



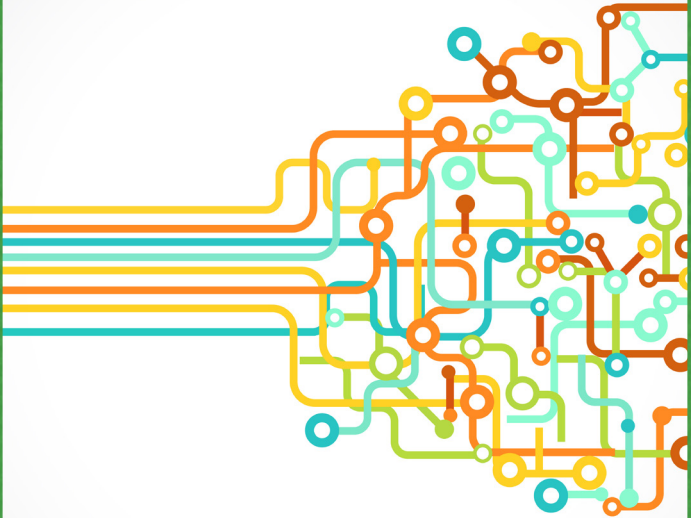
# CURENT

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

.....

## 2016 Industry Conference & **NSF/DOE Site Visit**

November 15-17, 2016  
Knoxville, TN



# EVENT GUIDE

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a National Science Foundation  
& Department of Energy  
Engineering Research Center






# curent's **VISION**

 **CURRENT** 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 32 members consisting of electric utilities, ISOs/RTOs, vendors, service groups, national labs and research consortia.

# general

The 2016 Industry Conference & NSF/DOE Site Visit is held at the **Crowne Plaza** (104 W. Summit Drive, 37902) in downtown Knoxville and at the **Min H. Kao Building** (1520 Middle Drive, 37996) on Nov. 15-16. Please note that a bus shuttle will be provided between the Crowne Plaza and the Min H. Kao building.



## LOCATIONS

Invited Presentations, Technical Paper Sessions and Research Thrust Overviews will all be held at the **Crowne Plaza** in the **Grand Summit Ballroom, Summit I and Summit II Rooms**. Lab Tours will be at the **Min H. Kao Building** on the **University of Tennessee** campus. Breakfast and lunch will be held at the **Crowne Plaza** in **Salons B and C**. The Industry & Faculty Working Dinner will be at the **Crowne Plaza** in a private dining room.



## TRANSPORTATION

Bus transportation will be provided to take people to and from the Crowne Plaza and Min H. Kao on Wed. afternoon. The bus will leave from the front entrance of the Crowne Plaza at 2:30pm. A bus will leave Min H. Kao at 4:00pm to return to the Crowne Plaza.

Our recommended taxi services:

- Paradise Taxi - 865.577.6330
- Tennessee Taxi Service - 865.984.8555



## PARKING

Hotel garage parking will be paid for by CURENT. Take your parking ticket to the registration desk to get a parking token. Parking at UTK is not recommended, although campus parking is available at Vol Hall Parking Garage at 1545 White Avenue, 37919.



## INTERNET INFORMATION

### Crowne Plaza

- network: **Crowne Plaza Knoxville Meetings**
- user name: **guest**
- password: **cp1111**

### Min H. Kao Building

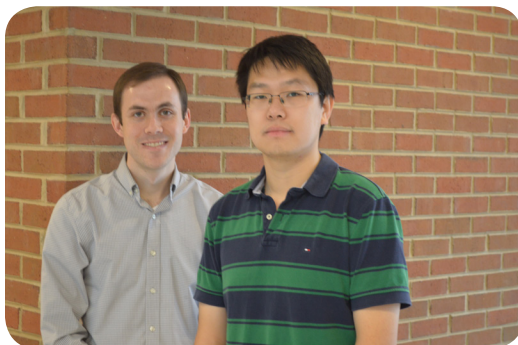
- network: **ut-visitor** (no password is needed, your browser will prompt you to enter your email address to register. If not, visit **guest.utk.edu** to log in.)

# information



## ORGANIZING COMMITTEES

### STUDENT LEADERSHIP



**Micah J. Till**

Student Chair

**Yichen Zhang**

Co-Chair

### STUDENT EVENT TEAM LEADERS

**Driving Team:** Edward Jones

**Lab Tour Team:** Jacob Dyer

**Equipment Team:** Geoffrey Laughon

**Publication Team:** M. Ehsan Raoufat

**Poster Printing Team:** Nan Duan

**Notebook Printing Team:** Qingxin Shi

**Registration Team:** Wenjun Ju

**Welcome Team:** Lakshmi Sundaresh

**Student Dinner Team:** Denis Osipov

**Photography Team:** Xiangyu Niu

### STAFF SUPPORT TEAM

**Director of Innovation & Industry:** Tom King

**Industry Outreach Director:** Lisa Beard

**Industry Technovator:** William Giewont

**Industry Liaison Officer:** Brad Trento

**Event Coordinator:** Wendy Smith

Additional thanks to all the faculty and students for their efforts organizing this event, as well as staff members **Chris Anderson, Judy Evans, Pam Arrowood, Bob Martin** and **Erin Wills.**

## Event Contacts

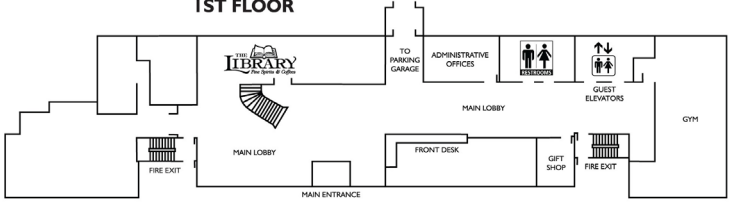
Should any issues arise, please contact:

