

51st North American Power Symposium

Wichita State University

Oct. 13 - 15, 2019



51st

INAPS



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**WICHITA STATE
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Department of
Electrical Engineering
and Computer Science



Welcome

The Electrical Engineering and Computer Science Department at Wichita State University welcomes all participants to Wichita. We are honored to host the 51st North American Power Symposium at a time when the University is investing in applied learning, entrepreneurship and economic impact based education.

Wichita is known as the "Air Capital of the World" and about 35% of the world's general aviation aircraft are produced in Wichita. While you are in Wichita, enjoy the rich old west culture. Old Cowtown Museum, Mid-America All-Indian Center – including the 440 foot tall Keeper of the Plains sculpture, Charles M. Russell Gallery and the North American Prairie Exhibit at the Wichita Sedgwick County Zoo are some of the highlights.

Since the inception of NAPS in 1969 as Midwest Power Symposium the focus of the conference has been to stimulate and advance scholarly work in all areas related to power engineering by bringing students, faculty and practicing engineers together, allowing student presenters to receive professional feedback on their early research and improve their overall research process.

This year's NAPS continues the tradition, providing opportunities for students to present their work and develop new connections. Undergraduate students are encouraged to attend the conference and there is a dedicated track for undergraduate papers. A soft-skill workshop allows students a chance to hear from industry and academic experts.

This year 229 papers were accepted and invited for presentation. 39 technical sessions with seven parallel sessions reflects the importance of advancing the power and energy industry to meet future needs. Two sessions are dedicated to undergraduate students. The 12 best papers and 5 undergraduate best papers will be presented in a special session, with awards for three outstanding papers and three outstanding undergraduate papers. Winners will be announced during the awards ceremony on Tuesday.

The conference will kick-off on Sunday morning with a soft-skill development workshop, where students get a chance to discuss their career path with experienced professionals from academia and industry in small groups. A tour to the Kansas Cosmosphere is the afternoon attraction on Sunday, which will be followed by a networking dinner. We have scheduled two plenary sessions, "Challenges for the Next Generation Power System: Industry Perspective" and "Tools for Future Power Systems." The Monday banquet dinner is themed American West of Yesterday at Prairie Rose Chuckwagon.

Dr. Dennis Livesay, Dean college of Engineering and Mr. Jeff Beasley Vice President, Customer Operations, Evergy Inc. will welcome the attendees and open the symposium on Monday morning. The Industry Panel is titled "Next Generation Power System: Industry Perspective." Panelists for this session are Dr. Timothy D. Unruh, Executive Director, National Association of Energy Service Companies, Jay Caspary, Director – Research, Development & Tariff Services, Engineering, Southwest Power Pool and Cody Hastings, Supervisor,

Operations Engineering, Evergy Inc. The Second panel session is titled "Tools for Future Power Systems." Panelists for this session are: Dr. Aunrag Srivastava, Associate Professor from Washington State University (Secure, but not Resilient) Dr. D. S. Naidu from University of Minnesota-Duluth (Divide and Defend Control Strategies for Cyber-Physical Systems) and Dr. Ganesh Venayagamoorthy from Clemson University (New Artificial Intelligence for the Evolving Power System).

The conference would not be possible without the gracious financial support of Evergy Inc, Nayak Corporation, Southwest Power Pool, Sunflower Electric Corporation, MKEC Engineering Services, Lucas-Nuelle and Wichita State University. The student programs are supported by IEEE Power and Energy Society and the National Science Foundation. Continuing the tradition IEEE Power and Energy Society is technical co-sponsor of the conference. We are also thankful to the WSU Foundation and WSU Conference Services Office for their support and providing staff to make the conference a success.

Once again, we extend our heartiest welcome to all of you and hope this will be a productive and memorable event.

Thank you
Visvakumar Aravinthan and Ward Jewell
Conference General Chairs

Symposium Organizers

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Dr. Visvakumar Aravinthan
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Koushik Sarkar
Mohd Abrar Rahman
Chinmay Kulkarni

Testimonials



"NAPS was my first conference as a student and provided me very enriching experience. It was my pleasure to get an opportunity to organize NAPS at the Washington State University and provide similar experience to other students around the world. I have been attending NAPS for more than 15 years now and look forward to see my friends and colleagues at the next one."

Dr. Anurag K Srivastava

Associate Professor & Director, Smart Grid Demonstration and Research Investigation Lab
Washington State University
General Chair: NAPS 2014



"Hosting NAPS was a wonderful experience and a great opportunity to showcase our power systems program to the peers. Kansas State University has hosted NAPS three times and every time it was a new experience. The best part was interacting with professors and students from other universities in a relaxed setting. The enthusiasm and excitement of students was a highlight of NAPS."

Dr. Anil Pahwa

University Distinguished Professor and Logan-Fetterhooft Chair
Kansas State University
General Chair: NAPS 1994 and NAPS 2013



"This is the only large, longstanding continent-wide power engineering meeting with a focus on students. The students did exceptionally well at NAPS 2018: the quality of the papers was high, and I felt that the students handled questions very intelligently. I have heard many times from successful power engineers that NAPS was their first large technical meeting."

Dr. Gerald Heydt

Regents' Professor Emeritus, Professor of Advanced Technology
Arizona State University
General Chair: NAPS 1980, 1988, and 2002



"Hosting the conference was a great experience for myself, my colleagues and our students. Meeting the students from other universities and hearing their presentations was great experience for our students. I have enjoyed watching several of the students who attended NAPS in 2004 develop careers in other universities and in industry"

Dr. Brian K. Johnson, P.E.

Schweitzer Engineering Laboratories Endowed Chair in Power Engineering and University Distinguished Professor
University of Idaho
General Chair: NAPS 2004

Saturday, October 12, 2019

12:00PM—9:00PM

Registration
Aloft Wichita

6:00PM—9:00PM

Informal networking and dinner for students
Aloft Wichita

Sunday, October 13, 2019

7:00AM—12:00PM

Registration
Rhatigan Student Center, WSU

7:00AM—8:00AM

Breakfast
Sage Lounge, Rhatigan Student Center, WSU

8:00AM—11:30AM

Soft-skills workshop for students
Rhatigan Student Center, WSU

11:30AM—5:00PM

Tour, Cosmosphere, Hutchinson, KS

12:00PM—8:00PM

Registration
John Bardo Center, WSU

6:00PM—8:00PM

Student Welcome Reception
Shocker Grill, Rhatigan Student Center, WSU

6:00PM—7:00PM

IEEE PES PEEC Meeting
Multi Purpose Room, John Bardo Center, WSU

7:00PM—8:00PM

NAPS Steering Committee Meeting
Multi Purpose Room, John Bardo Center, WSU

Monday, October 14, 2019

7:00AM—5:00PM

Registration
Rhatigan Student Center, WSU

7:00AM—8:00AM

Breakfast
Gridley Room, Rhatigan Student Center, WSU

8:00AM—8:30AM

Welcome and Opening Remarks
Beggs Ballroom, Rhatigan Student Center, WSU

8:30AM—9:30AM

Plenary Session 1: Challenges for the Next Generation
Power System: Industry Perspective
Beggs Ballroom, Rhatigan Student Center, WSU

9:30AM—10:00AM

Networking break
Rhatigan Student Center, WSU

10:00AM—11:30AM

Paper session 1
Rhatigan Student Center, WSU

11:30AM—12:30PM

Lunch
Beggs Ballroom, Rhatigan Student Center, WSU

12:30PM—2:00PM

Paper session 2
Rhatigan Student Center, WSU

2:00PM—3:30PM

Paper session 3
Rhatigan Student Center, WSU

3:30PM—3:45PM

Networking break
Rhatigan Student Center, WSU

3:45PM—5:15PM

Paper session 4
Rhatigan Student Center, WSU

6:00PM—8:30PM

Banquet Reception
Prairie Rose Chuckwagon

Tuesday, October 15, 2019

7:00AM—12:00PM

Registration
Rhatigan Student Center, WSU

7:00AM—8:00AM

Breakfast
Gridley Room, Rhatigan Student Center, WSU

8:00AM—9:00AM

Plenary Session 2: Tools for Future Power Systems
Beggs Ballroom, Rhatigan Student Center, WSU

9:00AM—10:30AM

Paper Session 5
Rhatigan Student Center, WSU

10:30AM—10:45AM

Networking break
Rhatigan Student Center, WSU

10:45AM—12:15PM

Paper Session 6
Rhatigan Student Center, WSU

12:15PM—1:45PM

Closing ceremony
Beggs Ballroom, Rhatigan Student Center, WSU

1.A: Best Paper Session I

Monday, 10:00 - 11:30 AM, RSC 265

Chair: Gerald T. Heydt, Arizona State University

#145 Realistic Microgrid Test Bed for Protection and Resiliency Studies

Phani Harsha Gadde and Sukumar Brahma

#116 Effect of Wind Farm Spatial Correlation on Oscillation Damping in the WECC System

Horacio Silva-Saravia and Hector Pulgar-Painemal

#120 Optimal Participation of Price-Maker Battery Energy Storage Systems in Energy, Reserve and Pay as Performance Regulation Markets

Reza Khalilisenobari and Meng Wu

#175 Clustering of Power System Oscillatory Modes Using DBSCAN Technique

Mohammadreza Maddipour Farrokhi, Mohammadreza Hatami, Vaithianathan "Mani" Venkatasubramanian, Gilles Torresan, Patrick Panciatici and Florent Xavier

#177 Bus Split Sensitivity Analysis for Enhanced Security in Power System Operations

Yuqi Zhou and Hao Zhu

#241 Co-Optimized Expansion Planning to Enhance Electrical System Resilience in Puerto Rico

Cody Newlun, Armando Figueroa-Acevedo, James McCalley, Anne Kimber and Efrain O'Neill - Carrillo

1.B: Best Paper Session II

Monday, 10:00 - 11:30 AM, RSC 266

Chair: Anil Pahwa, Kansas State University

#56 Role of the Reference Bus in Three-Phase State Estimation

Andre Langner and Ali Abur

#69 Probabilistic Network Observability of a Hybrid Power System with Communication Irregularities

Vanja Svenda, Aleksandar Stankovic, Andrija Saric and Mark Transtrum

#146 Comparing a New Power System Preventive Operation Method with a Conventional Industry Practice During Hurricanes

Yuanrui Sang, Jiayue Xue, Mostafa Sahraei-Ardakani and Ge Ou

#223 A Data-Aided Security Constraint Prescreening Technique and Application to Real-World System

