CURENT

**CENTER FOR ULTRA-WIDE-AREA RESILIENT
ELECTRIC ENERGY TRANSMISSION NETWORKS**

EVENT GUIDE

7th Annual
Industry Conference &
NSF/DOE Site Visit

Dec. 4-7, 2018
Knoxville, TN

a National Science Foundation &
Department of Energy
Engineering Research Center

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 36 members consisting of electric utilities, ISOs/RTOs, vendors, service groups, national labs and research consortia.

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partner institutions:

THE UNIVERSITY OF
TENNESSEE
KNOXVILLE

Northeastern

Rensselaer

TUSKEGEE

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

Sonja Glavaski

Program Director
ARPA-E

Dr. Sonja Glavaski is a Program Director at the Advanced Research Projects Agency-Energy (ARPA-E) overseeing diverse project portfolio developing innovative and disruptive technologies that would facilitate cost-effective building energy audits, more efficient power generation, electrification of transportation, and enable electricity grid to be more flexible and resilient.

Sonja Glavaski

Her technical focus area is data analytics, and distributed control of complex, cyber-physical systems with emphasis on operations and security of energy systems. Dr. Sonja Glavaski worked on establishment of several grid modernization and transportation focused ARPA-E programs. She spearheaded development and is currently helming the ARPA-E NODES Program that aims to develop transformational grid management and control methods to create a virtual energy storage system based on use of flexible loads and distributed energy resources (DERs).

Prior to joining ARPA-E, Dr. Glavaski served as a Control Systems Group Leader at United Technologies Research Center (UTRC), where she led a team of multi-disciplinary scientists working on developing game changing technologies for energy efficient building HVAC/R systems, wind turbines, fuel cells and flow batteries. It was at UTRC that she recognized the need to develop more systematic ways to integrate and operate all of these technologies with the electricity grid. Before being at UTRC, Dr. Glavaski led key programs at Eaton Innovation Center and Honeywell Labs. During her 20-plus-year career, Dr. Glavaski has contributed significantly to technical advancements in numerous product areas, including energy systems, vehicles and aircraft systems.

Dr. Glavaski received a Ph.D. and MS in Electrical Engineering from California Institute of Technology, and Dipl. Ing and a MS in Electrical Engineering from University of Belgrade.

Robert W. Cummings

*Senior Director of Engineering and Reliability Initiatives
NERC*

Mr. Cummings joined NERC in 1996 and has extensive experience in the industry in system planning, operations engineering, and wide area planning. He holds a Bachelor of Science Degree in Power System Engineering from Worcester Polytechnic Institute and is an IEEE Life Senior Member.

He is a member of the U.S. Department of Energy (DOE) Electricity Advisory Committee, and its Energy Storage and Smart Grid Subcommittees.

Robert W. Cummmings

Cummings is also a member of the Scientific Advisory Board (SAB) for CURENT (Center for Ultra-wide Area Resilient Electric Energy Transmission Networks), a National Science Foundation and Department of Energy Engineering Research Center headquartered at the University of Tennessee, Knoxville.

His geographically diverse experience includes Central Vermont Public Service Corporation in System Planning (generation and transmission), Public Service Company of New Mexico (Operations Engineering and Wide Area Planning), and the East Central Area Reliability Coordination Agreement (ECAR), a former regional office of NERC.

He was a principal investigator of the 2003 Northeast Blackout and the more recent September 8, 2011 Arizona-Southern California Outage, leading multiple event analysis teams in the sequence of events development, modeling and studies (powerflow and dynamics analysis), and transmission/generation performance areas. He directed the NERC Event Analysis program for five years, leading or working on 12 major disturbance analyses.

Mr. Cummings is the senior staff technical advisor for the NERC System Analysis and Modeling and the System Protection and Controls Subcommittees, and is the technical advisor to the North American Synchro-Phasor Initiative. He is also the technical director of the NERC System Protection Improvement Initiative, the Modeling Improvements Initiative, and the Frequency Response Initiative.

Ben Kroposki

Director of the Power Systems Engineering Center
NREL

Dr. Benjamin Kroposki is the Director of the Power Systems Engineering Center at the National Renewable Energy Laboratory (NREL) where he leads NREL's strategic research in the design, planning and operations of electrical power systems. He has over 25 years of experience in the design, testing, and integration of renewable and distributed power systems and has more than 130 publications in these areas. As an IEEE Fellow, Dr. Kroposki was recognized for his leadership in renewable and distributed energy systems integration.

Ben Kroposki

He has served on a number of IEEE technical standards working groups and chaired IEEE 1547.4, the first international standard on microgrids. Dr. Kroposki also was a co-founder of the International Institute for Energy Systems Integration which recently merged with the Energy Systems Integration Group (ESIG). ESIG is a leading source of global expertise for energy systems integration and operations whose purpose is to educate the global energy sector and the public about the ongoing transformation of energy systems and energy-related technologies, and to support progress that is economic, reliable, sustainable, thoughtful and collaborative.

Sandra McLeod

Sr. Manager in Advanced Security Initiatives Group
CISCO

Sandra is a senior manager in Cisco's Advanced Security Initiatives Group overseeing their Security Risk Assessment group which provides security evaluations, penetration testing, and architecture reviews for Cisco's products and cloud offerings. Over her 18 year career, she has developed expertise in security as a software engineer and security researcher, focusing on securing systems and software.

Sandra McLeod

John Grosh

Deputy Associate Director in the Computational Direcotorate
Lawrence Livermore National Laboratory

John Grosh is a Deputy Associate Director in the Computation Directorate at Lawrence Livermore National Laboratory (LLNL), where he oversees development of research in advanced computing and software technology. Under the DOE Grid Modernization Laboratory Consortium, he is the DOE lab lead for multi-lab research and development projects in electric grid planning and design tools and the North America Resilience Model Initiative. Over the past 12 years at LLNL, he has led the development of a wide range of research including electric grid and communications

John Grosh

modeling, software assurance, grid cyber security, computational algorithms, and programming tools. Mr. Grosh served as a Department Head managing more than 400 staff and the Director for the Center for Applied Scientific Computing leading research in computer science, computational mathematics, advanced multi-physics simulations, and data analytics. Before joining LLNL in 2006, Mr. Grosh spent 20 years in the DoD leading research in high performance computing, modeling and simulation, embedded software technology, cyber security, and munitions design. In 2003 - 2004, he co-chaired a multi-agency task force for the White House Office of Science and Technology Policy that developed the Federal plan for R&D and deployments in high-end computing.

