Edmund O. Schweitzer, III

Founder, President
Schweitzer Engineering Laboratories, Inc.

Education

B.S.E.E., Purdue University, 1968
M.S.E.E., Purdue University, 1971
Ph.D., Washington State University, 1977

Engineering Expertise

Dr. Edmund O. Schweitzer, III was born in Evanston, Illinois, USA, in 1947. He received his bachelor's and master's degrees in electrical engineering from Purdue University. He received his doctorate from Washington State University upon completion of his dissertation on digital protective relaying.

After obtaining his bachelor's degree in 1968, Dr. Schweitzer worked as an electrical engineer with the National Security Agency in Fort Meade, MD for five years and Probe Systems, Inc. in Sunnyvale, CA for two years. He continued his research in digital protective relaying while serving on the electrical engineering faculties of Ohio University and Washington State University. The research covered both theoretical and practical aspects and demonstrated the feasibility and practicality of digital techniques for protecting electric power apparatus and systems. He also taught courses in electric power system analysis, electrical energy conversion, power system protection, electronics, and communications theory.

In 1982, Dr. Schweitzer founded Schweitzer Engineering Laboratories, Inc. in Pullman, Washington to develop and manufacture digital protective relays and related products and services. Today, SEL is an employee-owned company, which serves the electric power industry worldwide and is certified to the international quality standard ISO 9001. SEL equipment is in service in many countries, at voltages from 5 kV through 500 kV, to protect and control transmission lines, power transformers, buses, feeders, motors, capacitor banks, and other power apparatus.

Dr. Schweitzer is recognized as a pioneer in digital protection and holds the grade of Fellow of the Institute of Electrical and Electronic Engineers (IEEE), a title bestowed on less than one percent of IEEE members. In 2002, he was elected a member of the National Academy of Engineering. He is the recipient of the Graduate Alumni Achievement Award from Washington State University and the Purdue University Outstanding Electrical and Computer Engineer Award. In September 2005, he was awarded an honorary doctorate from the Universidad Autónoma de Nuevo León in Monterrey, Mexico for his contribution to the development of electric power systems worldwide. In October 2012, he was also awarded an honorary doctorate from the Universidad Autónoma de San Luis Potosí in San Luis Potosí, Mexico. In May 2019, he was inducted into the National Inventors Hall of Fame.

Dr. Schweitzer has written dozens of technical papers in the areas of digital relay design, filtering for protective relays, protective relay reliability and testing, fault locating on overhead lines, line protection, induction motor protection, dynamics of overcurrent elements, protective relay sensitivity, and synchrophasor applications for electric power system protection, control, and monitoring, among other areas. He has also co-edited four SEL books.

Dr. Schweitzer holds over 100 patents pertaining to electric power system protection, control, communications, monitoring, and metering.

Professional Affiliations

Fellow, IEEE
Member of the National Academy of Engineering
Inductee of the National Inventors Hall of Fame

Honorary Societies

Eta Kappa Nu
Tau Beta Pi

Employment

President and Chief Technology Officer, Schweitzer Engineering Laboratories, Inc., Pullman, WA, 1983–Present.

Consultant to BBC/Brown-Boveri Electric Company, Allentown, PA, 1979–1985.

Associate Professor, Washington State University, Pullman, WA, 1982–1985.

Assistant Professor, Washington State University, Pullman, WA, 1979–1982.

Assistant Professor, Ohio University, Athens, OH, 1977–1979.

Electrical Engineer, Probe Systems, Inc., Sunnyvale, CA, 1973–1974.

Electrical Engineer, National Security Agency, Fort Meade, MD, 1968–1973.

Technical Papers

Edmund O. Schweitzer, III and A. J. Flechsig, "An Efficient Directional Distance Algorithm for Digital Computer Relaying," *Proceedings of IEEE PES Summer Power Meeting*, Paper No. A-77-725-5, Mexico City, Mexico, July 1977, Vol. 77-Ch 1193-2-PWR. Also appeared in *IEEE Transactions on Power Apparatus and Systems* (Abstract), Vol. 97, Mar/Apr 1978, p. 323.