Shubo Zhang, Hongxing Ye, Fengyu Wang, Yonghong Chen, Stephen Rose and Yaming Ma

#279 Small-Scale Microgrid Energy Market Based on PILT-DAO

Tianlu Gao, Wei Gao, Jun Zhang and Wenzhong Gao

#317 Model for Evaluating the Reliability of Cyber Component in Power Distribution Systems

Suvagata Chakraborty, Arun-Karthick Manoharan, Anton Heltiarachchige-Don, Visvakumar Aravinthan and Mohammad Heidari Kapourchali

1.C: Best Paper Undergraduate Session

Monday, 10:00 - 11:30 AM, RSC 262

Chair: Tom Overbye, Texas A&M University

#5 Optimal Adaptive Coordinated Cyber-Attacks on Power Grids Using Epsilon-Greedy Method

Peimeng Guan and Jiankang Wang

#94 Unsupervised Machine Learning for Anomaly Detection in Synchrophasor Network Traffic

Phillip Donner, Raymond Blaine and Aaron St. Leger

#236 Feasibility Study of Solar Energy System at the University of North Dakota

Bo K. Yesel, Jonathan J. Eslinger, Michael Nord, Daisy Flora Selvaraj and Prakash Ranganathan

#295 Analysis of Large Scale Distributed Generation on Radial Distribution System: Case Study in Sri Lanka

Maheesa Sivagnanam, Subaranjany Selvanayagam, Nimanthi Nandasiri, Visvakumar Aravinthan, Thiruvanantharam Tharmarajah and Vinodhine Shanmugurajah

#229 Power System Resource Adequacy Evaluation Under Increasing Renewables for the Midwestern US

Shelby Pickering, Ian Rostkowski, Shannon Foley, Matt Huebsch, Zaran Claes, David Ticknor, James Okullo, Brandon Heath, Armando Figueroa-Acevedo and James McCalley

1.D Undergraduate Paper Session

Monday, 10:00 - 11:30 AM, RSC 261

Chair: Sid Suryanarayanan, Colorado State University

#97 A Distributed Algorithm for Dynamic Dispatch of Thermostatically Controlled Loads

Kshitij Singh and Pratik Bajarla

#23 Dynamic Mode Decomposition in Various Power System Applications

Abdullah Alassaf and Lingling Fan

#15 A Cyber-Physical Testbed Design for the Electric Power Grid

Zachary O'Toole, Christian Moya, Connor Rubin, Alec Schnabel and Jiansheng Wang

#218 Utilizing Small Scale Mobile PV to Offset Residential Grid Consumption

Charles Thangaraj, Alexander Nagle, Kyle Kremzeir, Moayad Kutby, Mohammed Aldayel and Mashhor Alshrief

#153 A Unified Power System Model to Analyze the Benefits of Electric Vehicles in Power Grid

Clare Lamers, Clay Ozuna, Hao Huang and Katherine Davis

2.A: Stability I

Power System Analysis Track

Monday, 12:30 to 2:00 PM, RSC 261

Chair: Hector Pulgar, University of Tennessee Knoxville

#163 Decentralized Servomechanism Control Design for Inter-Area Oscillations Damping in Power System

Roghieh Abdollahi, Pierluigi Pisu, Daivid Schoenwald and Zoleikha Biron

#312 Integrated Transmission Systems Convex Optimal Power Flow Considering Security Constraints

Biswajit Biswas, Seyedmahdi Moghadas, Sukumar Kamalasadan and Sumit Paudyal

#237 A Novel Wide-Area Storage-Based Control for Transient Stability Enhancement

Wenzong Wang, Zhangxin Zhou and Gang Huang

#256 Synchronized Operating Point Stability of Multimachine Power System Using Holomorphic Embedding in Kuramoto Framework

Sonam Kharade, Sushama Wagh and Navdeep Singh

#319 Online Measurement Based Power System Reduced Order Model Generation and Validation

Sheikh Jakir Hossain and Sukumar Kamalasadan

#207 Comparative Analysis of PMU Based Corridor Voltage Stability Indices and Enhanced Approach

Syed Muhammad Hur Rizvi and Anurag Srivastava

2.B: Cyber Physical Systems I

Emerging Topics Track

Monday, 12:30 to 2:00 PM, RSC 262

Chair: Katherine Davis, Texas A&M University

#99 Cyber-Physical Vulnerability and Security Analysis of Power Grid with HVDC Line

Amir Gholami, Mohammad Mousavi, Anurag K. Srivastava and Ali Mehrizi-Sani

#26 MILP Modeling of Targeted False Load Data Injection Cyberattacks to Overflow Transmission Lines in Smart Grids

Darius Khezrimotlagh, Javad Khazaei and Arash Asrari

#27 A Data-Driven Dynamic State Estimation for Smart Grids Under DOS Attack Using State Correlations

Md Abul Hasnat and Mahshid Rahnamay-Naeini

#248 Smart-Grids Cyber-Attack Defense: A Solution Based on an Incremental Learning Support Vector Machine

Helton Do Nascimento Alves, Arturo Bretas and Newton Bretas

#40 Malicious Data Injection Attacks: A Relaxed Physics Model Based Strategy for Real-Time Monitoring

Tierui Zou, Arturo Bretas, Nader Aljohani and Newton Bretas

#239 Testbed-Based Evaluation of SIEM Tool for Cyber Kill Chain Model in Power Grid SCADA System

Vivek Kumar Singh, Steven Perez Callupe and Manimaran Govindarasu

2.C: Microgrid I

Renewables Track

Monday, 12:30 to 2:00 PM, RSC 264

Chair: Aaron St. Leger, United States Military Academy

#142 Angel: An Intelligent Digital Twin Framework for Microgrid Security

William Danilczyk, Yan Lindsay Sun and Haibo He

#247 Impact of Seasonal Net Load Variation on Load Shedding Ratio in Islanded Microgrid Operation

Tarek Masaud

#190 Controller Hardware-in-the-Loop Testbed for Distributed Coordination and Control Architectures

Oscar Azofeifa, Siddhartha Nigam, Olaoluwapo Ajala, Christopher Sain, Samuel Utomi, Alejandro Dominguez-Garcia and Peter Sauer

#68 Frequency Control in Microgrid Communities using Neural Networks

Hossein Salehfar and Shravan Kumar Akula

#14 Cost-Effective Three-Phase Current Amplifier Interface for Real-Time Simulator with Relays In-the-Loop

Maximiliano Ferrari, Emilio Piescorovsky, Joshua Hambrick and Travis Smith

#39 Operation of Parallel Grid-Supporting PVs

Sulaiman Almutairi, Zhixin Miao and Lingling Fan

2.D: Distribution System Modeling

Distribution Systems Track

Monday, 12:30 to 2:00 PM, RSC 265

Chair: Paras Mandal, University of Texas at El Paso

#47 Investigating the Effect of Load Modeling on Network Reconfiguration of a Distribution System

Shaziya Rasheed and Abhijit R. Abhyankar

#49 A Framework for Generating Synthetic Distribution Feeders Using OpenStreetMap

Shammya Saha, Eran Schweitzer, Anna Scaglione and Nathan Johnson

#102 A Time-Series Distribution Test System Based on Real Utility Data

Fankun Bu, Yuxuan Yuan, Zhaoyu Wang, Kaveh Dehghanpour and Anne Kimber

#214 Distribution-Level Phasor Measurement Units Application to Composite Load Model Validation

Yuan Liu and Pavel Etingov

#4 A Comparison of Multiple Methods for Short-Term Load Forecasting

Mingsui Sun, Mahsa Ghorbani, Edwin Chong and Sid Suryanarayanan

#174 On the Relationships Among Different Voltage Unbalance Definitions

Kshitij Girigoudar, Daniel K. Molzahn and Line a. Roald

2.E: Converter and Inverter Design

Power Electronics Track

Monday, 12:30 to 2:00 PM, RSC 266

Chair: Roy McCann, University of Arkansas

#3 Effects of Controller Saturation on Domain of Attraction Estimation of Droop-Controlled Inverter

Ethan Chun and Mahmoud Kabalan

#24 Heuristic Dynamic Programming for Adaptive Virtual Synchronous Generators

Sepehr Saadatmand, Mohamad Saleh Sanjari Nia, Pourya Shamsi, Mehdi Ferdowsi and Donald C Wunsch

#274 Suppressing Circulating Current in the Modular Multilevel Converter Using Line-to-Line Voltage Correction Modules

Sudarshan Tejanag Harave and Fernando Mancilla-David

#105 Dual Heuristic Dynamic Programming Control of Grid-Connected Synchronverters

Sepehr Saadatmand, Mohamad Saleh Sanjari Nia, Pourya Shamsi and Mehdi Ferdowsi

#280 A Control Scheme in the dq Reference Frame for Hexverter-Based Systems

Hector R. Robles-Campos and Fernando Mancilla-David

#123 On the Distortion of Pulse-Width-Modulated Five-Level Asymmetric Multilevel Inverters

Charul Kalaria, Victor Ogunkanmi, Avery Hagle, Ryne Swanbum and Bill Diong

2.F: Resiliency

Power System Analysis Track

Monday, 12:30 to 2:00 PM, RSC 256

Chair: Nga Nguyen, University of Wyoming

#111 Distributed Wind Power Resources for Enhanced Power Grid Resilience

Payman Dehghanian, Jinshun Su, Mostafa Nazemi and Bo Wang

#285 Microgrid Energy Management System for Normal and Emergency Operating Conditions

Maad Alowaiifeer, Abdullallah Alamri and Sakis Meliopoulos

#64 Strategic Placement of Distributed Generators Against Extreme Events

Ahmet Oner and Ali Abur

#77 Electrical Grid Smart Cable Detach Mechanism and Emergency Communication Network

Alfonso Jose Cruz Feliciano, Milad Ghiasi Rad, Celine Irvine and Santiago Grijalva

#96 Modeling, Simulation, and Prevention of July 23, 2018, Indonesia's Southeast Sumatra Power System Blackout

Agustiadi Agustiadi, Kevin Marojahan Banjar-Nahor, Yvon Bésanger and Ngapuli Irma Sinisuka

#13 Resilient and Extreme-Event-Aware Microgrid Using Energy Storage and Load Curtailment