George Stefopoulos

Director
Advanced Grid Innovation Lab for Energy (AGILe)

George Stefopoulos is the Director of the Advanced Grid Innovation Lab for Energy (AGILe) at NYPA. He joined NYPA as an R&D Engineer and worked with the Research and Technology Development Group from 2009 to 2015 and also served as NYPA's Smart Grid Solution Architect from 2015 to 2018. He holds a diploma in Electrical and Computer Engineering from the National Technical University of Athens, Greece, and MS and Ph.D. degrees from the Georgia Institute of Technology. He also holds an MBA degree in Executive Management from Pace University of New York. He is a Senior Member of IEEE and a member of the Institute of Engineering and Technology (IET).

George Stefopoulos

Industry Conference - Tuesday, Dec. 4th

Downtown Hilton

7:00-8:00am Registration & Breakfast

Salons A, B & C

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

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

8:15-8:45   *Building Efficient, Sustainable & Resilient Grid by Controlling the Edge*
Sonja Glavaski, Program Director,
ARPA-E

8:45-9:15   *From Here to There – Reliability in the Grid of the Future*
Robert W. Cummings, Sr. Director of Engineering and Reliability Initiatives,
NERC

9:15-9:45   *Integrating Ultra-high Levels of Variable Renewable Energy into Electric Power Grids*
Ben Kroposki, Director of the Power Systems Engineering Center
NREL

9:45-10:00   Break

10:00-10:30 *Securing Connected Critical Infrastructure*
Sandra McLeod, Sr. Manager in Advanced Security Initiatives Group
CISCO

10:30-11:00 *New Directions in Modeling Infrastructure Resilience*
John Grosh, Deputy Associate Director in the Computational Directorate,
Lawrence Livermore National Laboratory (LLNL)

11:00-11:30 *AGILe: A collaborative program of the New York Power Authority*
George Stefopoulos, Director,
Advanced Grid Innovation Lab for Energy (AGILe)

Salons D & E

11:30-1:00   **Lunch**

Tuesday, Dec. 4th (cont.)

1:00-3:40 **Technical Paper Presentations (Parallel Sessions)**

Salons A & B

**Power System Modeling
(1:00-1:50)**
*Session Chair:
Jesmin Khan, TU*

1:00-1:10
*Analytical method to aggregate
multi-machine SFR model with
applications in power system
dynamic studies*
Qingxin Shi, UTK

1:10-1:20
*Fast security assessment based
on deep convolutional neural
network*
Yan Du, UTK

1:20-1:30
*Power system simulation using
a differential transformation
method*
Yang Liu, UTK

1:30-1:40
*Market dispatch with high
renewable penetration on New
York academic model*
Stephen Burchett, RPI

1:40-1:50
*Modeling and simulation of
hybrid single-phase/three-phase
power systems*
**Marcelo de Castro Fernandes,
RPI**

Salon C

**Power Electronics
(1:00-2:00)**
*Session Chair:
Kevin Bai, UTK*

1:00-1:10
*Optimal dead-time setting
and loss analysis for GaN-
based voltage source converter*
Paige Williford, UTK

1:10-1:20
*Zero sequence circulating
current analysis and reduction
in paralleled three-level active
neutral point clamped inverters*
Ruirui Chen, UTK

1:20-1:30
*Inductor design and ZVS control
for a GaN-based high efficiency
CRM totem-pole PFC converter*
Jingjing Sun, UTK

1:30-1:40
*A high-efficiency SiC three-phase
four-wire inverter with virtual
resistor control strategy running
at V2H mode*
Yang Huang, UTK

1:40-1:50
*Noise mitigation and delay
compensation in high frequency
dual current programmed mode
control*
Kamal Sabi, TU

1:50-2:00
*Modeling dual active bridge
converter considering the effect
of magnetizing inductance for
electric vehicle application*
Saeed Anwar, UTK

2:00-2:30   Break

AGENDA

Tuesday, Dec. 4th (cont.)

Salons A & B

Power System Modeling and Estimation (2:30-3:40)
Session Chair:
Meng Wang, RPI

2:30-2:40
Sensor placement optimization tool (SPOT): enhancing distribution system monitoring and resiliency
Jiaojiao Dong, UTK

2:40-2:50
False data injection attack through PMU
Jiangnan Li, UTK

2:50-3:00
Fault location using sparse L1 estimator and phasor measurement units
Arthur Mouco, NEU

3:00-3:10
Avoiding divergence in multi-area state estimation
Pengxiang Ren, NEU

3:10-3:20
Equation-free system level modeling, analytics and model reduction
Gang Wang, Tufts

3:20-3:30
Speeding up the dissipating energy flow based oscillation source detection
Stavros Konstatinopoulos, RPI

3:30-3:40
Identifying overlapping successive events using a shallow convolutional neural network
Wenting Li, RPI

Salon C

Power System Control and HVDC (2:30-3:40)
Session Chair:
Kai Sun, UTK

2:30-2:40
Analysis of MTDC inertia emulation impact on connected AC systems
Shuyao Wang, UTK

2:40-2:50
Stability of wide area power system control with intermittent information transmission
Fatima Taousser, UTK

2:50-3:00
Estimation of closest unstable equilibrium points via nonlinear modal decoupling
Xin Xu, UTK

3:00-3:10
Chance-constrained optimal location of damping control actuators under wind power variability
Horacio Silva, UTK

3:10-3:20
Adaptive wide-area damping control using transfer function model derived from ring-down measurements
Lin Zhu, UTK

3:20-3:30
Control and load balancing with the IRIS IPWR in a high renewables penetration grid
Richard Bisson, UTK

3:30-3:40
Converter-grid resonance analysis considering DC bus dynamics and coupling over frequency
Igancio Vieto, RPI

