

75th Annual Conference for Protective Relay Engineers

March 28 - 31, 2022



Monday, March 28, 2022 Pre-Conference Events

8:00 am – 5:00 pm
Monday - Thursday

Schweitzer Engineering Laboratories Events **Memorial Student Center 2400**

“At the annual technical seminar, we will share our latest technologies and advancements and discuss how they can improve the protection speed of your power system, bring more value to your company, and provide more reliability to your customers. This is your opportunity to hear about practical applications as well as real-world examples and results from early adoptions of our newest innovations.”

[Register for SEL Events Here](#)

11:00 am – 7:30 pm

ABB Roadshow **Parked at Kyle Field Plaza**

Join local ABB experts for an engaging, hands on experience with our fully integrated product portfolio. You’ll be able to see, try, and learn more about ABB’s safer, smarter, and more sustainable product solutions– all in a mobile unit that we bring to you! The #PowerBetter tour is a trade show on wheels, showcasing the complete best of both integrated ABB one-line from source to socket. The show will kick-off in April and will travel across the U.S. until November, hosting over 1,000 customers in multiple cities.

1:00 pm – 3:00 pm

SynchroGrid Pre-Conference Presentation **Rudder Tower 410**

Many utilities currently use *assistive intelligence* to aid engineering efforts in system protection. In this seminar, SynchroGrid will demonstrate how utilities can now move beyond assisted intelligence towards *augmented intelligence*, allowing them to accomplish tasks that were formerly unachievable. We will conclude by looking to the near future with *autonomous intelligence*, showing the latest developments in integration processes between Doble PowerBase, ASPEN OneLiner, and SARA.

[Register for SynchroGrid Presentation Here](#)

1:00 pm – 3:30 pm

Qualus Power Services Overview of Electric Utility Communication Systems **Rudder Tower 701**

This session provides a foundation for understanding electric utility communication systems. This session is a preview of sections of our Protection Considerations and Communications Seminar and will introduce the following concepts:

- Communications Backbone considerations
- Enterprise vs Mission Critical networks (IT vs OT)
- Microwave vs Cellular vs IP vs ???
- Fiber Systems – OSP and ISP
- SCADA systems overview and design considerations

[Register for Qualus Event Here](#)

2:00 pm – 4:00 pm

ETAP Educational Seminar **Rudder Tower 501**

Presentation Topic: “Using ETAP Design & Analysis Software for Protection/Coordination, Arc Flash and Electrical Digital Twin”

[Register for ETAP Seminar Here](#)

4:00 pm – 5:00 pm

Professional Engineering Ethics **Rudder Tower 601**

Ethics in Engineering Practice. Join us for an ethics seminar to meet PDH requirements.
Mark H. Johnson, Texas A&M University

4:00 pm – 7:30 pm

Reception – Bethancourt Ballroom – Sponsored by Schweitzer Engineering Laboratories

75th March 28 - 31, 2022
Annual Conference
for Protective Relay Engineers



Tuesday, March 28, 2022
Pre-Conference Events

7:30 pm – 9:00 pm

[Pizza Party Sponsored by ECI](#)

Bethancourt Pre-Function Area

Electrical Consultants, Inc. (ECI) will be hosting a pizza party on Tuesday, March 29th from 7:30PM to 9:00PM at Bethancourt Pre-Function Area

Visit with ECI engineers & learn more about the exciting career opportunities available at ECI

Remember to Visit the Exhibit Booths at
Bethancourt Ballroom in the Memorial Student Center

Monday: 4:00 pm – 7:30 pm

Sponsored by **Schweitzer Engineering Laboratories**

Tuesday: 12:00 pm – 1:30 pm

and

5:00 pm – 7:30 pm

Sponsored by **GE Grid Solutions**

Wednesday: 12:00 pm – 1:30 pm

Tuesday, March 29, 2022

General Session
Moderator, Derrick Haas
Rudder Theatre

- 8:10 am Distance Elements for Line Protection Applications Near Unconventional Sources
Kasztenny, B., Schweitzer Engineering Laboratories
- 8:45 am Protective Relay Upgrade Resolves Planning Criteria Violations
Koellner, K., Lower Colorado River Authority
- 9:20 am Stop the Epidemic! Transformer Protection Misoperations
Hargrave, A., Schweitzer Engineering Laboratories
- 9:55 am **Break Sponsored by Dashiell Corporation**
- 10:15 am Balancing Substation Design Service Life to Meet Changing Service Conditions and Maximize Useful Life
Dolezilek, D., Schweitzer Engineering Laboratories
Sykes, J., Schweitzer Engineering Laboratories
- 10:50 am Impact of Renewable Generation Resources on the Distance Protection and Solutions
Smith, T., GE Grid Solutions
- 11:25 am Reviewing the new IEEE C37.250 Guide for Engineering, Implementation, and Management of SIPS
Henneberg, G., NV Energy

12:00-1:00 Lunch Bethancourt Ballroom

Paper Session 1: Transmission I
Moderator, Kevin Jones
Memorial Student Center 2400