Farshina Nazrul Shimin, Maryam Bahrampanah and Hashem Nehrir

2.G: New Trends in Markets

Economics Track

Monday, 12:30 to 2:00 PM, RSC 257

Chair: Kory Hedman, Arizona State University

#92 Security Constrained Unit Commitment with Corrective Transmission Switching

Arun Venkatesh Ramesh and Xingpeng Li

#170 Active/Reactive Locational Pricing in Distribution Networks

Sina Parhizi and Amin Khodaei

#72 Energy and Reserve Dispatch with Renewable Generation Using Data-Driven Distributionally Robust Optimization

Zhichao Shi, Hao Liang and Venkata Dinavahi

#30 Residential Load Management Using System Frequency and Grid Voltage as Price Indicators

Kavya Ashok, Shreyas Kulkarni, Steven Moore, Santiago Grijalva and Deepak Divan

#2 Collaborative Efforts in Mexico / United States Power Engineering Education

Gerald Thomas Heydt and Timothy Bichler

3.A: Visualization

Emerging Topics Track

Monday, 2:00 to 3:30 PM, RSC 261

Chair: Hao Zhu, University of Texas at Austin

#79 Wide-Area Electric Grid Visualization Using Pseudo-Geographic Mosaic Displays

Thomas Overbye, Jessica Wert, Adam Birchfield and James Weber

#158 A Matlab and PowerFactory-Based WAMS Simulator

Rommel Angel Cardenas Javier, Victor Gonzalez Sanchez, Mario Arrieta Paternina, Francisco Alexander Zelaya Arrazabal, Alejandro Zamora Mendez and Vicente Torres Garcia

#89 PMU Data Feature Considerations for Realistic, Synthetic Data Generation

Ikponmwoa Idehen, Wonhyeok Jang and Thomas Overbye

#192 Visibility of WECC Wide Area System Tests Measured from the Consumer Level

Sean McColley, John Pierre, Victor Bershinsky and Thomas Vanhoudt

#265 Design and Implementation of a Real-Time Energy Monitoring and Reporting System

Savanna New, Hannah Nano, Jarrad Havemann, Zian Wang, Mitchell Posey, Ernie Hogan, Khoi Chu, Devin McCormick, Tarek Youssef and Bhuvaneswari Ramachandran

#16 A Non-Exhaustive Search Algorithm to Identify Distribution Grid Operational Topology

Anandini Gandluru, Shiva Poudel and Anamika Dubey

3.B: Protection and Relays

Power System Analysis Track

Monday, 2:00 to 3:30 PM, RSC 262

Chair: Sukumar Brahma, Clemson University

#266 Fault Ride Through Capability Improvement of DFIG Based Wind Farms Using Active Power Controlled Bridge Type Fault Current Limiter

Md. Rashidul Islam, Jakir Hasan, Md. Najmul Huda and Mohammad Ashraf Hossain Sadi

#180 Arcing Fault Detection with Interpretable Learning Model Under the Integration of Renewable Energy

Yousaf Hashmy, Qiushi Cui, Zhihao Ma and Yang Weng,

#131 Predicting Cascading Failures in Power Grids Using Machine Learning Algorithms

Rezoan Shuvro, Mitun Talukder, Pankaz Das and Majeed M. Hayat

#269 Study of Smart Grid Protection Challenges with High Photovoltaic Penetration

Mohamadsaleh Jafari, Temitayo Olowu, Arif Sarwat and Mohammad Ashiqur Rahman

#293 An Investigation of the Impact of D-FACTS Devices Implementations on the Mho Distance Elements

Hussain Beled, Brian Johnson and Herbert Hess

#21 Event Classification in Distribution Networks Using a Quotient Gradient System

Hamid Khodabandehlou, Iman Niazazari, Hanif Livani and M. Sami Fadali

3.C: Machine Learning Applications

Emerging Topics Track

Monday, 2:00 to 3:30 PM, RSC 257

Chair: Mojdeh Khorsand Hedman, Arizona State University

#254 Residential Load Identification Based on Load Profile using Artificial Neural Network (ANN)

Steven Buchhop and Prakash Ranganathan

#226 Short-Term Load Forecasting on Smart Meter Via Deep Learning

Ishan Khatri, Xishuang Dong, John Attia and Lijun Qian

#95 Forecasting Residential Monthly Electricity Consumption using Smart Meter Data

Dimitra Ignatiadis, Gonzague Henri and Ram Rajagopal

#308 Application of Machine Learning for Online Dynamic Security Assessment in Presence of System Variability and Additive Instrumentation Errors

Anubhav Nath, Reetam Sen Biswas and Anamitra Pal

#203 Data Fusion Based Hybrid Deep Neural Network Method for Solar PV Power Forecasting

Dan Rosa De Jesus, Paras Mandal, Shantanu Chakraborty, Tomonobu Senjyu and Miguel Velez-Reyes

3.D: Power Electronics Applications

Power Electronics Track

Monday, 2:00 to 3:30 PM, RSC 264

Chair: Sadik Kukuksari, University of Northern Iowa

#57 Analysis and Modeling of a Non-Isolated Two-Phase Interleaved Boost Converter with Diode-Capacitor Cells in the DCM

Mohammad Altmanian, Mohamad Saleh Sanjari Nia, Mehdi Ferdowsi and Pourya Shamsi

#66 Quasi-Dynamic Domain Modeling of Line-Commutated Converters with the Analytical Approach

Kaiyu Liu, Sakis Meliopoulos, Boqi Xie, Chiyang Zhong and Jiahao Xie

#31 Time Domain Analysis of Power Quality Adverse Effects of Grid Interconnected Photovoltaic Generation

Rafael Cisneros-Magaña, Aurelio Medina and Claudio Rubén Fuerte-Esquivel

#270 A Soft Switching Single Stage Isolated Three Phase Bidirectional PFC Converter for Electric Vehicles Charging

Anant Singh, Prasanna U R, Kaushik Rajashekara, Vinay Rathore, Lazar Ben-Brahim and Adel Gastli, Vinothine Shanmugarajah

#125 Equivalent Modeling, Design and Analysis of Integrated Magnetics Ćuk Converter

Anushree Ramanath, Abhijit Kshirsagar, Sreekanth Thamballa and Ned Mohan

#305 Realization of Enhanced Phase Locked Loop using Raspberry Pi and LabVIEW

Rama Kolla, Zhengyu Wang, Zhixin Miao and Lingling Fan

3.E: Demand Response

Economics Track

Monday, 2:00 to 3:30 PM, RSC 265

Chair: Jay Caspary, Southwest Power Pool

#215 Optimal Trading Strategies in Continuous Double Auctions for Transactive Energy

Junkai Liang and Wenyuan Tang

#253 Improving LMP Based Day Ahead Forecasts Using Auto Regressive Integrated Moving Average (ARIMA) With Shadow Pricing, EFORd Rates, and Transmission Loss Ratios

Brian Morrow, Claire Krokker, Daisy Selvaraj and Prakash Ranganathan

#209 Designing Multistep Peak Time Rebate Programs for Curtailment Service Providers

Xiaochu Wang and Wenyuan Tang

#283 Pricing Implications of Transmission Security Modeling in Electric Energy Markets

Mehdi Saleh, Karthik Saikumar and Kory Hedman

#19 Integrating Demand Response Aggregators with Negawatt Trading Mechanisms in Electricity Markets

Abdullah Algarni, Sid Suryanarayanan and Toru Namerikawa

#117 Data-Driven Analysis of Regional Capacity Factors in a Large-Scale Power Market: A Perspective from Market Participants

Zhongyang Zhao, Caisheng Wang, Huaiwei Liao and Carol Miller

3.F: Power System Security

Power System Analysis Track

Monday, 2:00 to 3:30 PM, RSC 256

Chair: Mostafa Sahraei-Ardakani, University of Utah

#33 Two-Stage Stochastic Power Grid Expansion Considering Multiple N-1-1 Contingencies

Daniel Zuniga Vazquez and Neng Fan

#110 Ranking of Bulk Transmission Assets for Maintenance Decisions

Harsh Bhandari, Vijay Vittal, Gerald Heydt, Faustino Quintanilla and Wesley Knuth

#84 Remedial Action Scheme Utilization Practices for Operational Studies in West Interconnection

Xiaping Zhang, Jason Ausmus, Pankaj Sen and Joseph Mercer

#58 Impact of Active Distribution Network on Contingency Analysis of Transmission System

Megha Gupta and Abhijit R Abhyankar

#272 DNN-Based Contingency Screening Module for Voltage Stability Analysis

Tamer Ibrahim and Ahmed Mohamed

#168 Scenario-Based Analysis for Disaster-Resilient Restoration of Distribution Systems

Santosh Sharma, Qiuhua Huang, Ahmad Tbaileh and Qifeng Li

3.G: Microgrid II

Renewables Track

Monday, 2:00 to 3:30 PM, RSC 266

Chair: Saurav Basnet, Wentworth Institute of Technology

#103 Optimal Design of Microgrid at an Industrial Complex

Maximiliano Lainfiesta, Joaquin Guillon, Queen Okon and Xuewei Zhang

#113 Hardware in Loop (HIL) Testing of Energy Management Controller for Electric Vehicle Integrated Microgrid

Venkateswaran Lakshminarayanan, Goutham Selvaraj, Kaushik Rajashekara, Lazar Ben-Brahim and Adel Gastli

#124 Multi-Agent System Using Jade for Distributed DC Microgrid System Control

Anas Alseiyat and Jae-Do Park

#268 Dynamic Simulation of Distribution Systems and Microgrids for Reconfiguration Studies Using PSCAD/EMTDC

Ogbonnaya Bassey, Bo Chen, Karen Butler-Purpy and Chen Chen

#41 Real-Time Congestion Prevention in Modern Distribution Power Systems via Demand Response of Smart Homes

Arash Asrari, Meisam Ansari and Bibek K. C.