Wendy Smith: 865.805.0792

Brad Trento: 865.803.4179

# Hotel Map

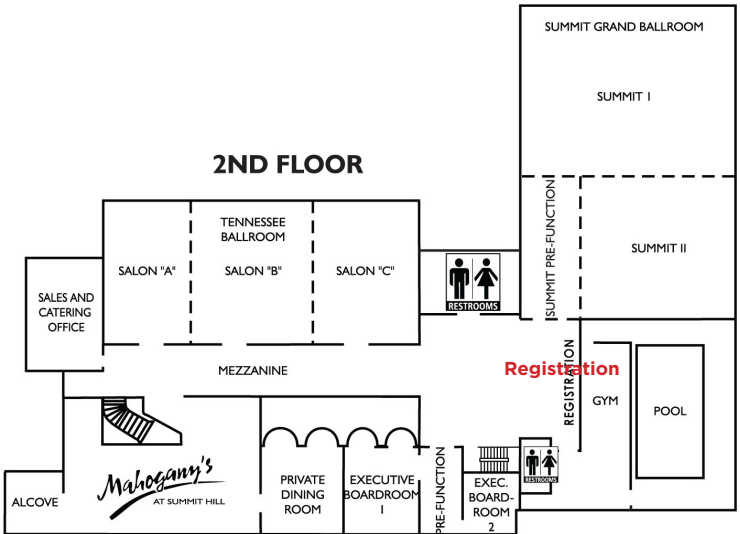
## 1ST FLOOR



**Entrance**

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

## 2ND FLOOR



## Event Info

Registration will be in the Summit Lobby outside the ballroom on the 2nd floor. The conference rooms are accessed through the doors in the mezzanine.

# Agenda

**Industry Conference - Tuesday, Nov. 15<sup>th</sup>**

 Crowne Plaza

7:30-8:30am **Registration & Breakfast**

## Grand Summit Ballroom

8:30-8:45 **Opening & Welcome**

8:45-11:45 **Invited Speakers**

8:45-9:15 **Introduction to GEIRI NA and HVDC Technology Development in China**

*Zhwei Wang, President,  
GEIRI North America*

9:15-9:45 **System Planning Activities Focused on Dynamic Issues at ERCOT**

*Jose Conto, Principal, Dynamic Studies  
System Planning, ERCOT*

9:45-10:15 **Break**

10:15-10:45 **WECC-BPA Project Using PMU Data to Damp Inter-area Oscillations**

*David Schoenwald, Principal Member  
of Technical Staff,  
Sandia National Laboratories*

10:45-11:15 **Overview of T&D Research at Southern Company**

*Clifton Black, Senior Research Engineer,  
Southern Company*

11:15-11:45 **BPA Operation Challenges Now and Projected Involving HVDC and Growing Renewables**

*Jeff Hildreth, Principal Engineer,  
Bonneville Power Administration*

## Salons B & C

11:45-1:00pm **Lunch**

## Event Info

The afternoon sessions will be held concurrently in the Summit I and Summit II Ballrooms.

# Industry Conference - Tuesday, Nov. 15<sup>th</sup>

 Crowne Plaza

1:00-4:00 Parallel Sessions-Student Presentations

## Summit I

### Power System Monitoring, Modeling & Estimation

*Session Chair:*  
*Hector Pulgar, UTK*

**1:00-1:20**

Battery Energy Storage Emulation in a Converter-based Power System Emulator, *Jessica Boles, UTK*

**1:20-1:40**

Semi-nonlinear Model Reduction and Its Application for Power Systems, *Denis Osipov, UTK*

**1:40-2:00**

Dynamic State Estimation of a Synchronous Generator with Unknown Parameters, *Alireza Rouhani, NEU*

**2:00-2:20**

Improving Network Parameter Error Detection via Multiple Measurement Scans, *Yuzhang Lin, NEU*

2:20-2:40

## Medallion Room

### Power System Control and Economics

*Session Chair:*  
*Greg Murphy, TU*

**2:40-3:00**

A Decoupling Based Direct Distributed Voltage and Reactive Power Control of a Power Grid Using Shapley Value: A Cooperative Game Theory Approach  
*Arif Arifin, TU*

## Summit II

### Power Electronics

*Session Chair:*  
*Kennedy Aganah, TU*

**1:00-1:20**

On the Asymmetry of Sequence Impedances over Frequency, *Ignacio Vieto, RPI*

**1:20-1:40**

Harmonic Stability Analysis and Controller Parameter Design of Three-phase Inverter-based Multi-bus AC Systems Based on Sequence Impedances, *Wenchao Cao, UTK*

**1:40-2:00**

High Efficiency GaN-based Power Supply for Multi-load Wireless Power Transfer, *Ling Jiang, UTK*

**2:00-2:20**

Cascaded Multilevel Inverter Topology for Distributed DC Sources  
*Benozir Ahmed, TU*

Break

## Carriage Room

### Monitoring and Data Analysis

*Session Chair:*  
*Meng Wang, RPI*

**2:40-3:00**

Modeling PMU Estimation Error  
*Jiecheng Zhao, UTK*



## Summit I

**3:00-3:20**

A Novel Decentralized Dynamic Demand Control Strategy for Power System Frequency Regulation  
*Qingxin Shi, UTK*

**3:20-3:40**

An Optimal Thevenin Equivalent Estimation Method and Its Application to the Voltage Stability Analysis of a Wind Hub  
*Stephen Burchett, RPI*

**3:40-4:00**

Flywheel Energy Storage Model, Control, and Location for Improving Stability: The Chilean Case  
*Horacio Silva-Saravia, UTK*

## Salon A

4:00-5:00

**Industry & Student Mixer**

## Salon B

6:00-9:00

**Industry and Faculty Dinner Meeting**

*-Day 1 Adjourned-*

## **Industry Conference & Site Visit**

**Wednesday, Nov. 16<sup>th</sup>**

 **Crowne Plaza**

7:00-8:00am Registration & Breakfast

### Grand Summit Ballroom

8:00-8:15

**Welcome Remarks**

*Jimmy Cheek, UTK Chancellor;*

8:15-8:45

**CURRENT Overview**

*Kevin Tomsovic, Center Director*

8:45-11:00

**Research Thrust Overviews**

8:45-9:30

**Monitoring & Modeling Thrust Overview**

*Yilu Liu, Deputy Director & Monitoring Thrust Leader; Ali Abur, NEU Campus Director & Modeling Thrust Leader*