3:40-4:00   Break

8

Smoky

4:00-5:00   **Industry & Student Mixer**

Hiwassee

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

~ Industry Conference Adjourned ~

Top: Dr. Allen Hefner presenting on Industry Day, 2017
Bottom: The CURENT Registration Team from last year's site visit (2017)

AGENDA

Day One NSF/DOE Site Visit - Wednesday, Dec. 5th

Downtown Hilton

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

Salons A, B & C

8:00-8:20   **Welcome Remarks -** *Kevin Tomsovic, Center Director;* **Wayne Davis***, Interim Chancellor;* **Denis Osipov***, Student Chair;* **Deans' Introduction***;* **Site Visit Team (SVT) Introduction**

8:20-9:00   **CURENT Overview**
Kevin Tomsovic, Center Director

9:00-11:45   **Research Thrust Overviews**

9:00-9:25   Monitoring Thrust Overview
Yilu Liu*, Deputy Director & Thrust Leader*

9:25-9:50   Modeling Thrust Overview
Ali Abur*, NEU Campus Director & Thrust Leader*

9:50-10:05   Break

10:05-10:30   Control Thrust Overview
Joe Chow*, RPI Campus Director & Thrust Leader*

10:30-10:55   Actuation Thrust Overview
Fred Wang*, Technical Director & Thrust Leader*

10:55-11:45   CURENT Engineered Systems Overview
Leon Tolbert*, Thrust Leader*

11:45-12:30   **Concurrent Sessions**

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

Salons D & E

12:30-1:30   **Lunch**

Salons A, B & C

1:30-2:00   I**nnovation and Industry Collaboration Program Overview,** *Tom King, Innovation & Industry Director*

2:00-3:00   **SVT Private Session with Industry**

Move to Min H. Kao

3:15-6:00   **Lab Tour & Poster Session**

~ Day One NSF/DOE Site Visit Adjourned ~

AGENDA

Day Two NSF/DOE Site Visit - Thursday, Dec. 6th

Downtown Hilton

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

Salons D & E	Sequoyah 3
SVT and University Officials' Breakfast	**Faculty Breakfast**

Salons D & E

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

Salons A, B & C

9:00-9:45   **Culture of Inclusion and Diversity**, *Daniel Costinett*, *Co-Director of Education & Diversity*

9:45-10:15   **Culture of Inclusion and Diversity,** *Private Session (SVT and CURENT Leadership)*

10:15-10:30   **Break**

10:30-11:15   **Assessment & Infrastructure**, *Kevin Tomsovic*, *Center Director*

11:15-12:00   **University Education**, *Chien-fei Chen*, *Director of Education & Diversity*

12:00-1:15   **Concurrent Events**

Smoky	Salons D & E
SVT and SAB Private Lunch	**General Group Lunch**

1:15-1:45   **Concurrent Sessions**

Sequoyah 1	Salons A, B & C
SVT Private Session	**Student / Faculty Session**

Salons A, B & C

1:45-2:15   **Pre-College Education**, *Anne Skutnik*, *Education Coordinator*

2:15-3:00   **SVT/Student Private Session**

3:00-3:15   **Break**

Sequoyah 1

3:15-4:15   **SVT Executive Session**

4:15-4:45   **SVT Question Presentation**

~ Day Two NSF/DOE Site Visit Adjourned ~

AGENDA

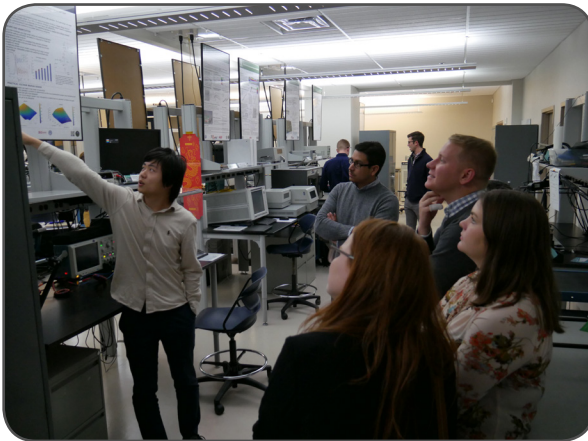**Day Three NSF/DOE Site Visit** - Friday, Dec. 7th

Downtown Hilton

Sequoyah 3

7:30-8:00	**SVT and Faculty Breakfast**
8:00-9:00	**Question Response Session**

Sequoyah 1

9:00-5:00	**SVT Report Writing**
5:00	**SVT Departs**

~ NSF/DOE Site Visit Adjourned ~

Top: Poster session, 2017 Site Visit
Bottom: Testbed demonstration during Lab Tour, 2017 Site Visit

Welcome

The 2018 Lab Tour and Poster Session will be held in the laboratories on the 1st and 4th floors of the Min 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.

Sample QR Code

QR Code Readers can be downloaded for free from most App Stores. Popular QR Code readers include "QR Droid" for Android Devices and "QR Reader for iPhone" for Apple Devices.

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

Features

Posters can be viewed electronically by scanning the QR Code on the individual posters or by going to the CURENT website (below). Posters are grouped by content on the website.

The posters in the lab tour are grouped by content. The posters within each room should belong to one to two content themes. Occasionally a poster will not be grouped with similar content due to room space or the author working in multiple content areas. The content areas have been given the following abbreviations:

CT	Power System Control
CV	Power Converter Design and Control
DV	Power Electronics Devices and Components
ED	Education
ET	Power System Estimation
HV	HVDC and FACTS
LT	Large Scale Testbed
ME	Power System Modeling
MT	Power System Monitoring
TB	Hardware Testbed

http://curent.utk.edu/research/conferences/2018-site-visit/

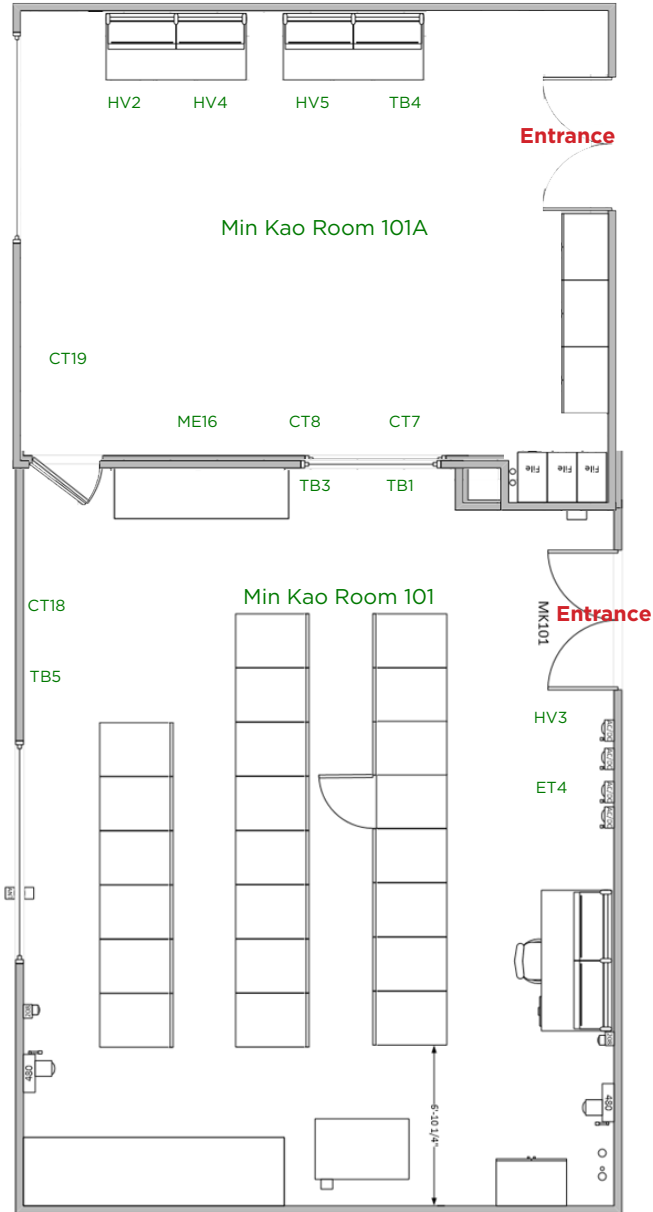# LAB TOUR AND POSTER SESSION

Min Kao Room 101 & 101 A
(Hardware Testbed Control & Build Lab)
Hardware Testbed (TB), Power System Control (CT), Power System Modeling (ME), HVDC and FACTS (HV) & Power Systems Estimation (ET)

TB1   Dingrui Li - Microgrid test with hardware testbed platform

TB3   Nattapat Praisuwanna - Adaptive protection scheme for microgrids

CT18   Yi Zhao - Adaptive wide-area damping controller design for large power system using a measurement-driven model

HV3   Kaiqi Sun - Frequency response reserves sharing across asynchronous grids through MTDC system

ET4   Ibukunoluwa Korede - UTK HTB WECC system state estimation using optimization methods

TB5   Jiangnan Li - Synchronized bad data injection attack on phasor network on HTB

CT7   Yiwei Ma - Real-time control and operation for a flexible microgrid with dynamic boundary

CT8   Yiwei Ma - A smart and flexible microgrid with a low-cost scalable open-source controller

HV2   Le Kong - Review of stabilization methods for DC systems with constant power loads

HV4   Shuyao Wang - Analysis of MTDC inertia emulation impact on connected AC systems

HV5   Shuoting Zhang- Development of a flexible modular multi-level converter test-bed

TB4   Shuoting Zhang - Integrated series compensation devices implementation in a power converter based transmission line emulator

CT19   Lin Zhu - A protection scheme for microgrids with dynamic boundary

ME16   Yu Su - Short term PV forecasting using autoregressive moving average model and cloud cover indices

Min Kao Room 101A
and Min Kao 101

Min Kao Room 101A

HV2   HV4   HV5   TB4

Entrance

CT19

ME16   CT8   CT7

TB3   TB1

File   File   File

CT18

Min Kao Room 101

MK101   **Entrance**

TB5

HV3

ET4

480

480

6'-10 1/4"

15

LAB TOUR AND POSTER SESSION
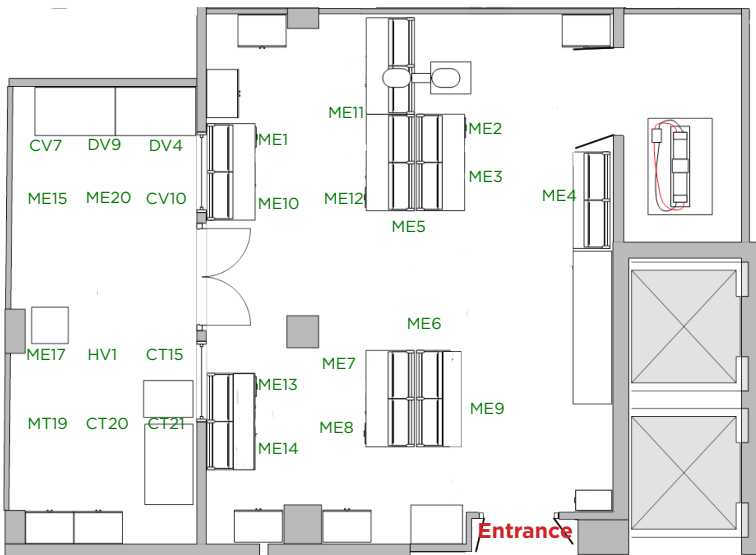
Min Kao Room 117
(High Power Electronics Lab)

Power Converter Design and Control (CV),

Power Electronics Devices and Components (DV), Power System Modeling (ME), HVDC & FACTS (HV), Large Scale Testbed (LT),

Power Systems Monitoring (MT)

& Power System Control (CT)

CV7   Shiqi Ji - Medium voltage power conditioning system (PCS) for asynchronous microgrid using 10 kV SiC MOSFET

CV10   James Palmer - Testing and validation of a 10kV SiC based 35kVA MMC phase leg

DV4   Xingxuan Huang - Design and testing of modular multilevel converter submodule based on 10 kV SiC MOSFETs