Edmund O. Schweitzer, III, R. R. Larson, and A. J. Flechsig, "An Efficient Inrush Current Detection Algorithm for Digital Computer Relay Protection of Transformers," *Proceedings of IEEE PES Summer Power Meeting*, Paper No. A-77-510-1, Mexico City, Mexico, July 1977, Vol. 77-Ch 1193-2-PWR. Also appeared in *IEEE Transactions on Power Apparatus and Systems* (Abstract), Vol. 97, Mar/Apr 1978, p. 323.

Edmund O. Schweitzer, III and A. J. Flechsig, "Design and Testing of a Microprocessor Based Directional Distance Relay," *Proceedings of IEEE PES Summer Power Meeting*, Paper No. A-78-545-6, Los Angeles, CA, July 1978, Vol. 78-Ch 1361-5-PWR. Also appeared in *IEEE Transactions on Power Apparatus and Systems* (Abstract), Vol. 98 (1), Jan/Feb 1979, p. 7.

R. R. Larson, A. J. Flechsig, and Edmund O. Schweitzer, III, "The Design and Test of a Digital Relay for Transformer Protection," *Proceedings of IEEE PES Summer Power Meeting*, Paper No. F-78-688-4, Los Angeles, CA, July 1978. Also, in *IEEE Transactions on Power Apparatus and Systems*, Vol. 98 (3), May/Jun 1979, pp. 795–804.

Edmund O. Schweitzer, III, "Multichannel Data Sampling Techniques for Power System Control and Protection," invited paper, EPRI (Electric Power Research Institute) Workshop: Digital Techniques for Control and Protection of Transmission-Class Substations, EPRI WS-79-184, pp. 5.1–5.11, Nov. 15–16, 1979, San Diego, CA.

Edmund O. Schweitzer, III and A. Aliaga, "Digital Programmable Time-Parameter Relay Offers Versatility and Accuracy," IEEE PES Summer Power Meeting, Paper No. F-79-769-1, Vancouver, BC, Canada, July 1979. Also, in *IEEE Transactions on Power Apparatus and Systems*, Vol. PAS-99, No. 1, Jan/Feb 1980, , pp. 152–157.

Edmund O. Schweitzer, III, "Evaluation and Development of Transmission Line Fault-Locating Techniques Which Use Sinusoidal Steady-State Information," presented at the 9th Annual Western Protective Relay Conference, Spokane, WA, 1982. Published in *Computers & Electrical Engineering*, Vol. 10, No. 4, 1983, pp. 269–78.

Edmund O. Schweitzer, III, Stanley E. Zocholl, and Antenor Aliaga-Zegarra, “Thermal Protection of Induction Motors, Enhanced by Interactive Electrical and Thermal Models,” *IEEE Transactions on Power Apparatus and Systems*, Vol. PAS-103, No. 7, 1984, pp. 1749–55. Also in *IEEE Power Engineering Review*, Per-5, No. 2, February 1985, pp. 17–24.

E. O. Schweitzer, III, M. Ando, A. Aliaga, R. A. Baker, and D. A. Seamans, “Development and Field Evaluation of Revenue Metering Device for HVDC Systems,” IEEE PES Summer Power Meeting, Paper No. 84 SM 689-6, Seattle, WA, July 1984. Also published in *IEEE Power Engineering Review*, Vol. PER-5, No. 2, February 1985, p. 43..

M. Ando, E. O. Schweitzer, III, and R. A. Baker, “Development and Field-Data Evaluation of Single-End Fault Locator for Two-Terminal HVDC Transmission Lines, Part I: Data Collection System and Field Data,” in *IEEE Power Engineering Review*, Vol. PER-5, No. 12, December 1985, p. 47.