## Summit II

**3:00-3:20**

Methodology to Assess Criticality of Large Power Transformers in the Bulk Electric System  
*Micah J. Till, UTK*

**3:20-3:40**

Validation of Real-time System Model in Western Interconnection  
*Yidan Lu, UTK*

**3:40-4:00**

Real-time Recovery of PMU Data with Hankel Matrix  
*Yingshuai Hao, RPI*



Min Kao: Room 435

5:45-6:45 SVT Private Meeting

6:45-7:00 SVT Question Presentation  
with CURENT Team

*-Day 2 Adjourned-*

**Site Visit - Thursday, Nov. 17<sup>th</sup>**

 Crowne Plaza

Salon B

7:30-8:30am SVT & University Administrators  
Breakfast

Salon C

7:30-8:30am Faculty Breakfast

Salon B & C

8:30-10:00 SVT & CURENT Team Meeting

Executive Boardroom 1

10:30-4:30 SVT Report Writing

5:00 SVT Departure

*-Site Visit Adjourned-*

# speakers

*We are proud to welcome the following speakers to this conference.*

## **Zhiwei Wang**

*President  
GEIRI North America*



Zhiwei Wang is President of GEIRI North America, a company that is registered in California. GEIRI North America is the R&D branch of State Grid Corporation of China (SGCC) operating in North America. GEIRI NA undertakes research and development of power technologies and oversees technical collaborations in the U.S. and Canada.

In July 2015, prior to this assignment, Mr. Wang successively served as President of State Grid US Representative Office in New York City; President of Wuxi Electric Power Supply Company in Wuxi prefecture, a subsidiary of Jiangsu Electric Power Company (JSEPC, a provincial company under SGCC) in Jiangsu province; and Assistant Director General of Department of International Cooperation of State Grid Corporation of China (SGCC) in Beijing since 2012.

Mr. Wang has over 12 years of senior management experience in power system planning, project development and investment of both generation and transmission, as well as corporate management. He was Deputy Director of the Department of Development and Planning at JSEPC from 2001 to 2010, and Director of the same department and Deputy Chief Engineer of JSEPC from 2010 to 2012.

He joined the Grid Dispatch Center of JSEPC as a system analyst in 1991, and began to work in Department of Development and Planning as a planner in 1993.

Mr. Wang obtained his B.S. and M.S. degrees in Engineering from Southeast University in 1988 and 1991, respectively, in Nanjing, China.



# speakers

## Jose Conto

*Principal, Dynamic Studies  
System Planning, ERCOT*



Mr. Conto is an expert in dynamic studies including transient stability and voltage stability, and on the application of engineering simulation software for transmission studies. Mr. Conto oversees power system dynamic studies with full planning processes and studies. Mr. Conto also provides technical support to ERCOT System Planning, ERCOT System Operations and ERCOT stakeholders on dynamics issues.

A former Chair of the NERC Modeling Working Group and former member of the NERC Standard Drafting Team developing a new continental-wide “Undervoltage Load Shedding” standard, Mr. Conto continues to participate on industry forums like NERC working groups, North America Transmission Forum’s working groups on topic of present need to enhance planning processes and studies.

Mr. Conto joined ERCOT in July 2000 as a staff in the planning department, performing different tasks like generation interconnection studies, RMR studies. Later, he became the Supervisor of the Dynamic Studies group at ERCOT System Planning, responsible for system-wide voltage stability studies and dynamic stability studies. He has automated several planning processes through the integration of multi-format data sources with automating scripts.

Prior to joining ERCOT, Mr. Conto was a Sr. Electrical Engineer with The Tokyo Electric Power, D.C., where he performed technical assessments on new technologies and policies for electric utilities and as a young engineer at Electric Research & Management, PA, he participated in software & hardware engineering projects like monitoring photovoltaic systems and enhanced its data analysis software, developed software to calculate AC electromagnetic fields from a 3-D current-carrying facility, developed magnetic sensors circuits and operated a geomagnetic disturbance (solar storm) monitoring system.

Mr. Conto received his BSEE from the University of Engineers, Lima, Peru in 1981 and his MSEE from University of Tokyo, Tokyo, Japan in 1985. He stayed with CRIEPI, Japan for one year. Mr. Conto is an IEEE Sr. Member.

## David Schoenwald

*Principal Member of Technical Staff,  
Sandia National Laboratories*



David Schoenwald is a Principal Member of Technical Staff in the Electric Power Systems Research Department at Sandia National Laboratories. In his current work, he focuses on control system design for damping inter-area power system oscillations, mitigation of network-induced issues in control systems employing real-time measurement feedback, and development of performance standards for grid-scale energy storage systems. In previous work, he has developed models and simulations for a diverse set of applications including agent-based economic models for critical infrastructures, system dynamics models for study of counter-insurgency tactics, and stability analysis of robotic swarms.

Prior to joining Sandia, he was with Oak Ridge National Laboratory where he developed models and controls for manufacturing applications. He was also an adjunct assistant professor in the Department of Electrical Engineering at the University of Tennessee, Knoxville, where he taught a graduate level course in nonlinear control systems.

Dr. Schoenwald currently serves as an associate editor on the IEEE Control Systems Society Conference Editorial Board, and he is the Technical Chair for the 2017 Electrical Energy Storage Applications & Technologies (EESAT) Conference. Previously, he was an associate editor for IEEE Transactions on Control Systems Technology and IEEE Control Systems Magazine. He has served as elected member of the IEEE Control Systems Society Board of Governors. He received the B.S. degree from the University of Iowa, the M.S. degree from the University of Illinois, Urbana-Champaign, and the Ph.D. degree from The Ohio State University.

# speakers

## Clifton Black

*Senior Research Engineer,  
Southern Company*

Clifton Black is a Senior Research Engineer at Southern Company focusing on emerging technologies in the areas of Grid Operations, Planning and Visualization. He manages collaborative research initiatives in this arena with EPRI and other external organizations. Clifton also leads the synchrophasor program at Southern Company.



