for many years. He is a domain expert in broad areas of power systems including power system planning, modeling, control and protection. He obtained his Ph.D. degree from Virginia Tech and has been a Senior Member of IEEE since 2004.

Said Sidiqi

Senior Program Manager
Tennessee Valley Authority (TVA)



Said Sidiqi is a Senior Program Manager in the Enterprise Research and Technology Innovation organization at Tennessee Valley Authority. Mr. Sidiqi has over 15 years of experience in the electric utility industry, primarily supporting transmission operations and reliability operations. He has held the positions of Senior Electrical Engineer, Principal Electric Engineer and Manager Advanced Power Applications. He is currently on rotational assignment to support the Transmission organization in R&D areas including advanced analytics, asset management, DER integration, grid resiliency, power quality, automation and mobility and cybersecurity.

Mr. Sidiqi has also been involved in numerous TVA initiatives to support cultural improvements including memberships in Employee Advisory Group(s), Diversity Council, Mentorship Programs, Health and Safety Committee and Employee Resource Group(s). Mr. Sidiqi is a graduate of Tennessee Technological University with a BSEE degree.

AGENDA

Industry Conference - Tuesday, Nov. 5th

Downtown Hilton

Mezzanine & Salons D&E

7:00-8:00am **Registration & Breakfast**

Salons A, B & C

8:00-8:15 **Opening & Welcome -** Kevin Tomsovic, Director

8:15-12:00 **Invited Speakers**

8:15-8:45 ***DOE Grid Research IN Transmission***
Michael Pesin
Senior Deputy Director
U.S. Department of Energy

8:45-9:15 ***Charging Electric Vehicles***
Burak Ozpineci
Group Leader – Power Electronics and Electric Machinery
Oak RIdge National Laboratory (ORNL)

9:15-9:45 ***New Roadmap, New Challenges, New Aviation Era***
Hao Huang
Technology Chief
GE Aviation

9:45-10:00 Break

10:00-10:30 ***3 Things You Need to Know About Electricity Markets***
Emanuel Bernadeau
Director Applied Innovation & Analytics
PJM

10:30-11:00 ***Power System Operation in a Near Zero Carbon Grid***
NIck Miller
Principal
HickoryLedge LLC

11:00-11:30 ***Grid Enhancement and Modernization with HVDC Transmission Technologies***
Jiuping Pan
Senior Principal Scientist
ABB

11:30-12:00 ***Diversity and Inclusion at TVA***
Said Sidiqi
Senior Program Manager
Tennessee valley Authority (TVA)

AGENDA

Tuesday, Nov. 5th (cont.)

Salons D & E

12:00-1:00pm **Lunch**

Smoky

1:00-2:00 **Student-Industry Mixer**

Min H. Kao (MHK)

2:00-2:15 Move to MHK, walk or ride the shuttles
Shuttles drop off on 1st floor of MHK

2:15-5:00 **Poster Session and Lab Tour**
Poster Session and Lab Tour will start in MHK 101 and MHK 124 with Hardware Testbed and Large-Scale Testbed demos (approx. 30 minutes)

5:00-5:30 Break
Shuttles will return industry to hotel at 5:00-5:15, meet outside 1st floor entrance

5:30-9:00 **Student Orientation and Pizza Dinner - MHK647**
(Activities to follow)

Downtown Hilton

Hiawassee

6:30-9:00 **Faculty Industry Dinner Meeting**

Above: Testbed demo during the 2018 Industry Day and Site Visit.

AGENDA

Day One NSF/DOE Site Visit - Wednesday, Nov. 6h

Downtown Hilton

Mezzanine & Salons D&E

7:00-8:00am **Registration & Breakfast**

Salons A, B & C

8:00-8:20 **Welcome Remarks - *Kevin Tomsovic**, Center Director; **Paige Williford,** Student Chair; **Deans' Introduction; Site Visit Team (SVT) Introduction***

8:20-8:45 **CURENT Overview**
***Kevin Tomsovic,** Center Director*

8:45-11:00 **Research Thrust Overviews**

8:45-9:30 Monitoring & Modeling Thrust Overviews
***Yilu Liu,** Deputy Director & Thrust Leader*
***Ali Abur**, NEU Campus Director & Thrust Leader*

9:30-10:15 Control & Actuation Thrust Overviews
***Joe Chow,** RPI Campus Director & Thrust Leader*
***Fred Wang**, Technical Director & Thrust Leader*

10:15-10:30 Break

10:30-11:00 CURENT Engineered Systems Overviews
***Leon Tolbert** and **Fran Li,** Thrust Leaders*

11:00-11:45 **Concurrent Sessions**

Boardroom	Salons A, B & C	Sequoyah 1
Site Visit Team Private Sesson	Industry Feedback Session	Deans' Meeting

Salons D & E

11:45-12:45 **Lunch**

Salons A, B & C

12:45-1:15 **Education and Outreach Program Overview**
***Anne Skutnik**, Education Coordinator*

1:15-1:45 **Innovation and Industry Collaboration Program Overview**
***Lisa Beard**, Industry Liaison Officer*

1:45-2:15 **SVT Private Session with Industry**

2:15-2:45 **Assessment, Infrastructure & Sustainability**
***Kevin Tomsovic**, Center Director*

2:45-3:15 **Culture of Inclusion & Diversity**
***Daniel Costinett,** Co-Director of Education & Diversity*

AGENDA

Wednesday, Nov. 6th

Min H. Kao (MHK)

3:15-3:30 Move to MHK, walk or ride the shuttles
(Shuttles drop off on 1st floor of MHK)

3:30-4:45 **Poster Session and Lab Tour**
Poster Session and Lab Tour will start in MHK 101 and MHK 124 with Hardware Testbed and Large-Scale Testbed demos (approx. 30 minutes)