M. Ando, E. O. Schweitzer, III, and R. A. Baker, “Development and Field-Data Evaluation of Single-End Fault Locator for Two-Terminal HVDC Transmission Lines, Part 2: Algorithm and Evaluation,” in *IEEE Transactions on Power Apparatus and Systems*, Vol. PAS-104, No. 12, December 1985, pp. 3531–3537.

Edmund O. Schweitzer, III, “Four New Relays for Overhead Transmission Line Protection,” presented at the 12th Annual Western Protective Relay Conference, Spokane, WA, October 1985. Published in Proceedings of the IASTED International Symposium on High Technology in the Power Industry, pp. 205–12, 1986.

Edmund O. Schweitzer, III and Robert. C. Bartz, “Field Experience With Fault Locating Relays,” presented at the 39th Annual Conference for Protective Relay Engineers, College Station, TX, April 14–16, 1986.

Edmund O. Schweitzer, III, T. T. Newton, and Richard A. Baker, “Power Swing Relay Also Records Disturbances,” presented at the 13th Annual Western Protective Relay Conference, Spokane, WA, October 1986.

Edmund O. Schweitzer, III, T. T. Newton, and Jules Esztergalyos, “Breaker Failure Relay and Monitor Records Breaker Performance,” presented at the 23rd Annual Minnesota Power Systems Conference, St. Paul, MN, October 1987.

W. D. Breingan, C. H. Castro, J. R. Latham, J. Mescua, A. G. Phadke, J. M. Postforoosh, E. O. Schweitzer, III, W. M. Strang, F. Y. Tajaddodi, and E. A. Udren, “Survey of Experience With Generator Protection and Prospects for Improvements Using Digital Computers,” *IEEE Transactions on Power Delivery*, Vol. 3, No. 4, October 1988, pp. 1511–22.

Edmund O. Schweitzer, III, “A Review of Impedance-Based Fault Locating Experience,” presented at the 15th Annual Western Protective Relay Conference, Spokane, WA, October 1988.

Jeff Roberts and Edmund O. Schweitzer, III, “Analysis of Event Reports,” presented at the 16th Annual Western Protective Relay Conference, Spokane, WA, October 1989.

Edmund O. Schweitzer, III, “New Developments in Distance Relay Polarization and Fault Type Selection,” presented at the 16th Annual Western Protective Relay Conference, Spokane, WA, October 1989.

Jules Esztergalyos, J. H. Brunke, and Edmund O. Schweitzer, III, “Micro Computer Based Breaker Failure Relaying for 500 kV Air-Blast Type Circuit Breakers,” presented at the 16th Annual Western Protective Relay Conference, Spokane, WA, October 1989. Also published in CIGRE Proceedings of the 34th Session, pp. 34–207/1–6, Vol. 2, 1993.

Edmund O. Schweitzer, III and Jolene Schafman, “Unified Shunt Capacitor Bank Control and Protection,” presented at the 17th Annual Western Protective Relay Conference, Spokane, WA, October 1990.

Edmund O. Schweitzer, III, “Where Is Microprocessor-Based Protection Heading?” presented at the Fall Meeting of Pennsylvania Electric Association's Relay Committee, Hershey, PA, September 1991.

Ahmed F. Elneweihi, Edmund O. Schweitzer, III, and Mark W. Feltis, “Improved Sensitivity and Security for Distribution Bus and Feeder Relays,” presented at the 18th Annual Western Protective Relay Conference, Spokane, WA, October 1991. Published in IEEE WESCANEX 93, Communications, Computers and Power in the Modern Environment, Conference Proceedings, 1993, pp. 337–9.

Edmund O. Schweitzer, III, Gary W. Scheer, and Mark W. Feltis, “A Fresh Look at Distribution Protection,” presented at the Second International Symposium on Distribution Automation and Demand Side Management, Fort Lauderdale, FL, January 13–15, 1992.

Edmund O. Schweitzer, III and Mark Feltis, “Advances in Microprocessor-Based Distribution Relays,” July 1992. Available: selinc.com.