DV9   Li Zhang – Gate driver power supply for 10 kV SiC MOSFET in MV MMC with DC-link voltage of 25kV

ME1   Okan Ciftci - Using continuously variable series reactors(CVSR) to control power on overloaded transformer

ME10   Cody Rooks- Robust microgrid economic dispatch considering renewable uncertainty using interval optimization

ME7   Yang Liu - Redundancy analysis and reduction in power system transient stability assessment: a sparse grid scheme

ME8   Yang Liu - Power system simulation using a differential transformation method

ME3   Melanie Gonzalez- Dynamic load modeling for eastern interconnection

ME2   Yan Du – Applying deep convolutional neural network for fast static security assessment

ME4   Ibrahim Altarjami - Impact of the governor deadband on the oscillations

ME5   Zhihao Jiang – Measurement-based power system dynamic model reductions

ME6   Xiao Kou - Transmission constrained economic dispatch via interval optimization considering wind uncertainty

ME9   Denis Osipov - Adaptive model reduction for parareal in time method for transient stability simulations

ME11   Qingxin Shi – Analytical method to aggregate multi-machine SFR model with applications in power system dynamic

ME12   Qingxin Shi – Analytical approach to estimating the probability of transient stability under stochastic disturbances

ME13   Lakshmi Sundaresh - Modelling of momentary cessation

ME14   Ignacio Vieto – Converter-grid resonance analysis considering DC bus dynamics and coupling over frequency

ME15   Dongsheng Yuan - A comparison among different modelling methods for multipulse rectifier system

ME17   Daniel Douglas - An on-line Thévenin equivalent estimation method and its application to the condition monitoring

ME20   Stephen Burchett - Market dispatch with high renewable penetration on New York academic model

HV1   Wei Feng - Graph computation based power flow for large-scale AC/DC system

MT19   Shutang You - Electromechanical wave propagation and the impact of high PV penetration on Its speed in the U.S. eastern interconnection

CT10   Huangqing Xiao - A measurement-driven wide-area damping controller: demonstration on RTDS

CT20   Shutang You - Comparative assessment of tactics to improve primary frequency response without curtailing solar output in high photovoltaic interconnection grids

CT21   Shutang You - Photovoltaic (PV) virtual inertia control in high PV power grids – software simulation and hardware test

Min Kao Room 117

Min Kao Room 125
(Power Electronics Lab)
Power Converter Design and Control (CV),
Power Electronics Devices and Components
(DV) & Hardware Testbed (TB)

CV9 **Ling Jiang** - A single-stage 6.78 MHz transmitter with the improved light load efficiency for wireless power transfer applications

CV1 **Saeed Anwar** - Modeling dual active bridge converter considering the effect of magnetizing inductance for electric vehicle application

CV16 **Zhe Yang** - GaN-based PV inverter design

DV7 **Paige Williford** - Optimal dead-time setting and loss analysis for GaN-based voltage source converter

DV8 **Paige Williford** - Characterization and utilization of 600 V/30 A GaN GITs for maximum device performance

CV4 **Jacob Dyer** - Dead-time compensation for SiC based VSI using online switching time monitoring

DV1 **Quillen Blalock** - Electroplating 3D printed inductors

DV3 **Spencer Cochran** - GaN-based synchronous rectifier with reduced THD for 6.78 MHz WPT applications

CV2 **Jared Baxter** - Applied optimization in power converter design

CV14 **Nathan Strain** - Design of a GaN-based high efficiency LLC resonant converter for data center power supply

CV15 **Jingjing Sun** - Design of a GaN-based High efficiency CRM totem-pole PFC converter for data center power supply

CV21 **Jie Li** - 6.78 MHz Wireless Power Transfer Systems Design

DV13 **Liang Qiao** - Online junction temperature monitoring ssing turn-on delay time for SiC MOSFETs

DV10 **Zhou Dong** - Review of common mode choke leakage inductance modeling

DV12 **Haiguo Li** - SiC impact on grid power electronics

TB2 **Haiguo Li** - Grid support function verification of type-III wind turbine

CV3 **Ruirui Chen** – Zero sequence circulating current analysis and reduction in paralleled three-level active neutral point clamped inverters

DV2 **Ruirui Chen** – Core characterization and inductor design investigation at low temperature
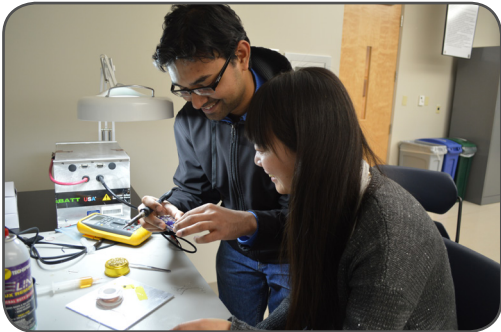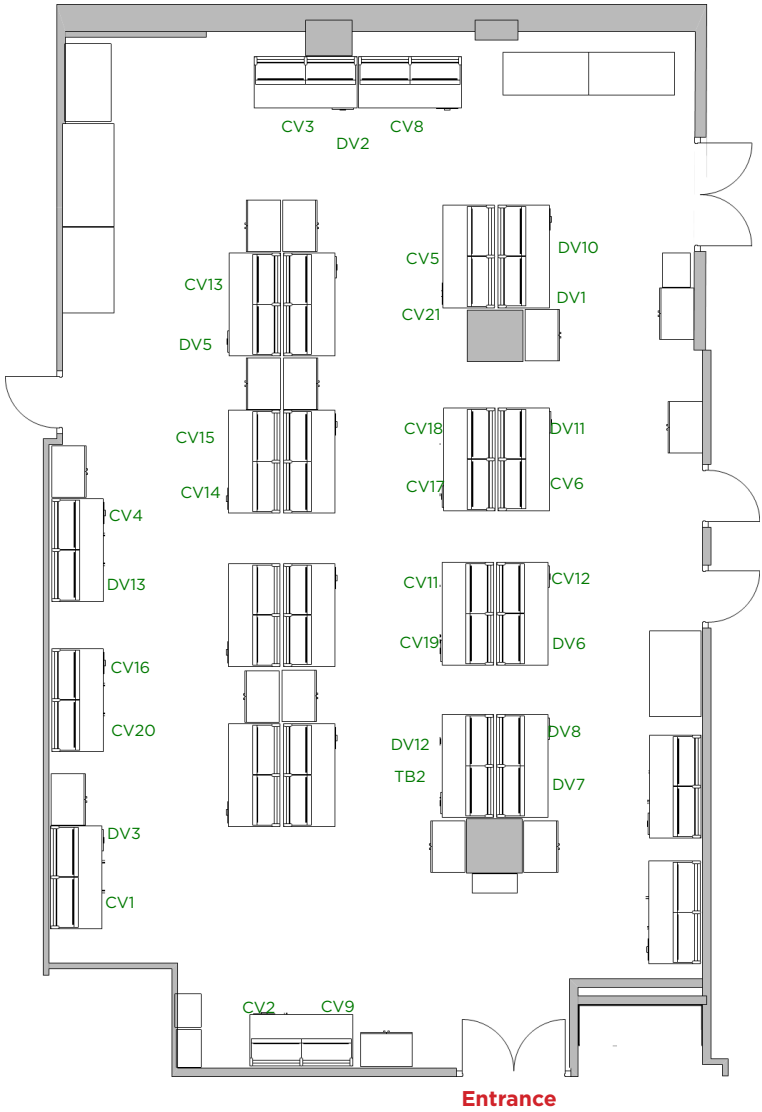
CV5   Handong Gui– A simple control to reduce the voltage stress of non-conducting switches in three-level ANPC converter