4:45-5:45 **SVT/Student Private Session - MHK404**

5:45-6:15 **Summary Q & A - Faculty & SVT - MHK435**

6:15-6:45 **SVT Executive Session - MHK435**

6:45-7:00 **SVT Question/Issues Presentation to ERC Team - MHK 435**
(Shuttles return SVT to hotel afterwards)

Downtown Hilton

Boardroom

7:30-10:00 **SVT Working Dinner and Discussion**

UT Conference Center

4th Floor

7:00-9:30 **Student Awards Dinner**
Room opens at 7:00, buffet starts at 7:30

Students at the Student Awards Dinner during the 2018 Site Visit

Day Two NSF/DOE Site Visit - Thursday, Nov. 7th

Downtown Hilton

7:45-8:15am **Concurrent Events**

Salons A & B	Sequoyah 3
SVT and University Officials' Breakfast	Faculty Breakfast

Salons A & B

8:15-9:00 **SVT & University Officials Meeting**

9:00-10:00 **Question Response Session**

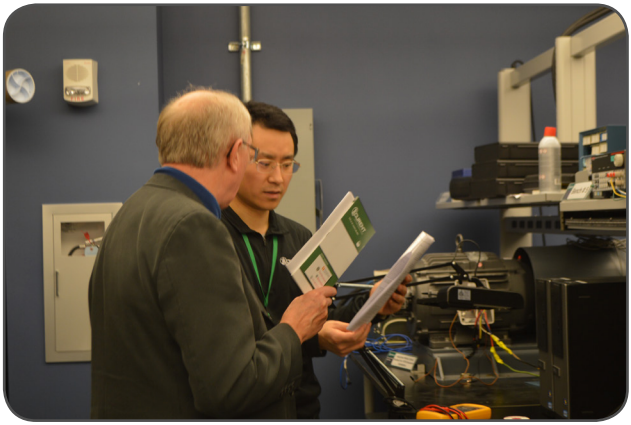
Boardroom

10:00-5:00 **SVT Report Writing**

5:00 **SVT Departs**

~ NSF/DOE Site Visit Adjourned ~

Top: Dr. Costinett asks a question during the 2018 Site Visit
Bottom: Lab Tour and Poster Session during 2018 Site Visit



Welcome

The 2019 Lab Tours and Poster Sessions will be held in the laboratories on the 1st, 4th and 5th floors of the Min H. Kao Building.

As you tour the labs, feel free to use your QR Code Reader on your Smart Phone to scan the bottom corner of each poster. The QR Code will send you to the CURENT website where the poster is stored. QR Code Readers can be downloaded for free from most App Stores.

Sample QR Code

Lab and Poster Locations

1st Floor Atrium	1st Floor Entrance
High Power Electronics Lab	Room 117
Hardware Testbed Control and Build Lab.	Room 101 & 101A
Power Electronics Lab	Room 125
Visualization Room	Room 124
Multipurpose Conference Room	Room 121
FNET Lab	Room 402
Packaging Lab.	Room 533

Generally, a room contains one to three categories of posters. The category abbreviations are below.

HV	Actuation and HVDC
TB	Hardware Testbed
LT	Large Scale Testbed
PC	Power Converter Design and Control
DC	Power Electronics Devices and Components
SC	Power System Control
ME	Power System Modeling
MT	Power System Monitoring
EU	Education

The poster border refers to the kind of research the poster is describing. Green poster borders indicate core research projects, blue poster borders indicate associated research projects and purple poster borders represent other research projects.

Min H. Kao Room 101 & 101 A

(Hardware Testbed Control & Build Lab)

Actuation and HVDC (HV), Power System Control (SC), Power Converter Design and Control (PC), Power System Monitoring (MT) & Hardware Testbed (TB)

HV11 Xiao Huangqing - Hybrid HVDC System for Cross-Seam Study

HV12 Le Kong - DC Impedance Model of MMC Considering Capacitor Voltage and Circulating Current Dynamics

HV14 Yiwei Ma - Enhancing Power System Transient Stability by Virtual Synchronous Generator Control Using Wide-Area Measurements

HV15 Kaiqi Sun - Frequency Response Reserves Sharing Across Asynchronous Grids through MTDC System

HV16 Wang Shuyao - Electromechanical Transient Modeling of Modular Multilevel Converter based HVDC Network

HV17 Wang Shuyao - Linearized Approach for Dynamic Modeling of Fast Electric Vehicle (EV) Charging Unit

TB2 Jiangnan Li - Vulnerability Assessment of PV Inverter IoT Devices

TB3 Nattapat Praisuwanna - Voltage Ride-Through Capability for PV-based Inverters in HTB

TB4 Taylor Short - Hardware Testbed Emulation: Frequency Control using Motor Drives

TB5 Jingxin Wang- Hardware Testbed

LT1 Hantao Cui - Large-Scale Test Bed A Cyber-Physical Power System Testing Platform

LT2 Jahidul Islam - Frequency Control for Power System using Centralized Model Predictive Controller

HV1 Wei Feng - Using Virtual Buses and Optimal Multipliers to Converge the Sequential AC/DC Power Flow Under High Load Cases

HV6 Yiwei Ma - A Smart and Flexible Microgrid with a Low-cost Scalable Open-source Controller

TB1 Dingrui Li - Development of a Converter Based Microgrid Testing Platform

PC16 Benjamin Dean - A communication testbed for modular power electronic systems in energy storage systems

PC17 Paychuda Kritprajun - VOLTTRONTM Agent Development for Enabling Reactive Power Support of Non-Utility DERs by Integrating Transactive Energy Approach