- 1:30 pm Novel Approach to Detect Secondary Arc on Single Pole Tripping Events
Stinskiy, A., SIEMENS
- 2:00 pm Coordination of Resistive Reach of Phase and Ground Distance Elements
Chowdhury, R., Schweitzer Engineering Laboratories
- 2:30 pm Transmission Line Setting Calculations – Beyond the Cookbook, Part II
Thompson, M., Schweitzer Engineering Laboratories
- 3:00 pm **Break**
- 3:30 pm Transmission Line Falling Conductor Protection System Development at SDG&E
Rahman, T., San Diego Gas & Electric Company
Udren, E., Quanta Technology
- 4:00 pm Protecting EHV Transmission Lines Using Ultra-High-Speed Line Relays: A New Standard for PNM
Smelich, G., Schweitzer Engineering Laboratories
- 4:30 pm Impedance-Based Directional Elements – Why Have a Threshold Setting?
McDaniel, R., Schweitzer Engineering Laboratories

Paper Session 2: Substation
Moderator, Ken Swift
Memorial Student Center 2406A

- 1:30 pm Bus Protection in Time-domain
Hossain, M., Energy Services Inc.
- 2:00 pm 21C Cap Bank Protection
Soroush, A., SIEMENS
- 2:30 pm Enhanced Transformer Differential Protection - Design, Test and Field Experience
Ramlachan, M., GE Grid Solutions
- 3:00 pm **Break**
- 3:30 pm Critical Infrastructure Protection with Modern Protection Relays
Palaniappan, R., GE Grid Solutions
- 4:00 pm Transformer Loss of Life Monitoring – a Review of In-service Installations Highlighting Achieved Benefits
Piatniczka, A., Hitachi Energy
- 4:30 pm Use of Resistive Voltage Dividers for Transformer Tertiary Ground Detection
Kockott, M., Hitachi Energy

Paper Session 3: Testing/Communication
Moderator, Erik Guillot
Memorial Student Center 2406B

- 1:30 pm Future is Here: Virtual Testing of Protection Systems using Digital Twin Technology
Sharma, M., Megger
Kuber, S., Megger
- 2:00 pm Characteristics of Line Trap and Line Tuner Failures in Carrier Relaying Channels
Palmer, C., PowerComm Solutions LLC
- 2:30 pm Direct Transfer Trip (DTT) leveraging redundant cellular communication channels
Stinskiy, A., SIEMENS
- 3:00 pm **Break**
- 3:30 pm IEC61850 based distribution automation system testing with RTDS and 4G LTE
Stinskiy, A., SIEMENS
- 4:00 pm Test the Right Stuff: Using Data to Improve Relay Availability, Reduce Failures, and Optimize Test Intervals
Zimmerman, K., Schweitzer Engineering Laboratories
- 4:30 pm PTP & Non-PTP Based End-to-End Dynamic Testing Methodology for Validation of Line Differential Protection Test Considerations and Challenges
Gonzalez, A., Megger
Kuber, S., Megger

Wednesday, March 30, 2022

General Session/Real World
Moderator, Genardo Corpuz
Rudder Theatre

- 8:00 am Alarming Experience with Ungrounded Tertiary Bus Ground Detection
Kobet, G., Tennessee Valley Authority
- 8:35 am A Proposed Scheme to Protect Transformer Bank and Arc Suppression Coil in Compensated-Grounded Distribution Systems
Leyba, M., GE Grid Solutions
- 9:10 am **Break**
- 9:40 am American Electric Power's Experience with Protection System Misoperations and Improvements
Burford, B., American Electric Power
- 10:15 am Locating Complex Double-Line-to-Ground Faults: Theory and Field Case Study
Chase, S., Schweitzer Engineering Laboratories
- 10:50 am Clocks Trust: An Investigation of Recent 500KV line Operations
Vandiver, B., Hitachi Energy
- 11:25 am Detection of Incipient Arcing Days Prior to Ultimate Device Failures
Benner, C., Texas A&M University

12:00 – 1:00 Lunch Bethancourt Ballroom

Paper Session 4: Protection & Control System Design I
Moderator, Craig Wester
Memorial Student Center 2406A

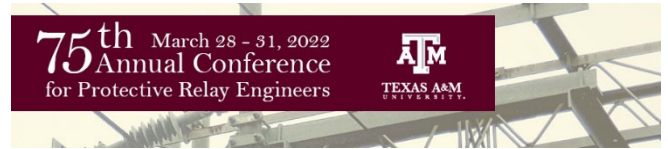
- 1:30 pm Pilot Implementation of Centralized Protection and Control – SRP Experience
Xavier, J., ABB, Inc.
- 2:00 pm Comparative Evaluation of Two Process Bus Solutions for a Distribution Substation
Shrestha, A., Schweitzer Engineering Laboratories
- 2:30 pm Case Study: Defining and Measuring Protection Signal Exchange Speed, Latency, and Reliability Within Digital Trip Circuits
Wade, A., Schweitzer Engineering Laboratories
- 3:00 pm **Break**
- 3:30 pm Using Wide-Area Precise Time Distribution to Increase Dependability and Security of Substation Time Synchronization
Elshafi, M., Schweitzer Engineering Laboratories
Williams, D., Burns & McDonnell
- 4:00 pm Review of Digital Substation Communication Technologies
Vandiver, B., Hitachi Energy
- 4:30 pm Designing a LAN Communication Network For Protection Applications
Ramlachan, M., GE Grid Solutions