CV8   Jiahao Niu – Impact of SVM on circulating harmonics in paralleled three level ANPC inverters

CV13   Ren Ren – Multi-commutation loop induced over-voltage in high frequency and switching speed three-level active neutral point clamped phase leg

DV5   Ren Ren – Characterization of 650 V enhancement GaN HEMT under cryogenic temperature

CV18   Peter Pham – Wireless power receiver for battery-powered devices

CV17   Andrew Foote – Optimal sizing of a dynamic wireless power transfer system for highway applications

CV11   Ruiyang Qin – Multi-layer self-resonant coil for wireless EV application

CV19   Gang Wang – Equation-free system-level modeling and bifurcation detection of series resonant DC/DC converters

CV20   Kamal Sabi – Delay compensation in high frequency dual current programmed mode control GaN based ZVS inverter

CV12   Ishita Ray – Power sharing in inverter-only microgrids

DV6   Wen Zhang - Characterization and modeling of a SiC MOS-FET's turn-on overvoltage

CV6   Yang Huang – A high-efficiency SiC three-phase four-wire inverter with virtual resistor control strategy running at V2H mode

DV11   Liyan Zhu – Switching transients in gate drive loops of hybrid GaN HEMTs and SiC MOSFET

Please note:
-The above poster numbers correspond with the lab maps at the end of this section.

-Posters can be viewed on your USB Drive.

-Posters can be viewed by scanning the QRC code on the poster

-Posters can be viewed on the site visit webpage http://curent.utk.edu/research/conferences/2018-site-visit/

Min Kao Room 125

CV3   CV8
DV2

CV13
DV5

CV5   DV10
CV21   DV1

CV15
CV14

CV18   DV11
CV17   CV6

CV4
DV13

CV11   CV12
CV19   DV6

CV16
CV20

DV12   DV8
TB2   DV7

DV3

CV1

CV2   CV9

Entrance

Left: Students working on research in the Power Electronics Lab
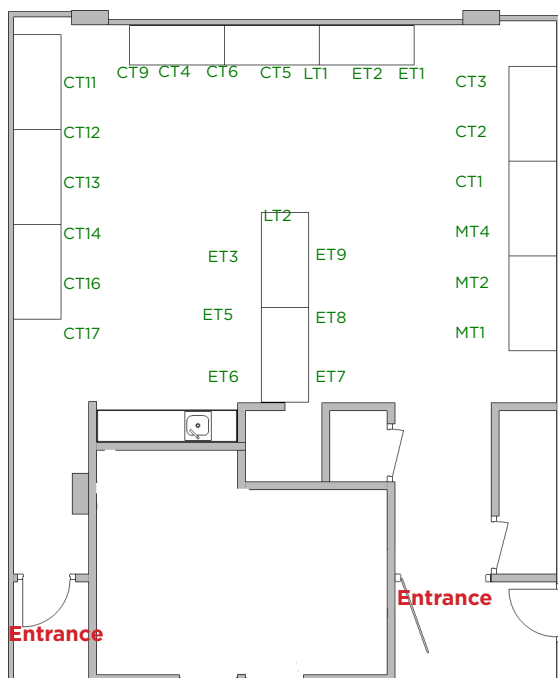
LAB TOUR AND POSTER SESSION

Min Kao Room 121
(Multipurpose Conference Room)
Power System Control (CT),
Power Systems Estimation (ET) &
Power Systems Monitoring (MT)

MT1 Stavros Konstantinopoulos - Low-rank matrix completion algorithm for synchrophasor missing data recovery

MT2 Stavros Konstantinopoulos - Speeding up the dissipating energy flow based oscillation source detection

MT4 Wenting Li - Identifying events through extracting features from high-dimensional power system data

CT1 Richard Bisson - Control and load balancing with the IRIS IPWR in a high renewables penetration grid

CT2 Dongbin Lu - Coordinated damping control based on state-space model using wide-area measurement

CT3 Stephen Fatokun - High penetration of distributed energy resources, taking advantage of difference in regional load pattern

CT4 Wenjie Han- Active disturbance rejection control in fully distributed automatic generation control with co-simulation of communication delay

CT9 Ahmet Öner - Improving resiliency of power grids during extreme events

CT5 Christoph Lackner - Effects of wind generation integration on power system transient stability

CT6 Christoph Lackner - Estimation of generator control system performance using synchrophasor data

CT11 Fatima Taousser - Stability of wide area power system control with intermittent information transmission

CT12 Fatima Taousser - Secondary voltage control via demand-side energy storage with temporal logic specifications