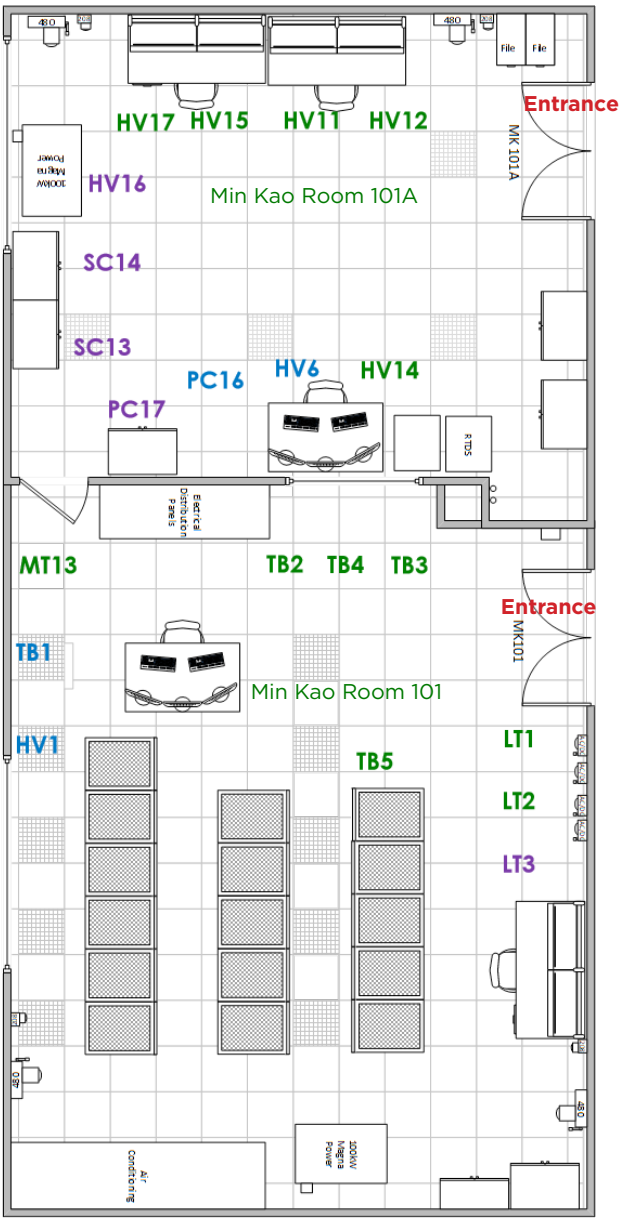
LAB TOUR AND POSTER SESSION

SC13 Evan McKee - Deep Reinforcement Learning for Real-Time Residential HVAC Control

SC14 Cody Rooks - A Robust Hierarchical Dispatch Scheme for Active Distribution Networks Considering Home Thermal Flexibility and System Uncertainty

LT3 Kaneko Akihisa - Evaluation of Dynamic Var Support from Distribution Network with PV Systems

MT13 Ibukunoluwa Korede - Misoperations Identification in Power System Using Protection Settings Evaluation Tool (PSET)



Min H. Kao Room 101A & Min H. Kao 101

Min H. Kao Room 117

(High Power Electronics Lab)

Actuation and HVDC (HV), Power Converter Design and Control (PC), Power System Control (SC), Power Electronics Devices and Components (DC) & Power System Modeling (ME)

HV13 Haiguo Li - SiC Impact on Utility Power Electronics Converter

HV3 Xingxuan Huang - Design and Testing of a 6.5 kV Modular Multilevel Converter Submodule Based on 10 kV SiC MOSFETs

HV4 Shiqi Ji - SiC Based Modular Transformer-less MW-Scale Power Conditioning System and Control for Flexible CHP (F-CHP) System

HV5 Shiqi Ji - Medium Voltage Power Conditioning System (PCS) for Asynchronous Microgrid Using 10 kV SiC MOSFET

HV7 Liang Qiao - Online Junction Temperature Monitoring Using Turn-on Delay Time for SiC MOSFETs

PC10 Yang Huang - Analytically Characterizing Common- & Differential-mode Performance of Three-phase Voltage-source Inverters Under Various PWM Patterns

DC5 Zhou Dong - Data Driven Leakage Inductance Modeling of Common Mode Choke

DC6 Ruiyang Qin - Multi-Layer Non-uniform Series Self-resonant Coil for Wireless Power Transfer

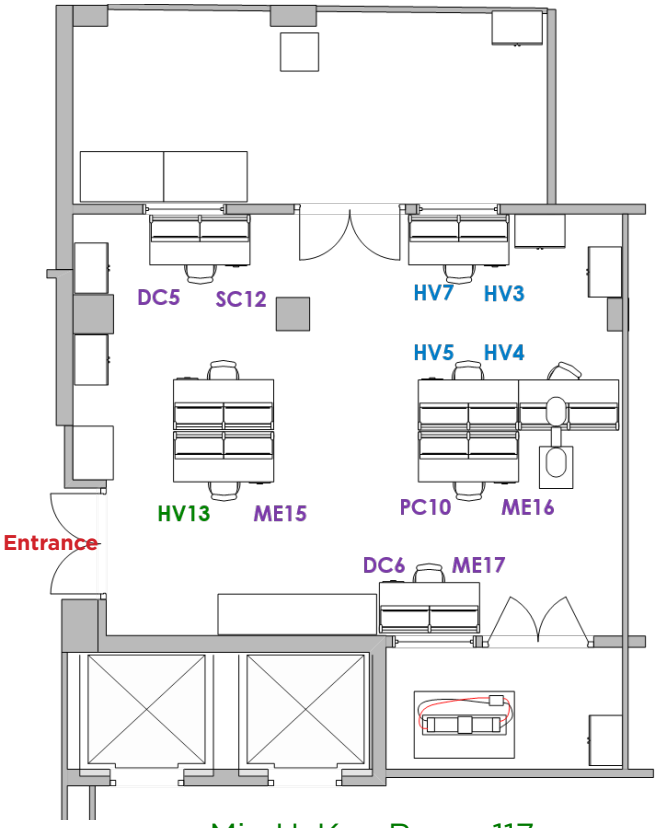
SC12 Mariana Kamel - Reinforcement Learning Approach for Transmission Lines Overload-Relief