#282 Energy Portfolio-Based Joint Flexibility Scheduling of Coordinated Microgrids

Farhad Angizeh, Kien Chau, Khashayar Mahani and Mohsen Jafari

4.A: Optimal Operation

Economics Track

Monday, 3:45 to 5:15 PM, RSC 257

Chair: Wenyan Tang, North Carolina State University

#141 Chance-Constrained Unit Commitment via the Scenario Approach

Xinbo Geng and Le Xie

#194 Noiseless Consensus Based Economic Dispatch Algorithm in Conjunction with STATCOM Controller for Reactive Power Compensation in Islanded Microgrids to Enhance Voltage and Power Stability

Shruti Singh and David Wenzhong Gao

#289 Security-Constrained Optimal Power Flow Solved with a Dynamic Multichain Particle Swarm Optimizer

Haixiang Zhang, Jianan Liu, Dongliang Xiao and Wei Qiao

#78 Enabling Customers Through Distributed Economic Dispatch

Sruthi Davuluri, Rupamathi Jaddivada and Marija Ilic

4.B: State Estimation

Power System Analysis Track

Monday, 3:45 to 5:15 PM, RSC 256

Chair: John Pierre, University of Wyoming

#106 Decentralized Dynamic State Estimation with Bimodal Gaussian Mixture Measurement Noise

Vahid Sarfi, Amir Ghasemkhani, Iman Niazazari, Hanif Livani and Lei Yang

#286 Improving Performance of Multi-Area State Estimation using Spectral Clustering

David Kelle and Ali Abur

#82 CT Instrumentation Channel Error Correction using Dynamic State Estimation

Emeka Obikwelu and Sakis Meliopoulos

#81 A Method for Correcting Frequency and RoCoF Estimates of Power System Signals with Phase Steps

Felipe Wilches-Bernal, Josh Wold, Ricky Concepcion and Jamie Budai

#155 Data-Drive Dynamic Model Identification for Synchronous Generators

Zhengyu Wang, Lingling Fan and Zhixin Miao

#93 Optimal Line Parameter Estimation Method for Mid-Compensated Transmission Lines

Yiqi Zhang and Yuan Liao

4.C: Microgrid Applications

Power Electronics Track

Monday, 3:45 to 5:15 PM, RSC 261

Chair: Mohammad Sadi, University of Central Missouri

#45 Comparison of Islanding and Synchronization for a Microgrid With Different Converter Control

Abdulhakim Alsaif, Zhixin Miao and Lingling Fan

#100 Neural Network Predictive Controller for Grid-Connected Virtual Synchronous Generator

Sepehr Saadatmand, Mohamad Saleh Sanjari Nia, Pourya Shamsi, Mehdi Ferdowsi and Donald C Wunsch

#128 Distribution System Harmonic Mitigation Using a PV System with Hybrid Active Filter Features

Abdallah a. Smadi, Hangtian Lei and Brian K. Johnson

#321 Comparative Analysis of Self-Synchronized Virtual Synchronous Generator Control and Droop Control for Inverters in Islanded Microgrid

Anusha Kandula, Vishal Verma, Sarika Solanki and Jignesh Solanki

#156 Exploring the Leakage Inductance of Transformers Used in Dual Active Bridge

Denisse Alejandra Meza Soria, Satish Ranade and Olga Lavrova

#129 Analysis of Various Transformer Structures for High Frequency Isolation Applications

Mohamad Saleh Sanjari Nia, Sepehr Saadatmand, Mohammad Altmanian, Pourya Shamsi and Mehdi Ferdowsi

4.D: Volt-Var. Control

Distribution System Track

Monday, 3:45 to 5:15 PM, RSC 262

Chair: Zhaoyu Wang, Iowa State University

#304 Feeder Level Linear Voltage Drop Model for Active Radial Distribution System Operation in the Presence of Distributed Generation

Aasheesh Deshmukh, Md Rakib Ur Rahman and Visvakumar Aravinthan

#301 Coordinated Voltage Regulator Control in Systems with High-Level Penetration of Distributed Energy Resources

Shahrazad Mahdavi and Aleksandar Dimitrovski

#28 Distribution Network Voltage Profile Optimization via Multi-Stage Flexible Optimal Power Flow

Chiyang Zhong, Boqi Xie and Sakis Meliopoulos

#149 DER Coordination Strategy for Volt/VAR Control Using IEC61850 GOOSE Protocol

Hamdi Albusheeh and Roy Mccann

#157 Reactive Power Optimization for Flat Voltage Profiles in Distribution Networks

Vanja Svenda, Mai Vu and Aleksandar Stankovic

#148 Advanced Supplemental Controller for a Static VAR Compensator in Power Systems

Anusree Mandal, Lili Dong and Allen Morinec

4.E: Energy Storage I

Renewables Track

Monday, 3:45 to 5:15 PM, RSC 264

Chair: Arash Asrari, Southern Illinois University

#65 Mathematical Models for Optimization of Grid-Integrated Energy Storage Systems: A Review

Chiebuka Eyisi, Ameena Saad Al-Sumaiti, Konstantin Turitsyn and Qifeng Li

#132 Battery Energy Storage-Based Strategy for Suppressing Wind Farm's Subsynchronous Oscillation

Lin Yang, Xiaohan Zhang and Chengzong Pang

#52 A Two-Stage Algorithm for Optimal Scheduling of Battery Energy Storage Systems for Peak-Shaving

Roozbeh Karandeh, Tumininu Lawanson and Valentina Cecchi

#169 Energy Management of a Battery Combined with PV Generation

Mohamed Abuagreb, Hussain Beled and Brian Johnson

#74 Suppression Strategy of Ultra-Low Frequency Oscillation in Yunnan Power Grid with BESS

Yixuan Chen, Yuanxiao Zhao, Guangchao Geng, Quanyuan Jiang, Wenlong Liu and Lingfang Li

#48 Optimal Energy Storage-Grid Coordination for Hospitals: Prototype Development

Gad Monga Ilunga, Mary Thompson, Osamuyi Obadogbony and Santiago Grijalva

4.F: Reliability

Power System Analysis Track

Monday, 3:45 to 5:15 PM, RSC 265

Chair: Mohamed Ben-Idris, University of Nevada, Reno

#6 Investigation of Computational Advantage of using Importance Sampling in Monte Carlo Simulation

Sai Kiran Kanchari Bavajigari and Chanan Singh

#91 Implementing Online Oscillation Monitoring and Forced Oscillation Source Locating at Peak Reliability

Hongming Zhang, Jiawei Ning, Haoyu Yuan and Vaithianathan "Mani" Venkatasubramanian

#205 Capacity Credit Evaluation of Wind Farm Considering Impact of Turbine Hub Level

Nga Nguyen, Saleh Almasabi and Joydeep Mitra

#139 Probabilistic Risk Assessment of an Active Distribution Network using Monte Carlo Simulation Approach

Umair Shahzad and Sohrab Asgarpour

#86 Multiobjective Optimization of PV/Wind/ESS Hybrid Microgrid System Considering Reliability and Cost Indices

Ali Parizad and Konstantinos Hatziaodionu

#225 Identifying an Exploitable Structure for the Core Problem of Load-Redistribution Attack Problems

Ramin Kaviani and Kory Hedman

4.G: Stability II

Power System Analysis Track

Monday, 3:45 to 5:15 PM, RSC 266

Chair: Barjeev Tyagi, IIT Roorkee

#178 Modal Damping Estimation: An Alternative for Hilbert Spectral Analysis

Mohammadreza Hatami, Mohammadreza Maddipour Farrokhifard and Vaithianathan "Mani" Venkatasubramanian

#217 Fuzzy Logic Controlled Bridge Switch-Type Flux-Coupling Non-Superconducting Fault Current Limiter for Transient Stability Enhancement of Power System

Mohammad Sadi, Ahmed Abuhussein and Ranjay Singh

#246 An Approach for Site Selection to Integrate Renewable Energy Sources Based on Power System Parameters

Shruti Ranjan and Abhijit R. Abhyankar

#252 Bifurcation Point Tracking in Generator Outage Scenario Using Nested Holomorphic Embedding Power Flow Method

Bhagyashree Umathe, Sonam Kharade, Sushma Wagh and Navdeep Singh

#143 A Second-Order Synchronous Machine Model for Multi-Swing Stability Analysis

Olaoluwapo Ajala, Alejandro Dominguez-Garcia, Peter Sauer and Daniel Liberzon

#114 Network Reduction in Transient Stability Models using Partial Response Matching

Benjamin Francis, Jacob Nuttall, Mark Transtrum, Andrija Saric and Aleksandar Stankovic

5.A: Control Applications

Emerging Topics Track

Tuesday, 9:00 to 10:30 AM, RSC 261

Chair: John Watkins, Wichita State University

#210 Model Predictive Energy Management for Building Microgrids With IoT-Based Controllable Loads

Duc Tran, Edward Sanchez and Masoud Nazari

#109 Exploring Optimal Control Strategies for Enhanced Grid Frequency Regulation

Chris Briere, Hector Pulgar and Seddik Djouadi

#189 Robust Frequency Control of Power Systems Under Time-Varying Loads

Zhenhua Wang, Haibo He and Yan Sun

#63 Nonlinear Optimal Tracking Control of Wind Energy Conversion System in Partial Load Region

Sudipta Paul and D. Subbaram Naidu

#310 Multiple Single Phase Inverters Based Combined Active Power Management and Voltage Regulation of Power Distribution System Based on a Novel Optimal Control Architecture

Robin Bisht, Arun Suresh and Sukumar Kamalasadan

#75 Robust Nonlinear Optimal Control for Voltage-Frequency and Active-Reactive Power Regulation in Microgrids

Serafin Ramos Paz, Fernando Ornelas Tellez and Jesus Rico Melgoza

5.B: New Trends

Renewables Track

Tuesday, 9:00 to 10:30 AM, RSC 264

Chair: Hanif Llvani, University of Nevada, Reno

#287 Offshore Wind Farm Collection Cable Layout Optimization Through Cost Minimization

Hamid Tahery and Sadik Kucuksari

#219 A Simplified and Effective GMPP Tracking Algorithm for Solar Photovoltaic System

Shwetank Agrawal, Barjeev Tyagi, Vishal Kumar, Pramod Agarwal and Pawan Sharma

#224 Electrical Energy Consumption, Energy Efficiency and Energy Conservation in Commercial Sector and "LEED" Certification

Emily Royal, Keun Lee and Pankaj K. Sen

#88 Maximizing Revenue from Electrical Energy Storage Paired with Community Solar Projects in NYISO Markets

Alexander Headley, Clifford Hansen and Tu Nguyen

#18 Loss Locational Sensitivity in Distribution Systems

Abdullah Alburidy and Lingling Fan

#232 Demand Response and Solar to Mitigate Peak Load

Tushar Sethi and Ward Jewell

5.C: DER Management

Distribution Systems Track

Tuesday, 9:00 to 10:30 AM, RSC 255

Chair: Anurag Srivastava, Washington State University

#187 A Smart Charging Strategy for Electric Vehicles to Increase their Hosting Capacity in Distribution Systems

Md Kamruzzaman and Mohammed Ben-Idris

#191 Local Smart Inverter Control to Mitigate the Effects of Photovoltaic (PV) Generation Variability