CT13 Tianwei Xia – Identification of dangerous power system oscillation

CT14 Tianwei Xia - Piecewise linearization based power system simulation

CT15 Huangqing Xiao- A measurement-driven wide-area damping controller: demonstration on RTDS

CT16 Xin Xu - A holomorphic embedding method to solve unstable equilibrium points of power systems

CT17 Xin Xu - Estimation of closest unstable equilibrium points via nonlinear modal decoupling

LAB TOUR AND POSTER SESSION

ET1 **Bilgehan Donmez** - Phasor-only robust state estimation with built-in topology error detection

ET2 **Lucas Lugnani** - ARMAX-based method for inertial constant estimation using synchrophasors

ET3 **David Kelle** - A spectral partitioning approach for multi-area state estimation

ET5 **Andre Langner** – State estimation of unbalanced power grids

ET6 **Arthur Mouco** – Fault location using sparse L1 estimator and phasor measurement units

ET7 **Pengxiang Ren** - Avoiding divergence in multi-area state estimation

ET8 **Vanja Svenda** - Flexible hybrid dynamic state estimator for power systems with communication irregularities

ET9 **Qiwei Zhang** - Demonstration of extended locational marginal price under wind penetration

LT1 **Christoph Lackner** - Large Scale Test Bed Implementation of Wide Area Automated Generation Control Scheme

**LT2** **Jin Young Lee** - Synchronized Bad Data Injection Using PMUs

Min Kao Room 121

Min Kao 1st Floor
(Atrium)
Education (ED)

ED1 **Manny Bhidya** – Mining Twitter Data of Power Outages Caused by Disasters: An Interdisciplinary Approach

ED2 **Ian Steenstra** - CURENT summer camp & REACH

ED3 **Renay Harris and Rachel Lanier** - Intelligent Analytics and Forecasting of Solar Power System Data

ED4 **Gustaf Njei** - Power Systems Analysis

ED5 **Shuying Zhen** - A Smart and Flexible Microgrid with a low-Cost Scalable Open-Source Controller: Designing Controller Functions for Multiple Batteries

1st Floor Atrium/Lobby

ED3

ED5

ED2

ED4

ED1

Entrance
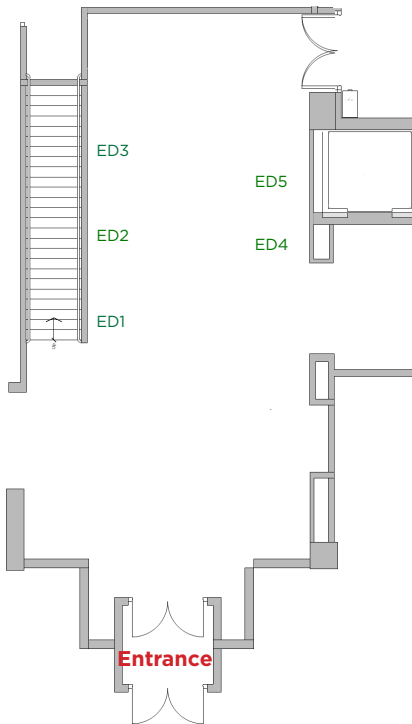
LAB TOUR AND POSTER SESSION

Min Kao Room 402
(Multipurpose Conference Room)
Power Systems Monitoring (MT)

MT16 Summer Fabus - Development and simulation of Puerto Rico transmission system study models

MT20 Apsana Bhandari - Real-time signal-to-noise ratio estimation by universal grid analyzer

MT3 Fuhua Li – Point-of-wave measurement for frequency computation during events

MT5 Abigail Till - Implementing event detection tools for the Southern Company system based on PMUs

MT6 Abigail Till - Baselining of Southern area power angle distribution using state estimation data

MT7 Weikang Wang – FNET Vision: a WAMS big data knowledge discovery system

MT8 Wenxuan Yao – An fast load control system based on mobile distribution-level phasor measurement unit

MT9 Yao Zhang – Measurement-driven disturbance magnitude estimations for bulk power systems using distribution-level synchrophasor from FNET

MT10 Yi Cui – Spatial characteristics-based measurement source identification for power system cyber security

MT11 Wenpeng Yu – FNET/GridEye monitoring system

MT12 Chujie Zeng – FNET/GridEye cloud infrastructure architecture

MT13 Xianda Deng – Line trip detection on a power grid with high PMU density deployment: opportunities and challenges

MT14 Jiaojiao Dong– Sensor placement optimization tool (SPOT): enhancing distribution system monitoring and resiliency

MT15 Jiaojiao Dong- Increasing distribution system resiliency using flexible DER and microgrid assets enabled by OpenFMB

MT17 He Yin - Advanced universal grid analyzer development and implementation

MT18 Mariana Kamel – Measurement-based voltage stability indicator for voltage dependent and induction motor loads

Min Kao Room 402
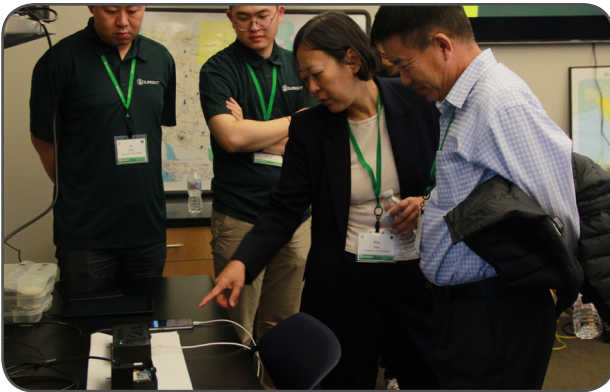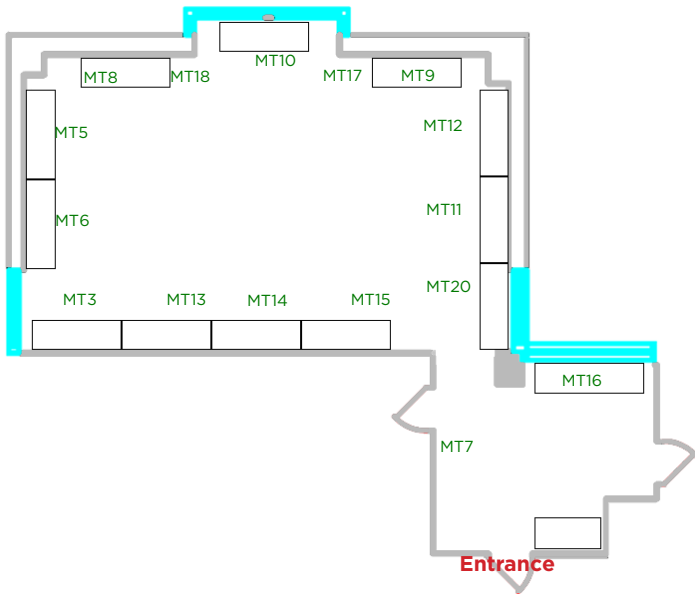
Top & Bottom: Lab Tour (MHK 402), 2017 Site Visit