ME15 Okan Ciftci - CVSR-Integrated Meshed Power Grid Analysis

ME16 Yan Du - Achieving 100x Acceleration for N-1 Contingency Screening with Uncertain Scenarios using Deep Convolutional Neural Network

ME17 Xiao Kou - A Distributed Energy Management Approach for Residential Demand

LAB TOUR AND POSTER SESSION



Min H. Kao Room 117

Please note:

-The poster numbers correspond with the lab maps for each room.
-Posters can be viewed on your USB Drive.
-Posters can be viewed by scanning the QRC code on the poster

LAB TOUR AND POSTER SESSION

Min H. Kao Room 125

(Power Electronics Lab)

Power Converter Design and Control (PC), Power Electronics Devices and Components (DC), Actuation and HVDC (HV), Power System Modeling (ME) & Power System Monitoring (MT)

PC6 Jiahao Niu - The Impact of Execution Frequency in Sorting Algorithm on Nearest Level Modulated Modular Multilevel Converter

DC3 Wen Zhang - Review and Bandwidth Measurement of Coaxial Shunt Resistors for WBG Devices Dynamic Characterization

DC4 Wen Zhang - Fast Wide-bandgap Device Overcurrent Protection with Direct Current Measurement

DC8 Kevin Bai - Equipping CURENT For Leadership in Research and Development of Wide-bandgap Semiconductor Packaging and Integration

PC5 Nathan Strain - Design of a GaN-Based High Efficiency LLC Resonant Converter for Data Center Power Supply

DC1 Quillen Blalock - 2S Mobile Battery Charger with Integrated Cell Balancing

DC2 Andrew Foote - Design of Inductive Power Transfer Coils for EVs with Fourier Analysis

PC7 Saeed Anwar - Design Optimization of Integrated Powertrain Charger DC-DC Converter for EV Application

PC8 Ruirui Chen - Analytical Analysis of AC and DC Side Harmonics of Three-Level Active Neutral Point Clamped Inverter with Space Vector Modulation

PC9 Ruirui Chen - Investigation of Fourth-leg for Common-mode Noise Reduction in Three-Level Neutral Point Clamped Inverter Fed Motor Drive

PC19 Handong Gui - Development of 1-MW Cryogenically Cooled Inverter for Electric Aircraft Applications

PC20 Handong Gui - Design of Low Inductance Bus Bar for 500 kVA Three-Level ANPC Converter

PC11 Peter Pham - Active Rectifier with On-Board Synchronization Control for a Wireless Power Transfer System at 6.78 MHz

HV2 Zihan Gao - Design of a SiC-based Medium Voltage Dual Active Bridge Converter

HV8 Paige Williford - Short Circuit Study of 600 V GaN GITs

LAB TOUR AND POSTER SESSION

HV9 Zhe Yang - Resolving Loss Discrepancy between Calculation and Measurement in a 4.5 kW GaN-based Inverter

HV10 Zhe Yang - An Improved Design Method for Gapped Inductors Considering Fringing Effect

PC1 Jared Baxter - Converter Analysis Using Discrete Time State-Space Modeling

PC2 Spencer Cochran - 7 Level Switched Capacitor Rectifier for Qi Wireless Power Transfer

PC3 Daniel Merced - Electric Vehicle Fast Charger Topology Survey

PC4 Kamal Sabi - Design and Implementation of a Bipolar-Unipolar Switched Boundary Current Mode (BCM) Control GaN-Based Single Phase Inverter

PC12 Jingjing Sun - Design of a GaN-Based High Efficiency CRM Totem-Pole PFC Converter for Data Centers

PC13 Liyan Zhu - Bidirectional 400V/12V 6kW Auxiliary Power Module for Electric Vehicles Application

PC14 Yunting Liu - DC Voltage Control of Inverter Interfaced SiC Dual Active Bridge Converter for Vehicle-to-Load (V2L) Applications

PC15 Yunting Liu - Direct Power Control for SiC Dual Active Bridge Converter with Parabolic Carrier

ME19 Qiwei Zhang - Zigzag Search for Multi-objective Optimization Considering Generation Cost and Emission