Rahul Jha and Anamika Dubey

#12 Fuzzy Ant Colony Optimization Technique for Predefined Performance of Distribution Systems Considering DGs and Shunt Capacitors

Preetham Goli, Suresh Makkena, Srinivasa Rao Gampa and Debapriya Das

#59 Measurement-Based Optimal Power Flow with Linear Power-Flow Constraint for DER Dispatch

Severin Nowak, Liwei Wang and Yu Christine Chen

#67 PV Penetration Optimization with WAM Smart Inverters Through Reduction of Power System Distribution Losses

Hossein Salehfar and John Beuning

#85 A Framework for Simultaneous Management of Greenhouse Gas Emission and Substation Transformer Congestion via Cooperative Microgrids

Meisam Ansari, Mostafa Ansari and Arash Asrari

5.D: Machines and Transformers

Tuesday, 9:00 to 10:30 AM, RSC 257

Chair: Bill Diong, Kennesaw State University

#38 A Solid State Transformer Model for Proper Integration to Distribution Networks

Darshit Shah, Bhanu Baddipadiga, Mariesa Crow and Mehdi Ferdowsi

#136 Analytical Modeling of a Ferromagnetic Core Reactor

Subash Pokharel and Aleksandar Dimitrovski

#167 Multi-Objective Design Optimization of Synchronous Reluctance Machines Based on the Analytical Model and the Evolutionary Algorithms

Hang Shao, Sufei Li, Chiyang Zhong and Thomas Habetler

#130 Analysis of Skin Effect in High Frequency Isolation Transformers

Mohamad Saleh Sanjari Nia, Sepehr Saadatmand, Mohammad Altimania, Pourya Shamsi and Mehdi Ferdowsi

#264 Robust Control of Solid State Transformer Using Dynamic Phasor Based Model with dq Transformation

Monika Madhusoodan, Ragini Meshram, Sushama Wagh, N. M. Singh and A. M. Stankovic

#201 An Improved Method for the Practical Determination of Core and Copper Losses in High Frequency Switchmode Transformers

Kartikeya Jayadurga Prasad Veeramraju and Jonathan Kimball

5.E: Sensors and PMU Application

Emerging Topics Applications

Tuesday, 9:00 to 10:30 AM, RSC 262

Chair: Brian Johnson, University of Idaho

#127 A PMU Based Islanding Detection Scheme Immune to Additive Instrumentation Channel Errors

Meghna Barkakati, Reetam Sen Biswas and Anamitra Pal

#34 MILP Based Deployment of Micro-PMU in Reconfigurable Active Distribution Network

Gagandeep Singh Dua, Barjeev Tyagi and Vishal Kumar

#101 Asset Monitoring using Smart Sensing and Advanced Analytics for the Distribution Network

Shreyas Kulkarni, Kavya Ashok, Frank Lambert and Deepak Divan

#186 Synchrophasor Measurement-Based Modal Analysis in Power Grids

Tao Jiang, Linqun Bai, Xue Li and Fangxing Li

#160 Distribution System State Estimation with AMI Based on Load Correction Method

Tazwar Muttaqi, Thomas L. Baldwin and Steve C. Chiu

#20 Synthesize Phasor Measurement Unit Data Using Large-Scale Electric Network Models

Ti Xu, Hanyue Li, Adam Birchfield and Thomas Overbye

5.F: Cyber Physical Systems II

Emerging Topics Track

Tuesday, 9:00 to 10:30 AM, RSC 256

Chair: Sergio Salinas, Wichita State University

#151 Opportunistic Network Sharing for Transporting Smart Grid Data Traffic

Vishnu Cherusola Dev, Uddipan Das and Vinod Nambodiri

#313 Physics-Guided Deep Learning for Time-Series State Estimation Against False Data Injection Attacks

Lei Wang and Qun Zhou

#238 Learning-Based Defense of False Data Injection Attacks in Power System State Estimation

Amav Kundu, Abhijeet Sahu, Katherine Davis and Erchin Serpedin

#318 Efficient Modeling of HIL Multi-Grid System for Scalability & Concurrency in CPS Security Testbed

Ravikumar Gelli, Burhan Hyder and Manimaran G

#46 A Routing and Link Scheduling Strategy for Smart Grid NAN Communications

Shuchismita Biswas and Virgilio Centeno

#204 Coherency-Based Detection Algorithm for Synchronphasor Cyberattacks

Philip Hart, Sowmya Acharya and Honggang Wang

5.G: Demand Response

Emerging Topics Track

Tuesday, 9:00 to 10:30 AM, RSC 266

Chair: Sukumar Kamalasadan, UNC, Charlotte

#197 Real-Time Voltage-Stability Enhancement via Demand Response

Mohammadhafez Bazrafshan, Hao Zhu and Nikolaos Gatsis

#212 Identification of the Potential of Residential Demand Response using Artificial Neural Networks

Ashwin Shirsat and Wenyuan Tang

#7 Chance-Constrained Water Pumping Managing Power Distribution Network Constraints

Anna Stuhlmacher and Johanna L. Mathieu

#243 A Data-Driven Approach for Providing Frequency Regulation with Aggregated Residential HVAC Units

Akintonde Abbas and Badrul Chowdhury

#273 A Data-Driven Based Strategy to Evaluate Participation of Diverse Social Classes in Smart Electric Grids

Mingyue He and Mojdeh Khorsand

#22 Integration of Rooftop PV Systems with Decentralized Residential and Commercial Demand Side Management

Hamidreza Sadeghian and Zhifang Wang

6.A: GMD and EMD

Emerging Topics Track

Tuesday, 10:45 to 12:15 PM, RSC 256

Chair: Xingpeng Li, University of Houston

#11 Grid Impact Evaluation of Localized Geomagnetic Field Enhancements using Sensitivity Analysis

Yiqiu Zhang, Komal Shetye, Adam Birchfield and Thomas Overbye

#261 Extreme Value Analysis of Geomagnetically Induced Currents Based on Historical Magnetic Field Data

Rishi Sharma and James D. McCalley

#242 Power Grid Resilience to Electromagnetic Pulse (EMP) Disturbances: A Literature Review

Dingwei Wang, Yifu Li, Payman Dehghanian and Shiyuan Wang

#228 System-Wide Case Study Assessment of Transformer Heating due to Geomagnetic Disturbances

Pooria Dehghanian, Komal Shetye, Katherine Davis and Thomas Overbye

#154 Optimal Mounting Configuration of Fixed Bifacial PV Systems

Lei Chen, Caisheng Wang, Mahdi Rouholamini, Saeed Alyami and Jihe Cai

6.B: Renewables

Economics Track

Tuesday, 10:45 to 12:15 PM, RSC 261

Chair: Qun Zhou, University of Central Florida

#260 Behind-the-Meter Energy Storage: Economic Assessment and System Impacts in Georgia

Sadegh Vejdani, Adam Kline, Mason Totri, Santiago Grijalva and Richard Simmons

#276 Conditions for Ramp Rates Causing Uplift

Shaobo Zhang and Kory Hedman

#134 Market Power in Electric Power Distribution Systems

Matthew Roveto and Yury Dvorkin

#35 Techno-Economic Investigation of a Hybrid Wind-Solar Distribution System using Stochastic Optimization

Ahmad Abuelrub, Hussien M. K. Al-Masri and Chanan Singh

#193 Noiseless Consensus Based Algorithm for Economic Dispatch Problem in Grid-Connected Microgrids to Enhance Stability Among Distributed Generators

Shruti Singh and David Wenzhong Gao

#42 Day-Ahead Distribution Market Analysis via Convex Bilevel Programming

Abdullah Alassaf, Lingling Fan and Ibrahim Alsaleh

6.C: Electric Vehicles

Renewables Track

Tuesday, 10:45 to 12:15 PM, RSC 257

Chair: Preetham Goli, University of Missouri-Kansas City

#320 Online Market Place for Bilevel EV Charging Control for Urban Community Park and Charge Lots

Sandhya Rani Nadipalli, Srinivas Jegannathan, Sultan Hakmi and Visvakumar Aravinthan

#164 On the Tariff Modification for Future Electric Vehicle Connection to the Grid

Roghieh a. Biroon, Zoleikha Abdollahi Biron and Ramtin Hadidi

#171 Demand Side Management for Homes in Smart Grids

Mohammad Rasoul Narimani

#208 Cost Reduction of School Bus Fleet Electrification with Optimized Charging and Distributed Energy Resources

William Becker, Eric Miller, Partha Mishra, Rishabh Jain, Dan Olis and Xiangkun Li

#147 Impacts of Plug-in Electric Vehicles on a Distribution Level Microgrid

Jubair Yusuf, a S M Jahid Hasan and Sadrul Ula

6.D: Fault Analysis

Power System Analysis Track

Tuesday, 10:45 to 12:15 PM, RSC 262

Chair: Darshit Shah, West Texas A&M University

#288 DC (Optimal) Power Flow-Based Models for Simulation and Mitigation of Overload Cascading Failures

Jianan Liu, Haixiang Zhang, Wei Qiao and Liyan Qu

#176 Dynamic Islanding in Power Systems Based on Real-Time Operating Conditions

Sagnik Basumallik and Sara Eftekhari

#227 Understanding Factors that Influence the Risk of a Cascade of Outages due to Inverter Disconnection

Caroline Popiel and Paul Hines

#37 Fault Location for Distribution Systems with Distributed Generations without using Source Impedances

Wen Fan and Yuan Liao

#202 An Exploration of the D-FACTS Influence in the Mho Ground Distance Elements in Presence of Fault Resistance and Parallel Lines Mutual Coupling

Hussain Beled, Brian Johnson and Herbert Hess

#108 Transmission Line Fault Location using Deep Learning Techniques

Rui Fan, Tianzhixi Yin, Renke Huang, Jianming Lian and Shaobu Wang

6.E: Electric Vehicles

Emerging Topics Track

Tuesday, 10:45 to 12:15 PM, RSC 264

Chair: Daisy Flora Selvaraj, University of North Dakota

#185 Cost-Benefit Analysis of Optimal Charging Strategy for Electric Vehicle with V2G

Jiachen Fan and Zhi Chen

#183 Learning EV Placement Factors with Social Welfare and Economic Variation Modeling

Jingyi Yuan, Qiushi Cui, Zhihao Ma and Yang Weng

#8 Optimized and Coordinated Charging Methods for Electric Vehicles Cost

Yu Hao, Atousa Yazdani and Mahyar Zarghami

#245 Impact of Temperature on State of Charge Estimation for an Electric Vehicle

Shivaraj Mohite, Udaykumar Suryawanshi, Mohd Adil Sheikh, Sushama Wagh and Navdeep Singh