Denis 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.

Denis Osipov
Student Chair

Coordinating Committees:
- Overall Student Organization for site visit

Paige Williford
Vice Chair

Coordinating Committees:
- Lab Tour
- Equipment
- Driver

Abigail Till
Vice Chair

Coordinating Committees:
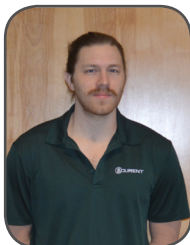- Publication
- Poster
- Notebook Printing

Stephen Fatokun
Vice Chair

Coordinating Committees:
- Photography
- Student Dinners

Cody Rooks
Vice Chair

Coordinating Committees:
- Registration
- Welcome

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

Chair: **Denis Osipov**

Vice Chair: **Abigail Till**
- Publication committee leader: **Qingxin Shi**
- Poster Printing committee leader: **Yu Su**
- Notebook Printing committee leader: **Haiguo Li**

Vice Chair: **Paige Williford**
- Lab Tour committee leader: **Handong Gui**
- Equipment committee leader: **Natt Praisuwanna**
- Driver committee leader: **Taylor Short**

Vice Chair: **Stephen Fatokun**
- Photography committee leader: **Zhe Yang**
- Student Dinners committee leader: **Xin Xu**

Vice Chair: **Cody Rooks**
- Registration committee leader: **Jingjing Sun**
- Welcome committee leader: **Paxton Wills**
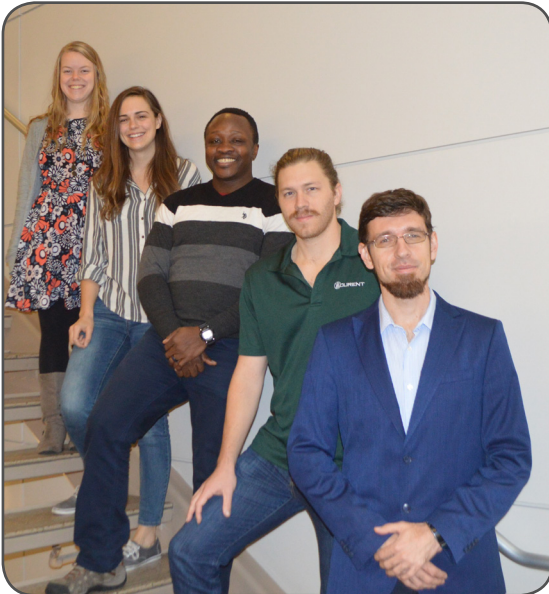
*L to R: Abby Till, Paige Williford, Stephen Fatokun,
Cody Rooks and Denis Osipov*

The 7th 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

INTERNET INFORMATION
Hilton
- network: HILTONCONFERENCE
- user name: HILTONCONFERENCE
- No password needed
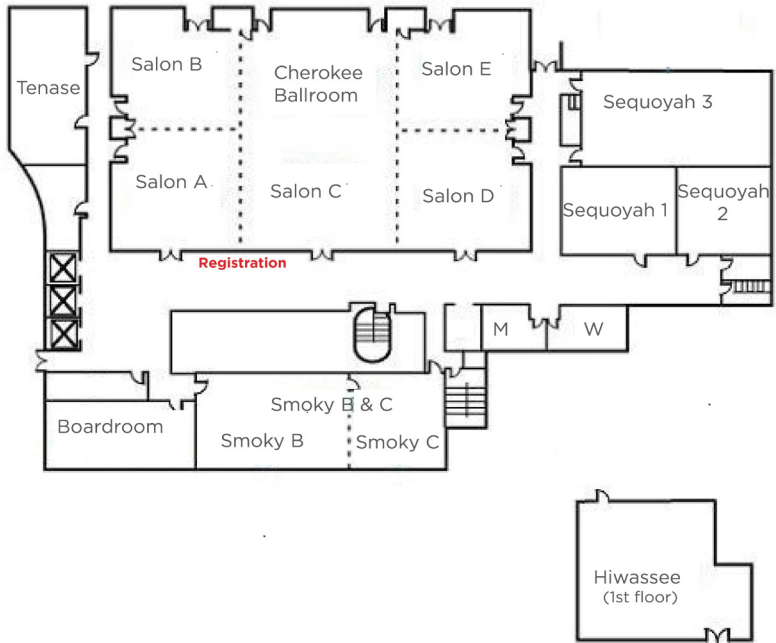
Min H. Kao Building
- network: **ut-visitor** (no password is needed, your browser will prompt you to enter your email address to register. If not, visit **guest.utk.edu** to log in.)

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

Hilton Conference Center - Main Floor

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 industry conference and site visit plans

CURENT thanks all our industry partners for their support.

ABB

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30

KEYSIGHT TECHNOLOGIES

KUB

Lawrence Livermore National Laboratory

NREL

BRIXON.io

NRECA

OAK RIDGE National Laboratory

ISO

OPAL-RT TECHNOLOGIES

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Southern Company

PEAKRELIABILITY assuring the wide area view

VR ENERGY

ACKNOWLEDGEMENT

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Thank you for
attending the
7th Annual
Industry Conference
and NSF/DOE
Site Visit.

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