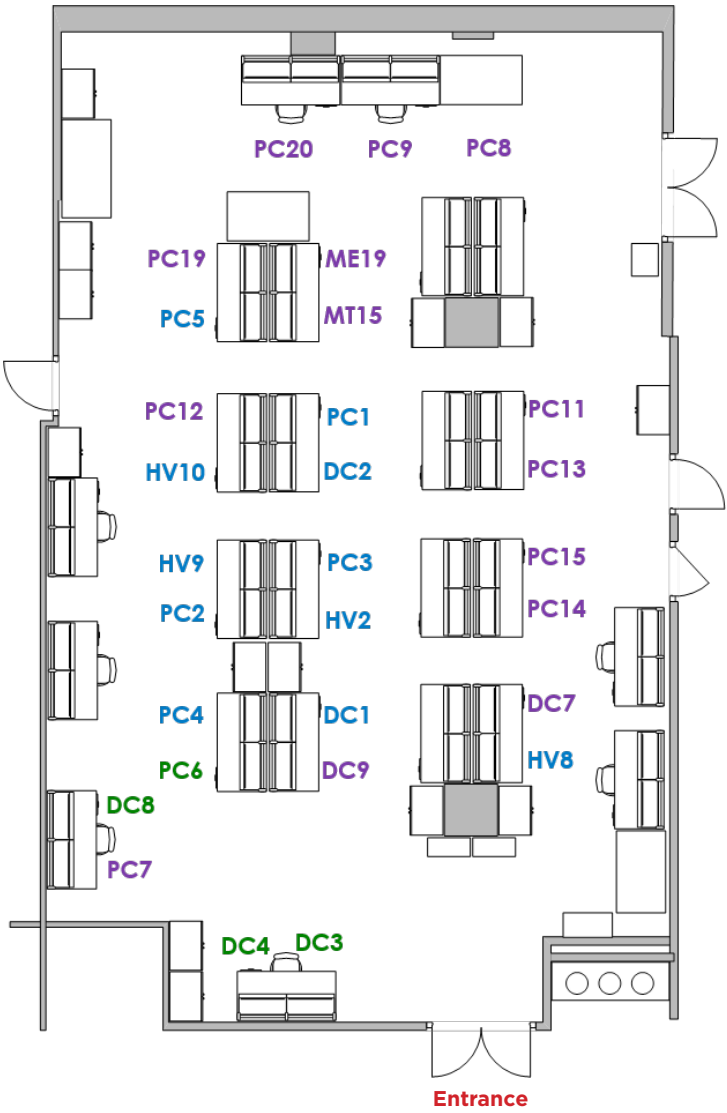
MT15 Orlem Santos - Explainable Deep Learning Methods for Power System Events Identification Using WAMS Post Disturbance Records

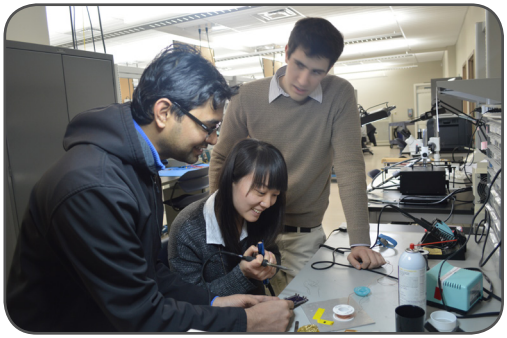
DC7 Ren Ren - Current-bias Dependent Permeability of Powder and Amorphous Core Induced Unbalanced DM Impedance and Mixed-mode Noise

DC9 Jie Li - 6.78 MHz Wireless Power Transfer Systems Design

LAB TOUR AND POSTER SESSION

Min H. Kao Room 125





Left: Students working on research in the Power Electronics Lab

Min H. Kao Room 121

(Multipurpose Conference Room)

Power System Modeling (ME), Power System Control (SC), Power System Monitoring (MT) & Power Converter Design and Control (PC)

ME20 Jinyoung Lee - Feasibility Study of False Data Injection Attacks on State Estimation

SC15 Jeremy Till - Impact of high PV penetration on the voltage stability of the ERCOT system

MT18 Chujie Zeng - Visualization and Modeling Features of IPE GridPortal

PC18 Richard Bisson - Control and Load Balancing with the IRIS IPWR in a High Renewables Penetration Grid

SC4 Ishita Ray - Interaction between Line Impedance and Inverter Control in Low Voltage Microgrid

SC5 Stephen Fatokun - Scalable Optimization Techniques for Market Integration of Distributed Energy Resources

SC6 Wenjie Han - Active Disturbance Rejection Control in Fully Distributed Automatic Generation Control with Co-Simulation of Communication Delay

SC7 Stavros Konstantinopoulos - Wind Turbine-Generator Control for Improving Dynamic Hosting Capacity in Congested Transmission Systems

SC8 Abdul Mohammed - A PSO Based Control Strategy For Combined Emission Economic Dispatch with Integrated Wind-Solar

SC9 Qingxin Shi - Thermostatic Load Control (TLC) for Frequency Regulation Considering Daily Demand Profile and Progressive Recovery

SC10 Xin Xu - Initial Study of the Power System Stability Boundary Estimated from Nonlinear Modal Decoupling

SC11 Xin Xu - Nonlinear Modal Decoupling Based Power System Transient Stability Analysis

ME1 Bilgehan Donmez - A Parallel Framework for Robust State Estimation Using Node-Breaker Substation Models

ME2 David Kelle - Improving Performance of Multi-Area State Estimation Using Spectral Clustering

ME3 Ramtin Khalili - Parameter Error Identification in Three-phase systems

ME4 Pengxiang Ren - Tracking Transmission Line Parameters in Power Grids Observed by PMUs

LAB TOUR AND POSTER SESSION

ME5 Qingxin Shi - Estimating the Profile of Incentive-based Demand Response (IBDR) By Integrating Technical Models and Social-behavioral Factors

ME6 Vanja Svenda - Probabilistic Network Observability of a Hybrid Power System with Communication

ME8 Marcelo deCastro - Fundamental Eigenvalue Analysis of Coalesced Power Transmission and Unbalanced Distribution Grids Using Modelica

ME9 Yan Du - Intelligent Multi-microgrid Energy Management based on Deep Neural Network and Model-free Reinforcement Learning

ME10 Yang Liu - Towards Faster-Than-Real-Time Grid Stability Assessment Using Differential Transformation

ME11 Yang Liu - Efficient and Robust Dynamic Simulation of Power Systems with Holomorphic Embedding

ME12 Ahmet Oner - Strategic Placement of Distributed Generators Against Extreme Events

MT3 Cesar Galvez - Fault Location Algorithm in Unbalanced Distribution Systems Using Wavelets

MT2 Wenting Li - Real-time Energy Disaggregation at Substations with Behind-the-Meter Solar Generation

SC1 Yu Su - Adaptive PV Power Reserve Strategy Using Inertia Estimation

SC2 Chengwen Zhang - Oscillations Damping Control using Measurement Derived Transfer Function Model (TERNA Case Study – Phase II)