His research interests include: Artificial Intelligence applied to Power Systems, Power System Optimization, Analytics and Visualization, Distributed Generation, Energy Storage, Fault Anticipation, Dynamic Rating and Line Monitoring Technologies.

Dr. Black actively participates in various technical forums with papers and presentations. He received the BS, MS and PhD degrees in Electrical Engineering from the University of Alabama (Tuscaloosa) in 1994, 1996 and 2004 respectively.

## Jeff Hildreth,

*Principal Engineer,  
Bonneville Power Administration*

Jeff Hildreth is the Principal Engineer for the electrical laboratories at the Bonneville Power Administration. The laboratory group (including high voltage, high current, and medium power) performs acceptance, diagnostic, research and development and staged system testing on equipment, transmission lines, and hardware and materials associated with BPA's power transmission system. In addition to his role in the laboratories, Mr. Hildreth serves on the BPA Technology Innovation council – a group of executives and subject matter experts who provide guidance to BPA's technology innovation program.



Mr. Hildreth has recently taught Power Systems courses at Washington State University as an adjunct professor and currently serves on the Industry Advisory Board for WSU-Vancouver's Electrical Engineering program.

Mr. Hildreth is a senior member of the Institute of Electrical and Electronic Engineers (IEEE) and currently serves as working group chairman for IEEE-510, "IEEE Guide for Electrical Safety in High-Voltage Testing."

## Welcome

The 2016 Lab Tour and Poster Session will be held in the laboratories on the 1<sup>st</sup> and 4<sup>th</sup> floors of the Min Kao Building. Rooms are indicated by signs beside each lab.

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

1 <sup>st</sup> Floor Atrium	1 <sup>st</sup> Floor Entrance
High Power Electronics Lab	Room 117
Hardware Testbed Control and Build Lab.	Room 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 or by going to the website address provided at the top of each poster list.

The posters in the lab tour are grouped by content. The posters within each room should belong to one to two content themes but 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:

TB	Testbeds
HV	HVDC, FACTS and Renewable Energy
CV	Power Converter Design and Control
DV	Power Electronic Devices and Components
CT	Power System Control
EM	Power System Estimation
MT	Power System Monitoring
MD	Power System Modeling
ED	Education Posters



**Power System Control; HVDC,  
FACTS and Renewables; Power  
Electronic Devices & Components;  
& Power System Estimation  
Min Kao Room 117  
<http://curent.utk.edu/posters117/>**



- HV1 **Sheng Zheng** - A DC Controller for Continuous Variable Series Reactors (CVSRs)
- DV2 **Shiqi Ji** - Protection and Temperature-Dependent Switching Characteristics of New Generation 10 kV SiC MOSFET
- CT3 **Christoph Lackner** - Power System Controllability through Nontraditional Generation
- EM4 **Christoph Lackner** - Real time Phasor only State Estimator with Topology Processing
- CT5 **Shaofei Shen** - An Adaptive Protection Scheme for Distribution Systems with DGs Based on Optimized Thevenin Equivalent Parameters Estimation
- CT6 **Satoru Akagi** - Voltage Control in Distribution Systems Considering Voltage Variation in Transmission System
- CT7 **Qingxin Shi** - Decentralized Dynamic Demand Control Strategy for Power System Frequency Regulation
- CT8 **Lin Zhu** - Adaptive Wide-Area Damping Control Using Measurement-Driven Model: NYPA Case Study
- CT9 **May Mahmoudi** - Measurement-Based Models for Wide-Area Control Design in the Future Power Grid
- CT10 **May Mahmoudi** - A Distributed Control Design Methodology for Damping Critical Modes in Power Systems
- CT11 **Yu Xia** - A Game-Theoretic Analysis of Wind Power Generator Bidding Strategies in Electricity Markets
- CT12 **Guanyu Tian** - Simulation-based Investigation of Solar Plant Siting Strategies
- CT13 **M. Eshan Raoufat** - Dynamic Control Allocation for Damping of Inter-area Oscillations
- CT14 **Yichen Zhang** - Verifying Support from Wind Turbine Generators Considering Deadband and Safety Limits

## Testbeds; HVDC, FACTS and Renewables; & Power System Estimation

Min Kao Room 101A

<http://curent.utk.edu/posters101/>



- TB1 **Bo Liu** - Design Consideration of Converter Based Transmission Line Emulation
- HV2 **Shouting Zhang** - HVDC Converter Transformer Saturation in Hybrid AC/DC Transmission Caused by Coupled Transmission Lines
- TB3 **Jessica Boles** - Battery Energy Storage Emulation in a Converter-Based Power System Emulator
- HV4 **Jessica Boles** - Inductive Power Harvesting for a Touchless Transmission Line Inspection System
- TB5 **Jingxin Wang** - Single Phase Induction Motor Emulation in Converter Based Power Grid Emulator
- HV6 **Kanglin Liu** - Measurement of Charge Density Distribution in Negative Corona on a Coaxial Cylinder Model Using Sound Wave
- HV7 **Wenchao Cao** - Stability Criterion and Controller Parameter Design of Radial-Line Renewable Systems with Multiple Inverters
- HV8 **Wenchao Cao** - Harmonic Stability Analysis and Controller Parameter Design of Three-Phase Inverter-Based Multi-Bus Ac Systems Based on Sequence Impedances
- HV9 **Xiaojie Shi** - Steady-State Analysis of Modular Multilevel Converter (MMC) under Unbalanced Grid Conditions
- HV10 **Yalong Li** - DC Fault Protection of Multi-Terminal VSC-HVDC System with Hybrid DC Circuit Breaker
- HV11 **Zhiyong Yuan** - Investigation of Frequency Control Capability of VSC HVDC for Large Power System
- HV12 **Yiwei Ma** - Voltage Closed-Loop Virtual Synchronous Generator Control of Full Converter Wind Turbine for Grid-Connected and Stand-Alone Operation
- EM13 **Chenxi Xu** - Robust Linear State Estimation with Equality Constraints