#315 A Diversity-Based Clustering Technique for Implementing Decentralized Node Level Charge Scheduling of Electric Vehicles

Chak Lam Shek, Arun-Kaarthick Manoharan, Srikanth Gampa, Thejas Chandrappa and Visvakumar Aravinthan

6.F: Energy Storage II

Renewables Track

Tuesday, 10:45 to 12:15 PM, RSC 265

Chair: Tarek Masaud, Marshall University

#107 Evolution of Distributed Energy Resource Grid Interconnection Standards for Integrating Emerging Storage Technologies

Akshay Kumar Jain, Adarsh Nagarajan, Ilya Chernyakhovskiy, Thomas Bowen, Barry Mather and Jaquelin Cochran

#43 Small-Signal Modeling and Analysis of a Grid-Connected PEM Fuel Cell

Javad Khazaei, Faegheh Moazeni, Brennan Trussell and Arash Asrari

#240 Sizing Battery Energy Storage Systems for Microgrid Participating in Ancillary Services

Abdullah Alharbi, Wenzhong Gao and Ibrahim Alsaidan

#200 Battery Degradation Modeling and Optimal Usage in a Microgrid Using Markov Decision Process

Vikram Roy Chowdhury, Jie Li, Jonghyun Park, Robert Landers and Jonathan Kimball

#211 Lifetime Revenue from Energy Storage Considering Battery Degradation

Atri Bera, Nga Nguyen and Joydeep Mitra

#290 Conservation Voltage Reduction by Coordinating Legacy Devices, Smart Inverters and Battery

Mohammad Ostadijafari, Rahul Ranjan Jha and Anamika Dubey

6.G: New Opportunities in Power System

Tuesday, 10:45 to 12:15 PM, RSC 266

Chair: Linquan Bai, University of North Carolina, Charlotte

#1 Large Scale Desalination: Potential for a Significant Electric Energy Market

Gerald Thomas Heydt, Farshad Mohammadi, Mostafa Sahraei-Ardakani and Yousef Al-Abdullah

#198 Comparative Evaluation of Super Grid Topologies Proposed for Europe and Latin America

Rodney Itiki, Madhav Manjrekar and Silvio Giuseppe Di Santo,

#51 Climate Change Effects on Solar, Wind and Hydro Power Generation

Vikramaditya Penmetsa and Keith Holbert

#309 Decoupled and Unified Approaches for Solving Transmission and Distribution Co-Simulations

Mohammad Asif Iqbal Khan, Arun Suresh, Sumit Paudyal and Sukumar Kamalasadan

#70 Distributed PV Penetration Impact Analysis on Transmission System Voltages Using Co-Simulation

Gayathri Krishnamoorthy, Rabayet Sadnan and Anamika Dubey

#50 SPP Grid Strength Study with High Inverter-Based Resource Penetration

Douglas Bowman, Deepak Ramasubramanian, Roy Mccann, Evangelos Farantatos, Anish Gaikwad and Jay Caspari

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Index

A

Abdollahi, Roghieh 7
 Abhyankar, Abhijit R. 8, 11, 14
 Abuagreb, Mohamed 13
 Abuelrub, Ahmad 17
 Abuhusseini, Ahmed 14
 Abur, Ali 6, 9, 12
 Acharya, Sowmya 16
 Agarwal, Pramod 14
 Agrawal, Shwetank 14
 Agustriadi, Agustriadi 9
 Ajala, Olaoluwapo 8, 14
 Akula, Shruvan Kumar 8
 Al-Abdullah, Yousef 18
 Alamri, Abdullaah 9
 Alasaf, Abdullah 7, 17
 Alunashee, Hamdi 13
 Alburidi, Abdullah 14
 Aldayel, Mohammed 7
 Algarni, Abdullah 11
 Alharbi, Abdullah 18
 Aljohani, Nader 7
 Almasabi, Saleh 13
 Al-Masri, Hussien M. K. 17
 Almutairi, Sulaiman 8
 Alowalfeer, Maad 9
 Alsaidan, Ibrahim 18
 Alsaif, Abdulkhakim 12
 Alsaleh, Ibrahim 17
 Alseyat, Anas 11
 Alshrieef, Mashhor 7
 Al-Sumaili, Aameena Saad 13
 Altmanian, Mohammad 10, 12, 15
 Alves, Helton Do Nascimento 7
 Alyami, Saeed 16
 Angizeh, Farhad 11
 Ansari, Meisam 11, 15
 Ansari, Mostafa 15
 Aravinthan, Visvakumar 3, 4, 6, 13, 17, 18
 Arrazabal, Francisco Alexander Zelaya 9
 Asgarpour, Sohrab 13
 Ashok, Kavya 9, 15
 Asrari, Arash 7, 11, 13, 15, 18

Attia, John 10
 Ausmus, Jason 11
 Azofeifa, Oscar 8

B

Baddipadiga, Bhanu 15
 Bahramipana, Maryam 9
 Bai, Linquan 15, 18
 Bajaria, Pratik 7
 Baldwin, Thomas L. 15, 18
 Banjar-Nahor, Kevin Marojahan 9
 Barkakati, Meghna 15
 Basnet, Saurav 11
 Bassey, Ogbonnaya 11
 Basumallik, Sagnik 17
 Bavajigari, Sai Kiran Kanchari 13
 Bazrafshan, Mohammadhafez 16
 Becker, William 17
 Beled, Hussain 10, 13, 17
 Ben-Brahim, Lazar 10, 11
 Ben-Idris, Mohammed 13, 15
 Bera, Atri 18
 Bershinsky, Victor 9
 Bésanger, Yvon 9
 Beuning, John 15
 Bhandari, Harsh 11
 Bibek K. C. 11
 Bichler, Timothy 9
 Birchfield, Adam 9, 15, 16
 Biron, Zoleikha Abdollahi 7, 17
 Biroon, Roghieh A. 17
 Bisht, Robin 14
 Biswas, Biswajit 7
 Biswas, Reetam Sen 10, 15
 Biswas, Shuchismita 16
 Blaine, Raymond 6
 Bowen, Thomas 18
 Bowman, Douglas 18
 Brahma, Sukumar 6, 10
 Bretas, Arturo 7
 Bretas, Newton 7
 Brewster, James 4
 Briere, Chris 14

Buchhop, Steven 10
 Budai, Jamie 12
 Bu, Fankun 8
 Butler-Purry, Karen 11

C

Cai, Jihe 16
 Callupe, Steven Perez 7
 Caspary, Jay 11, 18
 Cecchi, Valentina 13
 Centeno, Virgilio 16
 Chakraborty, Shantanu 10
 Chakraborty, Suvagata 4, 6
 Chandrappa, Thejas 18
 Chau, Kien 11
 Chen, Bo 11
 Chen, Chen 11
 Chen, Lei 16
 Chen, Yixuan 13
 Chen, Yonghong 6
 Chen, Yu Christine 15
 Chen, Zhi 18
 Chernyakhovskiy, Ilya 18
 Chiu, Steve C. 15
 Chong, Edwin 8
 Chowdhury, Vikram Roy 18
 Chu, Khoi 9
 Chun, Ethan 8
 Cisneros-Magaña, Rafael 10
 Claes, Zaran 6
 Cochran, Jaquelin 18
 Conception, Ricky 12
 Crow, Mariesa 15
 Cui, Qiushi 10, 18

D

Danilczyk, William 8
 Das, Debapriya 15
 Das, Pankaz 10
 Das, Uddipan 16
 Davis, Katherine 7, 16
 Davuluri, Sruthi 12

Dehghanian, Payman 9, 16
 Dehghanian, Pooria 16
 Dehghanpour, Kaveh 8
 De Jesus, Dan Rosa 10
 Deshmukh, Aasheesh 13
 Dev, Vishnu Cherusola 16
 Dimitrovski, Aleksandar 13, 15
 Dinavahi, Venkata 9
 Diong, Bill 8, 15
 Di Santo, Silvio Giuseppe 18
 Divan, Deepak 9, 15
 Djouadi, Seddik 14
 Dominguez-Garcia, Alejandro 8, 14
 Dong, Lili 13
 Dong, Xishuang 10
 Donner, Phillip 6
 Dua, Gagandeep Singh 15
 Dubey, Anamika 9, 15, 18
 Dvorkin, Yury 17

E

Eftekharnajad, Sara 17
 Eslinger, Jonathan J. 6
 Etingov, Pavel 8
 Eyisi, Chiebuka 13

F

Fadali, M. Sami 10
 Fan, Jiachen 18
 Fan, Lingling 7, 8, 10, 12, 14, 17
 Fan, Neng 11
 Fan, Rui 17
 Fan, Wen 17
 Farantatos, Evangelos 18
 Farrokhifard, Mohammadreza Maddipour 6, 14
 Feliciano, Alfonso Jose Cruz 9
 Ferdowsi, Mehdi 8, 10, 12, 15
 Ferrari, Maximiliano 8
 Figueroa-Acevedo, Armando 6
 Foley, Shannon 6
 Francis, Benjamin 14

Fuerte-Esquivel, Claudio Rubén 10

G

Gadde, Phani Harsha 6
Gaikwad, Anish 18
Gampa, Srikanth 18
Gampa, Srinivasa Rao 15
Gandluru, Anandini 9
Gao, David Wenzhong 12, 17
Gao, Tianlu 6
Gao, Wei 6
Gao, Wenzhong 6, 18
Garcia, Vicente Torres 9
Gastli, Adel 10, 11
Gatsis, Nikolaos 16
Gelli, Ravikumar 16
Geng, Guangchao 13
Geng, Xinbo 12
Ghasemkhani, Amir 12
Gholami, Amir 7
Ghorbani, Mahsa 8
Girigoudar, Kshitij 8
Goli, Preetham 15, 17
Govindarasu, Manimaran 7, 16
Grijalva, Santiago 9, 13, 17
Guan, Peimeng 6
Guillamon, Joaquin 11
Gupta, Megha 11

H

Habetler, Thomas 15
Hadidi, Ramtin 17
Hagle, Avery 8
Hakmi, Sultan 4, 17
Hambrick, Joshua 8
Hansen, Clifford 14
Hao, Yu 18
Harave, Sudarshan Tejanag 8
Hart, Philip 16
Hasan, A S M Jahid 17
Hasan, Jakir 10
Hashmy, Yousaf 10
Hasnat, Md Abul 7
Hatami, Mohammadreza 6, 14
Hatziaodoniu, Konstadinos 13
Havemann, Jarrad 9