SC3 Yi Zhao - Hardware Implementation Of Wide-area Damping Control On OPAL-RT

Min H. Kao 1st Floor / Atrium

Education (EU)

EU1 Hadley Bradford – Smart Home Load Management Using Dynamic Programming

EU2 Norbert Birgirmana – The Development of Continental Communication Network Topologies on the CURENT Large-Scale Testbed

EU3 Isaiah Carter and De'Angelo Cooper – Predicting Solar Power Output using Artificial Intelligence

EU4 Eric Cruz – Neural Network Framework for Photovoltaic Variability and Power System Stability Analysis

EU5 Zandria Hughes and Jennifer Avellaneda Bravo – Small Scale Solar Photo-Voltaic Module

EU6 Jordan Jones – Power Device Characterization and Mechanical Construction of Cryogenically-Cooled Motor Drive for Aircraft Application

EU7 William Karls – A Comparison of Modulation Techniques for Three-Level Neutral-Point-Clamped Inverter Fed Motor Drives

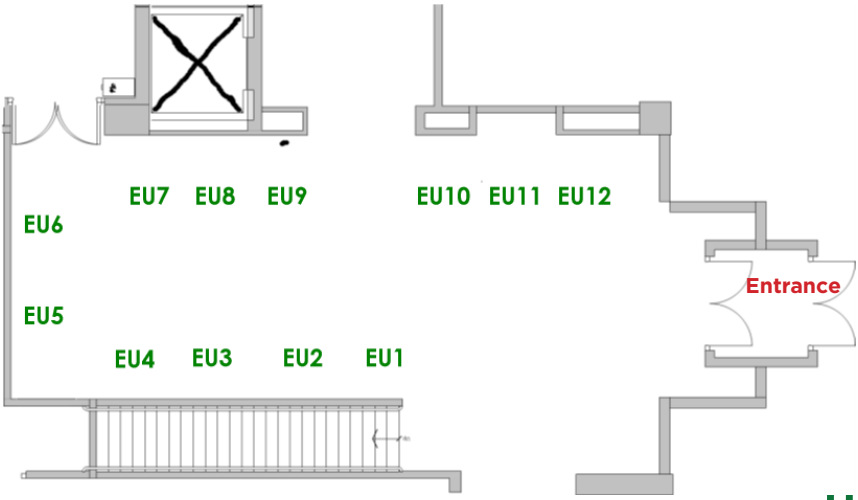
EU8 Sydney Ishmael and Cade Lott – Simulation and Design of a Single-Phase Isolated Bidirectional Electric Vehicle Charger

EU9 Anderson Myers – Multi-Level and Multi-Scale Interactive Visualization Method for Enhancing Distribution System Reliability and Resilience

EU10 Sharifa Sharfeldden – Analysis and Design of Combating Field Complications for Wireless Power Transfer

EU11 Peyton Spencer – A Differential Transformation Toolbox for Solving Power System Differential Equations

EU12 Vince Wilson – Comparing the Synchronous and Virtual Electrical Inertia Arising from Induction Motors and Motor Drives



Min H. Kao 1st Floor / Atrium

Min H. Kao Room 402

(FNet Lab)

Power System Modeling (ME) &

Power System Monitoring (MT)

ME13 Abigail Till - Impact of High PV Penetration on Transient Stability — a Case Study on the U.S. ERCOT System

ME14 Deng Xianda - A Real-Time Co-Simulation Framework for Power System Transient Stability Analysis within Multiple Software

MT4 Zhihao Jiang - Enhanced Measurement-based Dynamic Equivalent of Large-Scale Power Systems

MT5 Tong Ning - Dynamic Equivalence of Large-Scale Power Systems Based on Boundary Measurements – A Parameter Optimization Based Approach

MT6 Lakshmi Sundaresh - Estimating the PV Generation Lost During Momentary Cessation

MT7 Weikang Wang - Frequency Disturbance Event Detection Based on Synchrophasors and Deep Learning

MT8 Yuru Wu - Solar Energy-based Computation and Communication Module

MT9 Deng Xianda - Line Outage Detection and Localization via Synchrophasor Measurement

MT10 Wenpeng Yu - Synchrophasor Data Timestamp Error Detection and Estimation

MT11 Lin Zhu - Forced Oscillation Mitigation Using Utility-scale Battery Energy Storage System: Case Study on EI Model

ME7 Yinfeng Zhao - Data-Driven Security Assessment of Power Grids with High PV using Machine Learning

MT1 Fuhua Li - Fault-Tolerant Frequency Measurement Based on Point-on-Wave Data

ME18 Dongsheng Yuan - The DP Modeling and Input Impedance Modeling for 18-pulse Auto-transformer Rectifier Unit

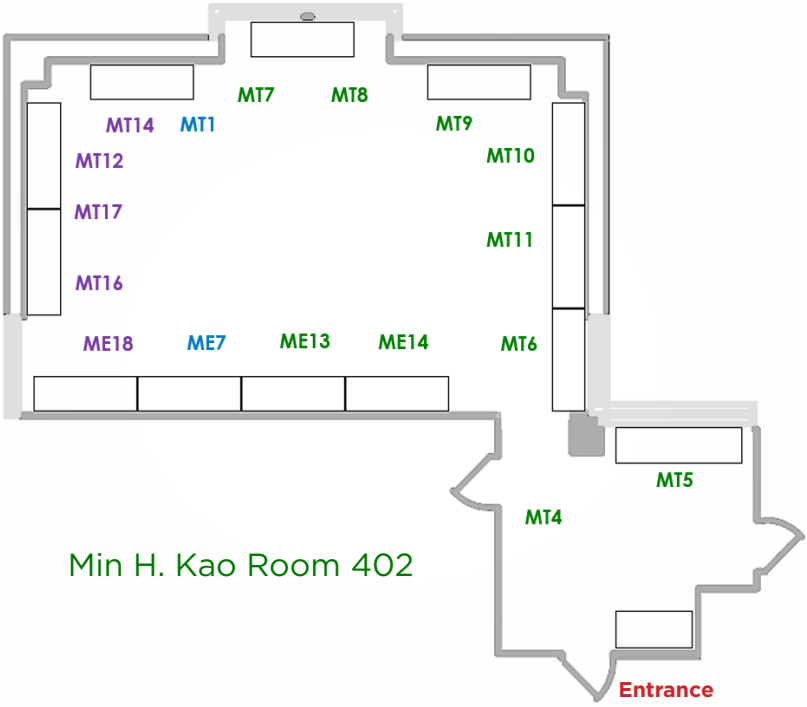
MT12 Jiaojiao Dong - Increasing Distribution System Resiliency Using Flexible DER and Microgrid Assets with Transactive Control