- EM14 **Chenxi Xu** - Robust Linear State Estimation For Large Multi-area Power Grids
- EM15 **Arthur Mouco** - Improvement of Fault Location Method Based on Sparse PMU Measurements
- EM16 **Bilgehan Donmez** - Sparse Estimation Based External System Line Outage Detection
- EM17 **Pengxiang Ren** - Robust Continuous-Discrete Extended Kalman Filter for Estimating Machine States with Model Uncertainties
- EM18 **Qi Wang** - A Maintenance Mode Decision Method for Traction Power Supply System of High-Speed Railway
- EM19 **Xiaotong Hu** - Co-optimization for Distribution Network with Multi-Microgrids based on a Bi-level Optimization model with Dynamic Electricity Pricing
- EM20 **Alireza Rouhani** - Observability Analysis for Dynamic State Estimation
- EM21 **Alireza Rouhani** - A Robust Dynamic State Estimator Against Exciter Failures
- EM22 **Alireza Rouhani** - Dynamic State Estimation of a Synchronous Generator with Unknown Parameters

## Please Note:

-The above poster numbers correspond with the lab maps on the following pages.

-Posters can also be viewed on your USB Drive.

## Lab Tour & Poster Session

### Power Converter Design and Control & Power Electronic Devices and Components Min Kao Room 125 <http://curent.utk.edu/posters125/>



- CV1 **Ling Jiang** - Two-Stage Wireless Power Transmitter with Inherent Current Source Output
- CV2 **Surendar Somasundaram** - A Non-Isolated Bidirectional ZCS/ZVS Multi-resonant DC-DC Converter for Energy Storage Interface
- DV3 **Edward Jones** - Cross-Talk Analysis for Enhancement-Mode 650-V GaN HFETs in a Phase-Leg Topology
- DV4 **Edward Jones** - Temperature-Dependent Turn-On Loss Analysis for GaN HFETs
- DV5 **Edward Jones** - Analysis of the dv/dt Transient of Enhancement-Mode GaN FETs
- DV6 **Edward Jones** - Review of Commercial GaN Power Devices and GaN-Based Converter Design Challenges
- CV7 **Zhe Yang** - GaN-Based PV Inverter Design
- DV8 **Kamal Sabi** - Power Density and Efficiency Optimization of a 2kW Single Phase GaN-Based Inverter
- CV9 **Brad Trento** - High Efficiency and High Power Density WBG PFC for Telecom Applications
- CV10 **Jingjing Sun** - Development of ultra-high efficiency, high-density 3kw single phase rectifier with one power stage
- CV11 **Chongwen Zhao** - A Dual-Mode Wireless Power Transfer Using Multi-Frequency Programmed Pulse Width Modulation
- DV12 **Fuhua Li** - Brushless Permanent Magnet Dual-Memory Machine
- CV13 **Tao Li** - High Frequency Isolated Bidirectional DC/DC Converter For Energy Storage Systems

- DV14 **Doug Boulter** - Optimization of GaN-Based Ultra-Low Power Boost Converter in Far-Field Energy Harvesting
- DV15 **Spencer Cochran** - GaN-Based Synchronous Rectifier for WPT Systems with Reduced THD and Phase Control
- CV16 **Jie Li** - An Overall Optimization Design Method for Wireless Power Transfer Using Magnetic Resonance
- DV17 **Maeve Lawniczak** - Increasing Inductor Power Density Using Controllable Electropermanent Magnets
- DV18 **Fei Yang** - Parasitic Inductance Extraction and Verification for 3D Planar Bond All Module
- CV19 **Handong Gui** - A Battery Cell Balancing Control Scheme with Minimum Charge Transfer
- DV20 **Edward Jones** - Techniques and Challenges for Characterization of GaN FETs
- DV21 **Ruirui Chen** - Ultra-light Highly Efficient MW-Class Cryogenically Cooled Inverter for All Future Electric Aircraft Applications
- DV22 **Craig Timms** - Characterization of High-Voltage High-Speed Switching Power Semiconductors for High Frequency Cryogenically-Cooled Application
- DV23 **Jacob Dyer** - Online Condition Monitoring of SiC Devices Using Intelligent Gate Drive for Converter Performance Improvement
- DV24 **Wen Zhang** - Common source inductance introduced self-turn-on in MOSFET turn-off transient
- DV25 **Bo Liu** - A Compensation Scheme to Reduce Input Current Distortion in GaN Based 450 kHz Three-Phase Vienna Type PFC
- DV26 **Benozir Ahmed** - Single-Phase Multilevel Inverter Topology for Distributed DC Sources

## Lab Tour & Poster Session

### Power System Modeling, Estimation, and Controls & Testbed Emphasis Min Kao Room 121



<http://curent.utk.edu/posters121/>

- MD1 Micah J. Till - Incorporating Generation Variability in Reliability Assessment Studies
- MD2 Micah J. Till - Methodology to assess criticality of large power transformers in the bulk electric system
- MD3 Hailiang Lu - DC Bias Simulation Model of Transformer Based on No-load Current Measurement Data
- MD4 Joseph Garcia - Wireless and Real-Time Photovoltaic Power Monitoring System
- MD5 Haoyu Yuan - Mitigating Overestimation of Voltage Stability Margin by Coupled Single-Port Circuit Models
- MD6 Haoyu Yuan - Novel Linearized Power Flow and Linearized OPF Models for Active Distribution Networks with Application in Distribution LMP
- MD7 Yuzhang Lin - Improving Network Parameter Error Detection via Multiple Measurement Scans
- MD8 Yuzhang Lin - Strategic Use of PMUs to Improve Network Parameter Error Detection
- MD9 Xin Fang - Coupon-Based Demand Response Considering Wind Power Uncertainty: A Strategic Bidding Model for Load Serving Entities
- MD10 Yan Du - Coordinating Multi-Microgrid Operation within Distribution System: A Cooperative Game Approach
- EM11 Denis Osipov - Voltage Stability Margin Estimation for a Load Area Using A Three-Bus Equivalent
- MD12 Denis Osipov - Semi-Nonlinear Model Reduction and its Application for Power Systems
- TB13 M.R.A. Paternina - Integration of the Northeast Power Coordinated Council System into a Reduced-Order Eastern Interconnection