Hayat, Majeed M. 10
Headley, Alexander 14
Heath, Brandon 6
Hedman, Kory 9, 11, 13, 17
Hedman, Mojdeh Khorsand 10
He, Haibo 8, 14
Henri, Gonzague 10
Hess, Herbert 10, 17
Hettiarachchige-Don, Anton 4, 6
Heydt, Gerald T. 4, 6, 9, 11, 18
Hines, Paul 17
Hoffman, Karissa 4
Hogan, Ernie 9
Holbert, Keith 18
Hossain, Sheikh Jakir 7
Huang, Garng 7
Huang, Hao 7
Huang, Qihua 11
Huang, Renke 17
Huda, Md. Najmul 10
Huebsch, Matt 6
Hyder, Burhan 16

I

Ibrahim, Tamer 11
Idehen, Ikponmwosa 9
Ignatiadis, Dimitra 10
Ilic, Marija 12
Ilunga, Gad Monga 13
Irvine, Celine 9
Islam, Md. Rashidul 10
Itiki, Rodney 18

J

Jaddivada, Rupamathi 12
Jafari, Mohamadsaleh 10
Jafari, Mohsen 11
Jain, Akshay Kumar 18
Jain, Rishabh 17
Jang, Wonhyeok 9
Javier, Romel Angel Cardenas 9
Jeganmohan, Srinivas 17
Jewell, Ward 3, 4, 14
Jha, Rahul 15, 18
Jiang, Quanyuan 13
Jiang, Tao 15

Johnson, Brian K. 4, 10, 12, 13, 15, 17
Johnson, Nathan 8

K

Kabalan, Mahmoud 8
Kalaria, Charul 8
Kamalasadan, Sukumar 7, 14, 16, 18
Kamruzzaman, Md 15
Kandula, Anusha 12
Kapourchali, Mohammad Heidari 6
Karandeh, Roozbeh 13
Kaviani, Ramin 13
Kelle, David 12
Khalilisenobari, Reza 6
Khan, Mohammad Asif Iqbal 18
Kharade, Sonam 7, 14
Khatrri, Ishan 10
Khazaei, Javad 7, 18
Khezrimotlagh, Darius 7
Khodabandehlou, Hamid 10
Khodaei, Amin 9
Kimball, Jonathan 15, 18
Kimber, Anne 6, 8
Kline, Adam 17
Knuth, Wesley 11
Kolla, Rama 10
Kremzeir, Kyle 7
Krishnamoorthy, Gayathri 18
Krocker, Claire 11
Kshirsagar, Abhijit 10
Kucuksari, Sadik 10, 14
Kulkarni, Chinmay 4
Kulkarni, Shreyas 9, 15
Kumar, Vishal 14, 15
Kundu, Arnav 16
Kutby, Moayad 7

L

Lainfiesta, Maximiliano 11
Lakshminarayanan, Venkateswaran 11
Lambert, Frank 15
Lamers, Clare 7
Landers, Robert 18
Langner, Andre 6
Lavrova, Olga 12
Lawanson, Tumininu 13

Lee, Keun 14
Lei, Hangtian 12
Liang, Hao 9
Liang, Junkai 11
Lian, Jianming 17
Liao, Huaiwei 11
Liao, Yuan 12, 17
Liberzon, Daniel 14
Li, Fangxing 15
Li, Hanyue 15
Li, Jie 18
Li, Lingfang 13
Li, Qifeng 11, 13
Li, Suwei 15
Liu, Jianan 12, 17
Liu, Kaiyu 10
Liu, Wenlong 13
Liu, Yuan 8
Livani, Hanif 10, 12, 14
Li, Xiangkun 17
Li, Xingpeng 9, 16
Li, Xue 15
Li, Yifu 16

M

Madhusoodan, Monika 15
Mahani, Khashayar 11
Mahdavi, Shahrzad 13
Makkena, Suresh 15
Mancilla-David, Fernando 8
Mandal, Anusree 13
Mandal, Paras 8, 10
Manjrekar, Madhav 18
Manoharan, Arun-Karthick 4, 6, 18
Masaud, Tarek 8, 18
Mather, Barry 18
Ma, Yaming 6
Ma, Zhihao 10, 18
Mccalley, James D. 6, 16
McCann, Roy 8, 13, 18
Mccolley, Sean 9
McCormick, Devin 9
Medina, Aurelio 10
Mehrizi-Sani, Ali 7
Melgoza, Jesus Rico 14
Meliopoulos, Sakis 9, 10, 12, 13
Mendez, Alejandro Zamora 9

Mercer, Joseph 11
 Meshram, Ragini 15
 Miao, Zhixin 8, 10, 12
 Miller, Carol 11
 Miller, Eric 17
 Mishra, Partha 17
 Mitra, Joydeep 13, 18
 Moazeni, Faegheh 18
 Moghadasi, Seyedmahdi 7
 Mohamed, Ahmed 11
 Mohammad, Farshad 18
 Mohan, Ned 10
 Mohite, Shivraj 18
 Molzahn, Daniel K. 8
 Moore, Steven 9
 Morinec, Allen 13
 Morrow, Brian 11
 Mousavi, Mohammad 7
 Moya, Christian 7
 Muttaqi, Tazwar 15

N

Nadipalli, Sandhya Rani 4, 17
 Nagarajan, Adarsh 18
 Nagle, Alexander 7
 Naidu, D. Subraman 14
 Namboodiri, Vinod 4, 16
 Namerikawa, Toru 11
 Nandasiri, Nimanthi 4, 6
 Nano, Hannah 9
 Narimani, Mohammad Rasoul 17
 Nath, Anubhav 10
 Nazari, Masoud 14
 Nazemi, Mostafa 9
 Nehrir, Hashem 9
 Newlun, Cody 6
 New, Savanna 9
 Nguyen, Nga 9, 13, 18
 Nguyen, Tu 14
 Nia, Mohamad Saleh Sanjari 8, 10, 12, 15
 Niazazari, Iman 10, 12
 Nigam, Siddhartha 8
 Ning, Jiawei 13
 Nord, Michael 6
 Nowak, Severin 15
 Nuttall, Jacob 14

O

Obadlagbony, Osamuyi 13
 Obikwelu, Emeka 12
 Ogunkanmi, Victor 8
 Okon, Queen 11
 Okullo, James 6
 Olis, Dan 17
 Olowu, Temitayo 10
 O'Neill-Carrillo, Efrain 6
 Oner, Ahmet 9
 Ostadijafari, Mohammad 18
 O'Toole, Zachary 7
 Ou, Ge 6
 Overbye, Thomas 6, 9, 15, 16
 Ozuna, Clay 7

P

Pahwa, Anil 4, 6
 Pal, Anamitra 10, 15
 Panciatici, Patrick 6
 Pang, Chengzong 4, 13
 Parhizi, Sina 9
 Parizad, Ali 13
 Park, Jae-Do 11
 Park, Jonghyun 18
 Paternina, Mario Arrieta 9
 Paudyal, Sumit 7, 18
 Paul, Sudipta 14
 Paz, Serafin Ramos 14
 Penmetts, Vikramaditya 18
 Pickering, Shelby 6
 Pierre, John 9, 12
 Piesciorsky, Emilio 8
 Pisu, Pierluigi 7
 Pokharel, Subash 15
 Popiel, Caroline 17
 Posey, Mitchell 9
 Poudel, Shiva 9
 Prasanna U R 10
 Pulgar, Hector 6, 7, 14

Q

Qian, Lijun 10
 Qiao, Wei 12, 17
 Quintanilla, Faustino 11

Qu, Liyan 17

R

Rad, Milad Ghiasi 9
 Rahman, Md Rakib Ur 4, 13
 Rahman, Mohammad Ashiqur 10
 Rahman, Mohd Abrar 4
 Rahnamay-Naeini, Mahshid 7
 Rajagopal, Ram 10
 Rajashekara, Kaushik 10, 11
 Ramachandran, Bhuvaneshwari 9
 Ramanath, Anushree 10
 Ramasubramanian, Deepak 18
 Ramesh, Arun Venkatesh 9
 Ranade, Satish 12
 Ranganathan, Prakash 6, 10, 11
 Ranjan, Shruti 14
 Rasheed, Shaziya 8
 Rathore, Vinay 10
 Rizvi, Syed Muhammad Hur 7
 Roald, Line 8
 Robles-Campos, Hector R. 8
 Rose, Stephen 6
 Rostkowski, Ian 6
 Rouholamini, Mahdi 16
 Roveto, Matthew 17
 Royal, Emily 14
 Rubin, Connor 7

S

Saadatmand, Sepehr 8, 12, 15
 Sadi, Mohammad 12, 14
 Sadi, Mohammad Ashraf Hossain 10
 Sadnan, Rabayet 18
 Saha, Shammaya 8
 Sahraei-Ardakani, Mostafa 6, 11, 18
 Sahu, Abhijeet 16
 Saikumar, Karthik 11
 Sain, Christopher 8
 Salehfar, Hossein 8, 15
 Saleh, Mehdi 11
 Salinas, Sergio 4, 16
 Sanchez, Edward 14
 Sanchez, Victor Gonzalez 9
 Sang, Yuanrui 6
 Sarfi, Vahid 12

Saric, Andrija 6, 14
 Sarkar, Koushik 4
 Sarwat, Arif 10
 Sauer, Peter 8, 14
 Scaglione, Anna 8
 Schnabel, Alec 7
 Schoenwald, David 7
 Schweitzer, Eran 8
 Selvanayagam, Subaranjany 6
 Selvaraj, Daisy Flora 6, 11, 18
 Selvaraj, Goutham 11
 Senjyu, Tomonobu 10
 Sen, Pankaj K. 11, 14
 Serpedin, Erchin 16
 Sethi, Tushar 14
 Shah, Darshit 15, 17
 Shahzad, Umair 13
 Shamsi, Pourya 8, 10, 12, 15
 Shanmugarajah, Vinodhine 6, 10
 Shao, Hang 15
 Sharma, Pawan 14
 Sharma, Rishi 16
 Sharma, Santosh 11
 Sheikh, Mohd Adil 18
 Shek, Chak Lam 18
 Shetye, Komal 16
 Shimim, Farshina Nazrul 9
 Shi, Zhichao 9
 Shuvro, Rezoan 10
 Silva-Saravia, Horacio 6
 Simmons, Richard 17
 Singh, Anant 10
 Singh, Chanan 13, 17
 Singh, Kshitij 7
 Singh, Navdeep 7, 14, 18
 Singh, N. M. 15
 Singh, Ranjay 14
 Singh, Shruti 12, 17
 Singh, Vivek Kumar 7
 Sinisuka, Ngapulil Irmea 9
 Sivagnanam, Maheesa 6
 Smadi, Abdallah A. 12
 Smith, Travis 8
 Solanki, Jignesh 12
 Solanki, Sarika 12
 Soria, Denisse Alejandra Meza 12
 Srivastava, Anurag K. 4, 7, 15
 Stankovic, Aleksandar 6, 13, 14, 15