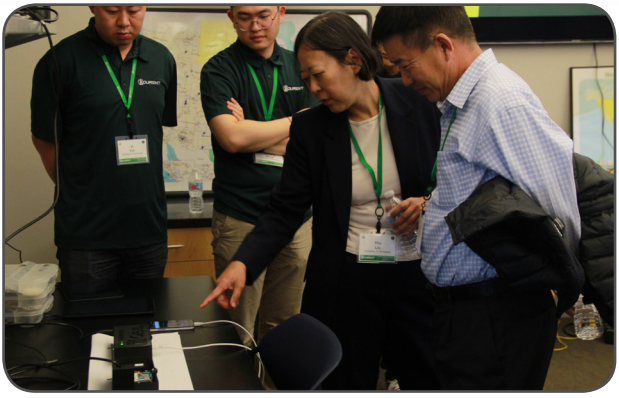
MT14 Shengyuan Liu - Event Detection of Power Systems Based on Unequal-Interval Reduction of PMU Data and Local Outlier Factor

MT16 He Yin - Pulsar Based Timing Instrument Design

MT17 Aaron Wilson - Decentralization of Substation Communications Architecture Using Distributed Ledger Technology (DLT)

LAB TOUR AND POSTER SESSION

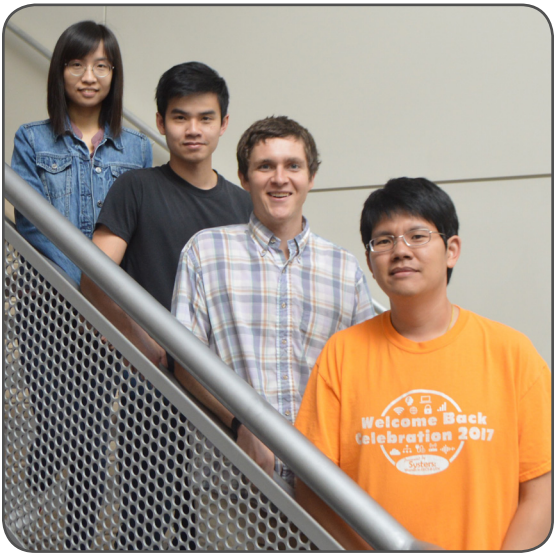




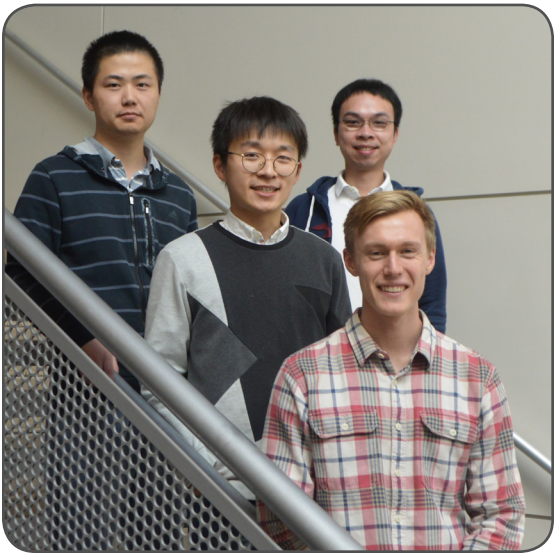
Top: Lab Tour (MHK 402) 2017 Site Visit
Bottom: Lab Tour (MHK 101) 2018 Site visit

Paige Williford
Student Chair
Coordinating:

- Overall Student Organization for site visit
- Coordinates co-chairs and committees



Above L to R: Jingjing Sun, Peter Pham, Andrew Foote and Natt Praisuwanna



Below, L to R: Wen Zhang, Zhijao Jiang, Chengwen Zhang and Ian Schomer (Not pictured: Boxin Xu)

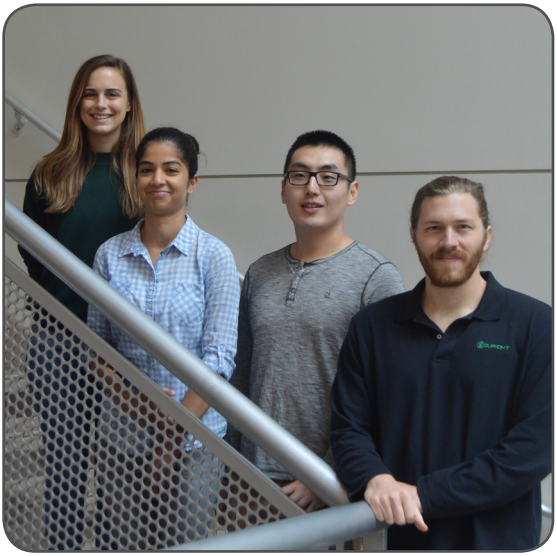
Student Leadership for Industry Day and the NSF/DOE Site Visit