- TB14 **Yidan Lu** - Reduced WECC and EI Models for Education and Research
- CT15 **Yidan Lu** - Wide-Area Hierarchical Voltage Control for Systems with High Wind Penetration
- MD16 **Yidan Lu** - Validation of Real-Time System Model in Western Interconnection
- EM17 **Xuemeng Zhang** - Measurement-based Model Reduction to Improve Accuracy and Speed of Simulation
- MD18 **Xuemeng Zhang** - Frequency Response Study on the ERCOT under High Photovoltaic (PV) Penetration Conditions
- MD19 **Nan Duan** - Power System Simulation Using the Multi-Stage Adomian Decomposition Method
- MD20 **Nan Duan** - Estimating the Nonlinear Oscillation Frequency of a Power System Using the Harmonic Balanced Method
- MD21 **Nan Duan** - Applying Reduced Generator Models in the Coarse Solver of Parareal in Time Parallel Power System Simulation
- MD22 **Lakshmi Sundaresh** - Feasibility study of a large scale real-time grid simulator using NI LabVIEW FPGA
- MD23 **Derek Lusby** - Identifying and Mitigating FIDVR with Z Deviation Control
- MD24 **Horacio Silva** - Flywheel energy storage model, control and location for improving stability: The Chilean case
- MD25 **Hesen Liu** - Comparison of MIMO System Identification Methods for Electromechanical Oscillation Damping Estimation
- MD26 **Jonathan Devadason** - Analysis of voltage control in a DFIG based wind generator with variable reactive power limits

# Lab Tour & Poster Session

## Power System Modeling and Monitoring Emphasis Min Kao Room 402



<http://curent.utk.edu/posters402/>

- MD1 **Abdulelah Alharbi** - Saudi Arabian Power Grid Dynamic Model
- MT2 **Abdulelah Alharbi** - Correlation between Generator Trips and Locational Marginal Prices (LMPs)
- MT3 **Bin Wang** - Formulation and Characterization of Power System Electromechanical Oscillations
- MT4 **Slava Maslennikov** - A Test Cases Library for Methods Locating the Sources of Sustained Oscillations
- MT5 **Dao Zhou** - Big Data Analytics Platform for Synchrophasor Measurements
- MT6 **Wenpeng Yu** - Oscillation analysis based on ambient data
- MT7 **Jiecheng Zhao** - Impact of Distributed Resources on Performance of Synchrophasors
- MT8 **Jiecheng Zhao** - Model of Parameterized PMU Estimation Impairment
- MT9 **Shutang You** - Oscillation Mode Identification Based on Wide-Area Ambient Measurements Using Multivariate Empirical Mode Decomposition
- MT10 **Shutang You** - Ring-Down Oscillation Mode Identification Using Multivariate Empirical Mode Decomposition
- MT11 **Shutang You** - Impact of High PV Penetration on U.S. Eastern Interconnection Frequency Response
- MT12 **Xiaoxing Zhang** - CS<sub>2</sub> Detection in SF<sub>6</sub> by Ultraviolet Absorption Spectrum
- MT13 **Yingshuai Hao** - Real-time Recovery of Missing PMU Data with Hankel Matrix
- MD14 **Yingshuai Hao** - Recovery of Simultaneous and Consecutive PMU Data Losses by Exploiting Low-rank Hankel Matrix



- MT15 **Ling Wu** - Low Inertia Indicator of Bulk Power Systems Using Event Based Rate of Frequency Drop from Synchronous Measurements
- MT16 **Ling Wu** - Statistical Analysis on the Interarea Oscillations in Eastern Interconnection (EI), 2013-2015
- MT17 **Yi Cui** - Statistic Algorithm for Oscillation Event Identification
- MT18 **Wenxuan Yao** - Thermal Sensitivity Study and Reliability Improvement for phasor measurement units
- MT19 **Wenxuan Yao** - Magnetic Field based Wireless GMD/EMP-E3 Impact Monitoring Device
- MT20 **Liu Liu** - Multivariate Empirical Mode Decomposition Based Signal Analysis and Efficient Storage In Smart Grid
- MT21 **Yu Su** - Study on the Impact of Increased Penetration of Photovoltaic Generation on Small Signal Stability of Interconnected Power Systems
- MT22 **Jiahui Guo** - Solar Power Output Forecasting Model Through Statistical Learning of Historical Dataset
- MT23 **Xiangyu Niu** - Vulnerability Assessment of Phasor Networks
- MT24 **Jason Paisley** - Performance of the R in analyzing PMU data from smart grid
- MT25 **Hantao Cui** - Day-ahead Coordinated Operation of Utility-Scale Electricity and Natural Gas Networks Considering Demand Response Based Virtual Power Plants
- MT26 **Riyasat Azim** - A Decision Tree Based Approach for Controlled Islanding of Microgrids
- MT27 **Riyasat Azim** - Power Management Strategy Combining Energy Storage and Demand Response for Microgrid Emergency Autonomous Operation
- MT28 **Hongyu Li** - Probabilistic Dynamic Security Assessment for Power System under Stochastic Excitation

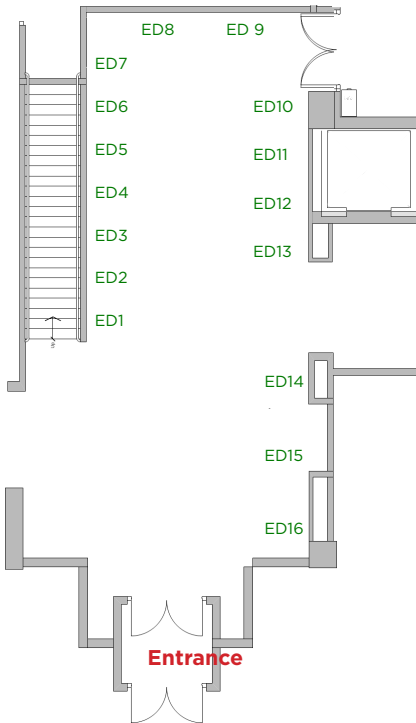
## Education Emphasis 1st Floor Entryway