Paper Session 5: Distribution
Moderator, Bret Burford
Memorial Student Center 2400

- 1:30 pm Protection System Design for Practical Microgrids Connected to a Distribution Network
Palaniappan, R., GE Grid Solutions
- 2:00 pm Novel Methods to Detect and Identify Fault and Open-Phase Conditions in Pole-Top Capacitor Banks
Blair, J., Schweitzer Engineering Laboratories
- 2:30 pm Power System Contingencies to Evaluate FLISR Systems
Kelley, C., Schweitzer Engineering Laboratories
- 3:00 pm **Break**
- 3:30 pm Selective Tripping at Point of Common Coupling (PCC) Using Inverse-Time Voltage Characteristics
Subbarayan, J., Schweitzer Engineering Laboratories
- 4:00 pm Power Hardware-in-the-Loop Testing of Zero-Sequence Current Transformers for Fire Prevention Applications
Smith, T., GE Grid Solutions
- 4:30 pm High-Speed Falling Conductor Protection in Distribution Systems using Synchrophasor Data
Leyba, M., GE Grid Solutions

Paper Session 6: Generation/Industrial
Moderator, Derrick Haas
Memorial Student Center 2406B

- 1:30 pm Methods to Improve Transient Stability of Low-Inertia Synchronous Machines
Rahim, M., Lancium
- 2:00 pm Impact of a 47 MVA Aero-derivative Gas Turbine Generator on a 346 MW Bulk Wind Farm – Case Study on Voltage & Frequency Response
Rahim, M., Lancium
- 2:30 pm Bus Differential Protection Upgrade for a 1,500 MVA Nuclear Power Plant with Atypical Connections
Matta, B., Schweitzer Engineering Laboratories
- 3:00 pm **Break**
- 3:30 pm Generator Protection Validation Testing Using a Real-Time Digital Simulator: Stator Winding Protection
Chowdhury, R., Schweitzer Engineering Laboratories
- 4:00 pm Application of Standard Three-Phase Power Transformer Protection to Special Railway Transformers – an Overview and Insight
Kockott, M., Hitachi Energy
- 4:30 pm Fundamentals of Main Tie Main Schemes and Using State Machines
Millner, D., NERX Power Consultants LLC



Thursday, March 31, 2022

Paper Session 7: Protection & Control System Design II
Moderator, Eric Udren
Memorial Student Center 2406A

- 8:00 am Applying and Commissioning a Sustainable Multi Application IEC61850 Process Bus Protection Scheme
Ramlachan, M., GE Grid Solutions
- 8:35 am Meeting Protective Relay Performance Requirements with IEC61869-13
Smith, T., GE Grid Solutions
- 9:10 am The Copper Diet - Recipes to Promote Standardization, Centralization and Redundancy in a Digital Substation World
Hartmann, W., GE Grid Solutions
- 9:45 am **Break**
- 10:20 am Improved Protection Reliability with PTP Master Implementation in Protection Relays
Ramlachan, M., GE Grid Solutions
- 10:55 am Development and Implementation of Practical Processes for NERC CIP-010 Compliance Evaluation
Chang, T., Quanta Technology
- 11:30 am Substation SCADA Retrofit at Silicon Valley Power –
Vandiver, B., Hitachi Energy

Paper Session 8: Transmission II
Moderator, Jacob Billings
Memorial Student Center 2406B

- 8:00 am UHS Relay Testing for Optimal Protection of a Long 345 kV Line with Series Compensation
Lewis, M., Lone Star Transmission, LLC
Carvalneira, E., OMICRON
Kirby, R., Schweitzer Engineering Laboratories
- 8:35 am An Unlikely Pair: Combining Traveling Waves and Phasors for Reclosing on Hybrid Lines
Das, S., Schweitzer Engineering Laboratories
- 9:10 am Interoperability of System Protection Software
Thomas, N., SynchroGrid
Gurley, J., Oncor Electric Delivery
- 9:45 am **Break**
- 10:20 am Compensation of Impedance Measurement Error Due to Arcing
Blumschein, J., SIEMENS
- 10:55 am Transmission Line Parameter Estimation Using Traveling-Wave Fault Location Data
Shrestha, A., Schweitzer Engineering Laboratories
- 11:30 am Evaluation of Ultra-High-Speed Line Protection, Traveling-Wave Fault Locating, and Circuit-Breaker Reignition Detection on a 220 kV Line in the Kalahari Basin, Namibia
Kirby, R., Schweitzer Engineering Laboratories