Chair: **Paige Williford**
- Lab Tour committee leader: **Peter Pham**
- Photography committee leader: **Ian Schomer**
- Student Dinners committee leader: **Boxin Xu**

Co-Chair: **Ishita Rayl**
- Equipment committee leader: **Natt Praisuwanna**
- Registration committee leader: **Jingjing Sun**

Co-Chair: **Yu "Michael" Su**
- Poster Printing committee leader: **Chengwen Zhang**
- Notebook Printing committee leader: **Zhihao Jiang**
- Publication committee leader: **Wen Zhang**

Co-Chair: **Cody Rooks**
- Driver committee leader: **Andrew Foote**
- Welcome committee leader: **Cody Rooks**



L to R: Paige Williford, Ishita Ray, Yu "Michael" Su and Cody Rooks

Paige and the student co-chairs wish to thank all the committee members and other CURENT students for their time and efforts in preparing for the industry conference and site visit.

INFORMATION

The 8th Annual Industry Conference & NSF/DOE Site Visit is at the **Hilton** (501 W. Church Avenue, 37902) in downtown Knoxville and at the **Min H. Kao Building** (1520 Middle Drive, 37996) on Dec. 4-7, 2018.

LOCATIONS

Invited Presentations, Technical Paper Sessions and Research Thrust Overviews will all be held at the **Hilton** in the **Salons A, B & C**. Lab Tours will be at the **Min H. Kao Building** on the **University of Tennessee** campus. Breakfast and lunch will in the **Hilton** in **Salons D & E.** The Industry & Faculty Dinner Meeting will be in the **Hiawasee Room** at the **Hilton**.

PARKING

Hotel garage parking will be covered by CURENT. Bring your parking ticket to the registration desk to recieve a parking card. Please note that parking cards can be erased by cell phones and credit cards so keep your parking card aways from these items.

Parking at UTK for the lab tour is not recommended, although campus parking is available at Vol Hall Parking Garage at 1545 White Avenue, 37919. We recommend that people walk the short walk to the Min H. Kao building for the lab tour or catch a ride with one of our shuttle vans.

TRANSPORTATION

Recommended taxi service:

- Triple A Cab - 865.970.0016
- Uber
- Tesla transport 865-556-1213

INTERNET INFORMATION

Hilton

- network: **HILTONCONFERENCE**
- user name: **HILTONCONFERENCE**
- No password needed

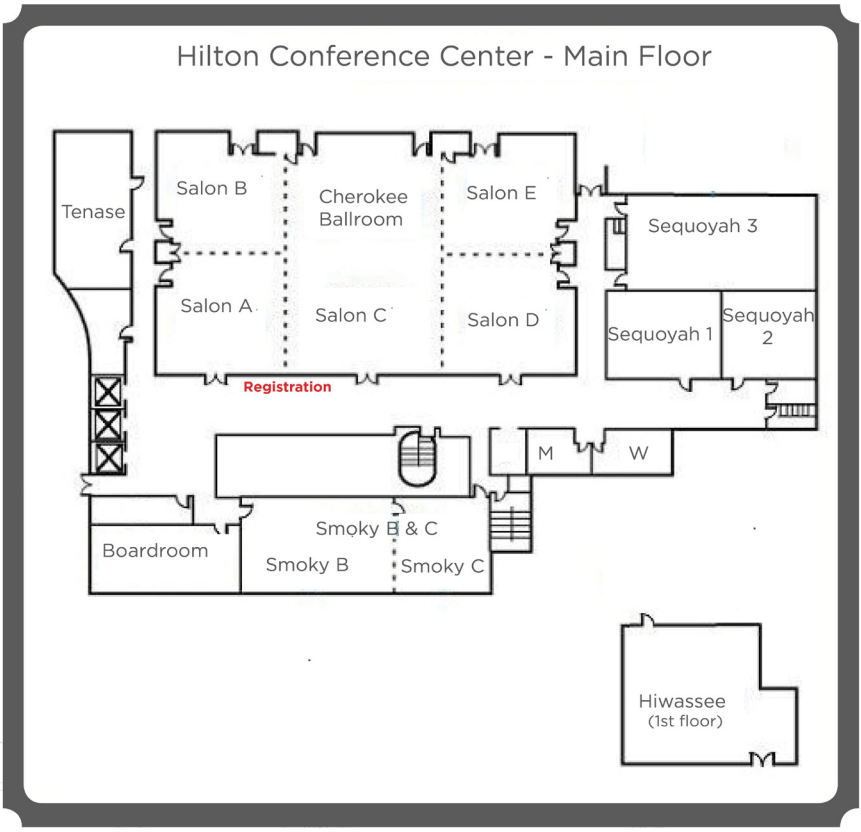
Min H. Kao Building

- network: **ut-visitor** (no password is needed, your browser will prompt you to enter your email address to register. If not, visit **guest.utk.edu** to log in.)

EVENT CONTACT

Please contact Wendy Smith at 865.805.0792 or 865.974.9707 if any issues arise.

HOTEL MAP



The conference is on the second floor. From the lobby, go up the stairs or take the elevators to the 2nd floor.

The presentations and discussions take place mostly in Salons A, B & C. Breakfast and lunch will be served buffet style and the dining area will be in Salons D & E.

Above: Student leadership working on plans for the industry conference and site visit.

INDUSTRY MEMBERS

CURENT thanks all our industry partners for their support.

conEdison

ACKNOWLEDGEMENT

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Other US government and industrial sponsors of CURENT research are also gratefully acknowledged.

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Entrepreneur in Residence: Tao Xia
Education Coordinator: Anne Skutnik
IT Manager: Ryan Smiley
Infrastructure: Bob Martin
Event Coordinator: Wendy Smith

Thank you for attending the 8th Annual Industry Conference and NSF/DOE Site Visit.

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