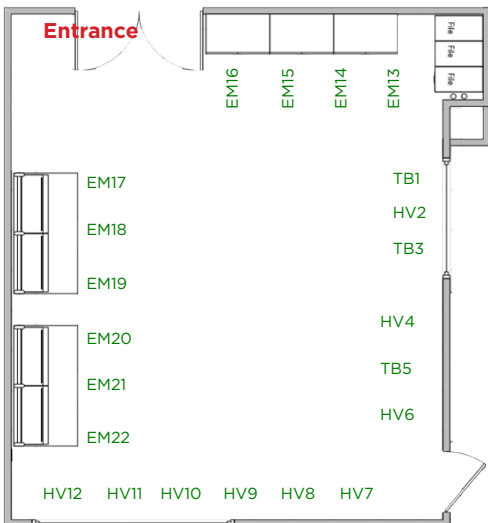
<http://curent.utk.edu/postersedu/>

- ED1 Terryl Dobson & Madeline Phillips - Vulnerability Assessment of Phasor Networks (YSP Project)
- ED2 Sean Indelico & Blair Johnson - 3D Animation of Power System Data (YSP Project)
- ED3 Lauren Sanderson - The Power of Math (RET Project)
- ED4 Laura Migun - Engineering in the Geometry Classroom (RET Project)
- ED5 Quillen Blalock - Inductor Design: Geometric Optimization
- ED6 Kyle Goodrick - Automated Double Pulse Test System for Switching Loss Characterization
- ED7 Dallas Hamlin - Cryogenic Power Inverter Passive Components
- ED8 LeAnn Thompson - HVDC Dynamic Modeling Using A 9-Bus System
- ED9 Andrew Wintenburg - Energy Disaggregation Using Convolutional Sparse Coding
- ED10 Clarence Jackson II - Data Streaming Client Development in SIMULINK for LTB Real-time Application
- ED11 Kim Glasser - Smart Home Energy Management System
- ED12 Anthony Huber, Jeremy Herwig, Vishnu Chander - Large-Scale Testbed Visualization
- ED13 Rafael Camarillo - Modeling of Accurate Coupling Coefficients for Power Computations

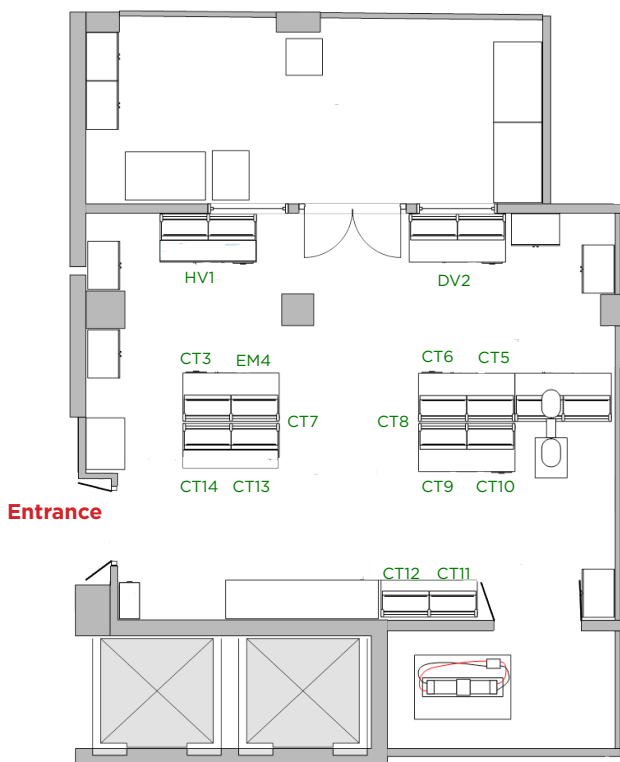
### 1st Floor Lobby Education Posters



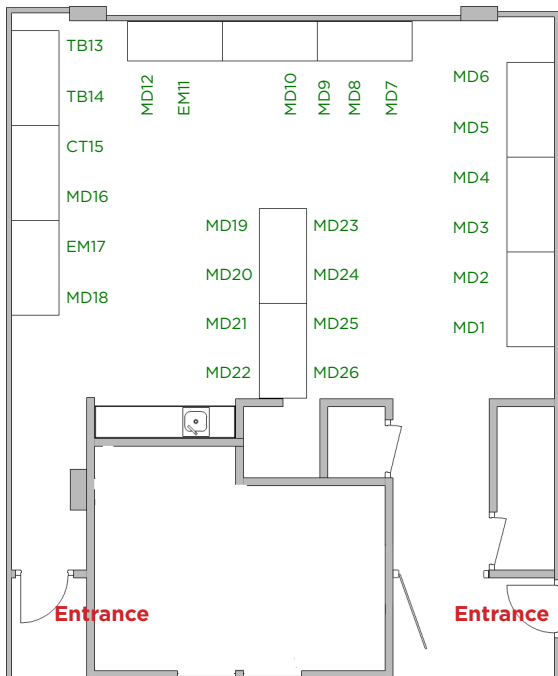
### Min Kao Room 101A Hardware Testbed Control & Build Lab