St. Leger, Aaron 6, 8
 Sun, Mingsui 8
 Sun, Yan 14
 Sun, Yan Lindsay 8
 Suresh, Arun 14, 18
 Suryanarayanan, Sid 7, 8, 11
 Suryawanshi, Udaykumar 18
 Svenda, Vanja 6, 13
 Swanbum, Ryne 8

T

Tahery, Hamid 14
 Talukder, Mitun 10
 Tang, Wenyuan 11, 12
 Tbaileh, Ahmad 11
 Tellez, Fernando Ornelas 14
 Thamballa, Sreekanth 10
 Thangaraj, Charles 7
 Tharmarajah, Thiruvanan 6
 Thompson, Mary 13
 Ticknor, David 6
 Torresan, Gilles 6
 Totri, Mason 17
 Tran, Duc 14
 Transtrum, Mark 6, 14
 Trussell, Brennan 18
 Turitsyn, Konstantin 13
 Tyagi, Barjeev 14, 15

U

Ula, Sadrul 17
 Umathe, Bhagyashree 14
 Utomi, Samuel 8

V

Vanhoudt, Thomas 9
 Vazquez, Daniel Zuniga 11
 Veeramraju, Kartikeya Jayadurga Prasad 15
 Vejdan, Sadegh 17
 Velez-Reyes, Miguel 10
 Venkatasubramanian, Vaithianathan "Mani"
 6, 13, 14
 Verma, Vishal 12
 Vittal, Vijay 11
 Vu, Mai 13

W

Wagh, Sushama 7, 14, 15, 18
 Wang, Bo 9
 Wang, Caisheng 11, 16
 Wang, Dingwei 16
 Wang, Fengyu 6
 Wang, Honggang 16
 Wang, Jiankang 6, 7
 Wang, Lei 16
 Wang, Liwei 15
 Wang, Shaobu 17
 Wang, Shiyuan 16
 Wang, Wenzong 7
 Wang, Xiaochu 11
 Wang, Zhaoyu 8, 13
 Wang, Zhengyu 10, 12
 Wang, Zhenhua 14
 Wang, Zian 9
 Watkins, John 14
 Weber, James 9
 Weng, Yang 10, 18
 Wert, Jessica 9
 Wilches-Bernal, Felipe 12
 Wold, Josh 12
 Wu, Meng 6
 Wunsch, Donald C 8, 12

X

Xavier, Florent 6
 Xiao, Dongliang 12
 Xie, Boqi 10, 13
 Xie, Jiahao 10
 Xie, Le 12
 Xue, Jiayue 6
 Xu, Ti 15

Y

Yang, Lei 12
 Yang, Lin 13
 Yazdani, Atousa 18
 Ye, Hongxing 6
 Yesel, Bo K. 6
 Yin, Tianzhixi 17
 Youssef, Tarek 9
 Yuan, Haoyu 13

Yuan, Jingyi 18
 Yuan, Jinshun x 9
 Yuan, Yuxuan 8
 Yusuf, Jubair 17

Z

Zarghami, Mahyar 18
 Zhang, Haixiang 12, 17
 Zhang, Hongming 13
 Zhang, Jun 6
 Zhang, Shaobo 17
 Zhang, Shubo 6
 Zhang, Xiaohan 13
 Zhang, Xiapiang 11
 Zhang, Xuewei 11
 Zhang, Yiqi 12
 Zhang, Yiqiu 16
 Zhao, Yuanxiao 13
 Zhao, Zhongyang 11
 Zhong, Chiyang 10, 13, 15
 Zhou, Qun 16, 17
 Zhou, Yuqi 6
 Zhou, Zhangxin 7
 Zhu, Hao 6, 9, 16
 Zou, Tierui 7

Kansas Facts

Dodge City, Kansas is the windiest city in the United States.

Smith County, Kansas is the geographical center of the 48 contiguous states.

Amelia Earhart, first woman granted a pilot's license by the National Aeronautics Associate and first woman to fly solo across the Atlantic Ocean was from Atchison.

Pizza Hut restaurants opened its first store in Wichita, Kansas.

Helium was discovered in 1905 at the University of Kansas.

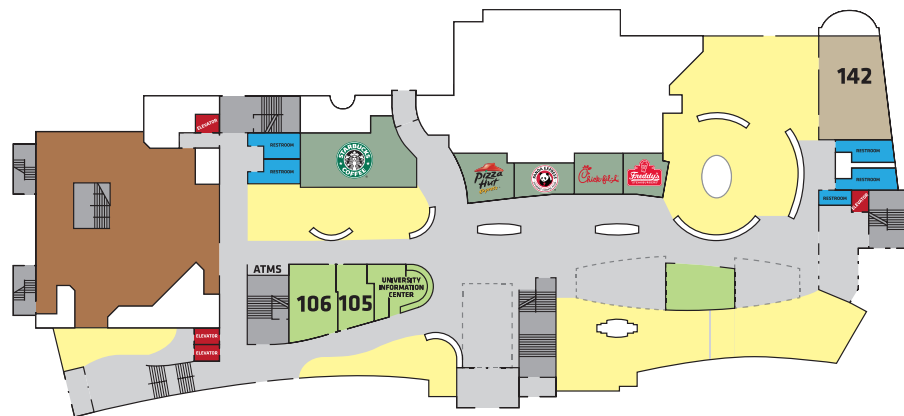
Wichita is one of the nation's top aircraft manufacturing cities.

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Map of Rhatigan Student Center

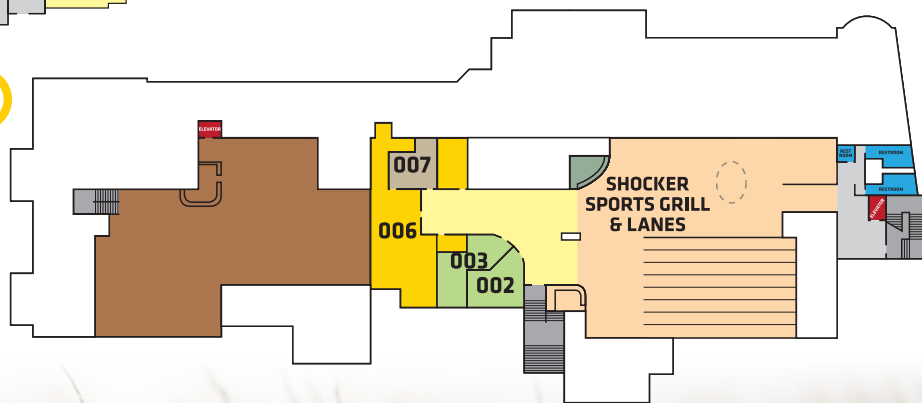


← First Floor →

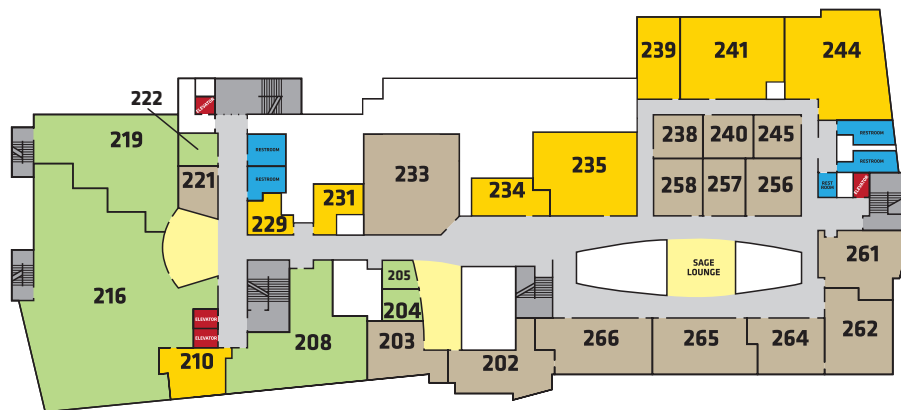
Entry Level
Food Court

→ Lower Level →

Shocker Sports Grill And Lanes



Map of Rhatigan Student Center



Second Floor



256 Edmiston Room

257 Ashton/Bridges Room

261 Olive Room

262 Herman Room

264 Spencer Room

265 Lucas Room

266 Pike Room



Third Level



Beggs Ballroom

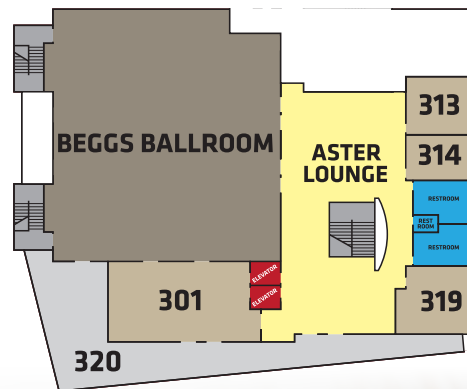
301 Gridley Room

304 Aster Lounge

313 Prairie Room

314 Venters Room

319 McKay Room



Map of Wichita State University



BUILDING CODES MAP

FOR INTERACTIVE MAP AND DIRECTIONS, VISIT WICHITA.EDU/MAPS



WICHITA STATE
UNIVERSITY

Buildings

- EE** John Bardo Center
- MR** Marcus Welcome Center
- RS** Rhatigan Student Center
- PZ** Pizza Hut Museum

Parking

- 35S** Sunday Parking
Parking for PEEC and NAPS 2019 Steering Committee meetings.
Park only in "Green - Yellow Stripped" lots.
- 24** Parking Reserved for NAPS
Parking lot 24 has been reserved for NAPS 2019 attendees.
- 7** RSC Parking
Parking lot 7 is not reserved for NAPS but attendees can park in free spots.
- 7** Parking Garage
Visitors in park in levels 2 to 4, hourly rates apply.

Parking spots marked with **RED** signs are reserved 24/7. Parking fines will incur.

For attendees from Wichita State, regular parking rules apply.