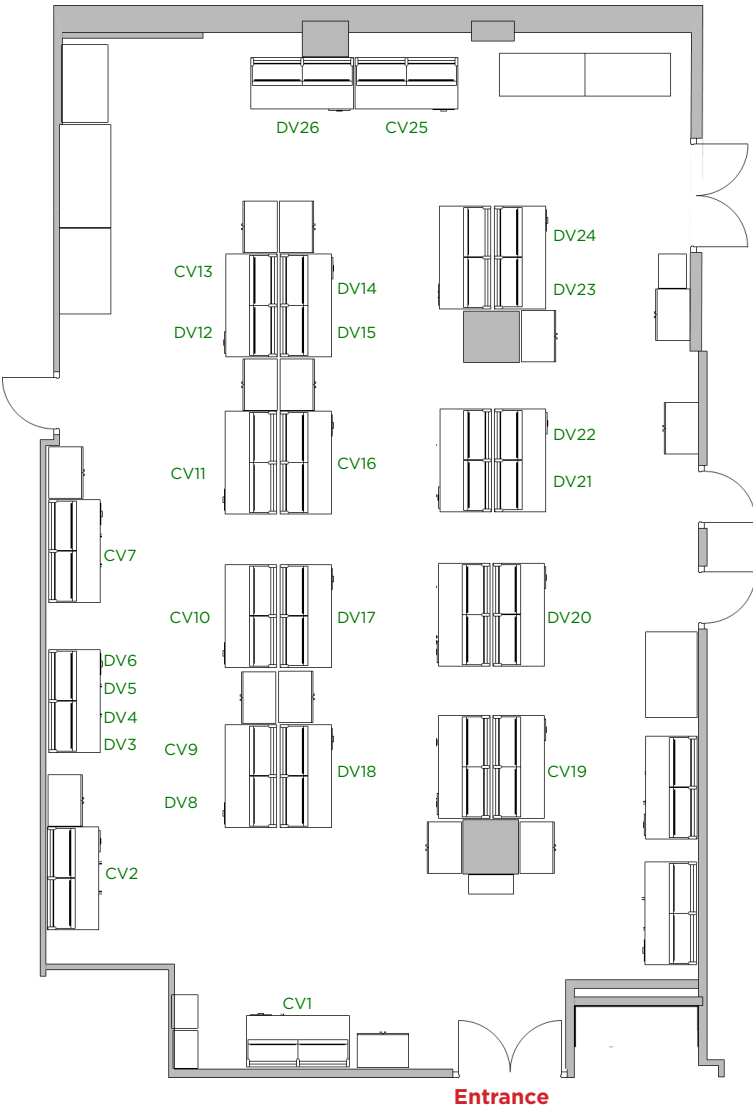
## Min Kao Room 117 High Power Electronics Lab



## Min Kao Room 121 A/B Conference Room

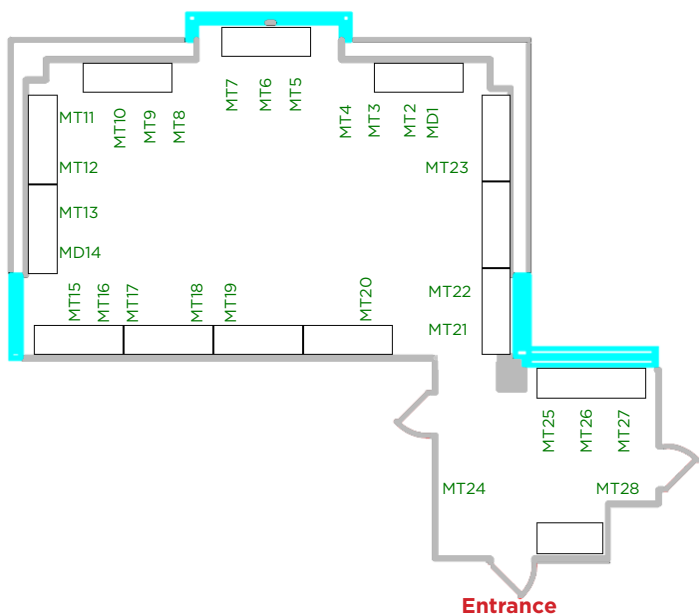


# Min Kao Room 125 Power Electronics Lab



# Min Kao Room 402

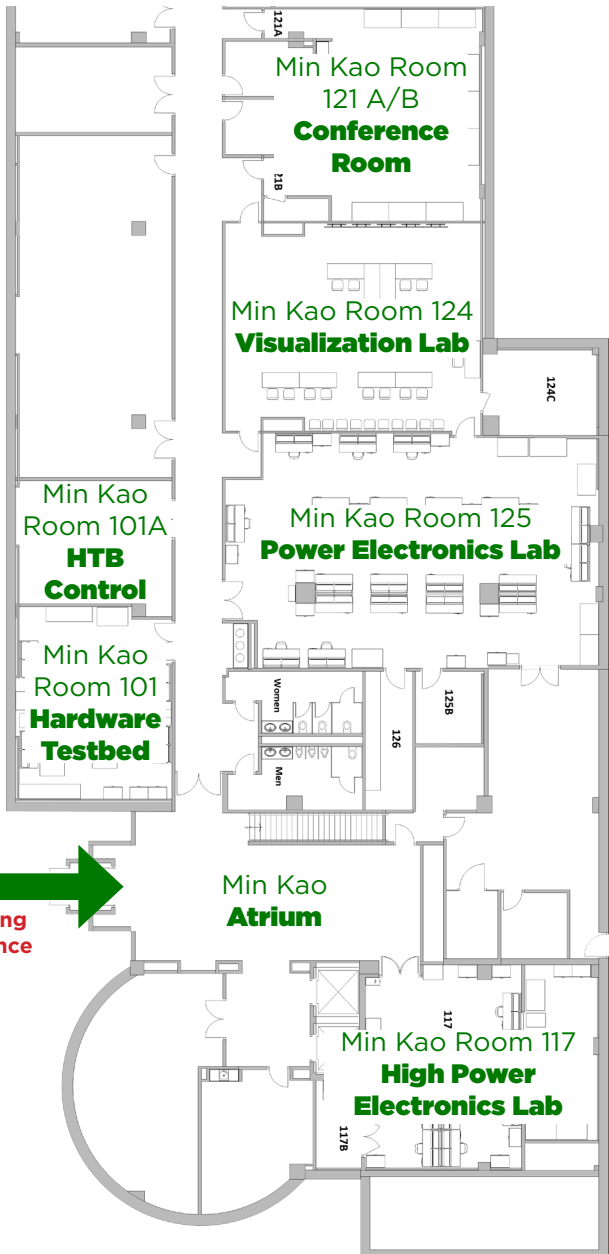
## **FNET Laboratory**





# Min H. Kao Building Lab Tour

## 1st Floor Overview



**Building  
Entrance**

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