A. F. Elneweihi, E. O. Schweitzer, III, and Mark W. Feltis, “Negative-Sequence Overcurrent Element Application and Coordination in Distribution Protection,” IEEE PES Summer Power Meeting, Seattle, WA, July 1992.

J. Esztergalyos, J. H. Brunke, E. O. Schweitzer, III, and L. S. Anderson, “Microcomputer Based Expert System for Control, Protection and Management of 500 kV AC Air Blast Circuit Breakers,” presented at the CIGRE 1992 Session, Paris, France, August 30–September 5, 1992.

E. O. Schweitzer, III and Jeff Roberts, “Distance Relay Element Design,” presented at the 19th Annual Western Protective Relay Conference, Spokane, WA, October 1992.

Edmund O. Schweitzer, III and Daqing Hou, “Filtering for Protective Relays,” presented at the 19th Annual Western Protective Relay Conference, Spokane, WA, October 1992.

J. Roberts, A. Guzmán, and E. O. Schweitzer, III, “Z = V/I Does Not Make a Distance Relay,” presented at the 20th Annual Western Protective Relay Conference, Spokane, WA, October 1993.

John J. Kumm, Mark S. Weber, E. O. Schweitzer, III, and Daqing Hou, “Philosophies for Testing Protective Relays,” presented at the 20th Annual Western Protective Relay Conference, Spokane, WA, October 1993.

E. O. Schweitzer, III and S. E. Zocholl, “Aspects of Overcurrent Protection for Feeders and Motors,” presented at the 1994 IEEE Industrial and Commercial Power Systems Technical Conference, Irvine, CA, May 1–5, 1994.

J. J. Kumm, M. S. Weber, D. Hou, and E. O. Schweitzer, III, “Predicting the Optimum Routine Test Interval for Protective Relays,” presented at the IEEE/PES 1994 Summer Meeting, San Francisco, CA, July 24–28, 1994.

John J. Kumm, Edmund O. Schweitzer, III, and Daqing Hou, “Assessing the Effectiveness of Self-Tests and Other Monitoring Means in Protective Relays,” presented at the 21st Annual Western Protective Relay Conference, Spokane, WA, October 1994.

Renu Arora, Ernie Poggi, Jeff Roberts and Edmund O. Schweitzer, III, “Limits to the Sensitivity of Ground Directional and Distance Protection,” presented at the 22nd Annual Western Protective Relay Conference, Spokane, WA, October 1995.

Karl Zimmerman and Edmund O. Schweitzer, III, “Substation Communications: When Should I Use EIA-232, EIA-485, and Optical Fiber?” presented at the 23rd Annual Western Protective Relay Conference, Spokane, WA, October 1996.

John Kumm and Edmund O. Schweitzer, III, “Statistical Comparison and Evaluation of Pilot Protection Schemes,” presented at the 23rd Annual Western Protective Relay Conference, Spokane, WA, October 1996.

Paul M. Anderson, E. O. Schweitzer, III, Bill Fleming, and Tony J. Lee, “Reliability Analysis of Transmission Protection Using Fault Tree Methods,” presented at the 24th Annual Western Protective Relay Conference, Spokane, WA, October 1997.

Edmund O. Schweitzer, III, “Advancing the Quality of Protection,” Guest Editorial, IEEE Computer Applications in Power, January 1998.

Edmund O. Schweitzer, III and Tony Lee, “Measuring and Improving the Switching Capacity of Metallic Contacts,” presented at the 26th Annual Western Protective Relay Conference, Spokane, WA, October 1999.

Ruthard Minkner and Edmund O. Schweitzer, III, “Low Power Voltage and Current Transducers for Protecting and Measuring Medium and High Voltage Systems,” presented at the 26th Annual Western Protective Relay Conference, Spokane, WA, October 1999.

Bai-Lin Qin, A. Guzmán-Casillas, and Edmund. O. Schweitzer, III, “A New Method for Protection Zone Selection in Microprocessor-Based Bus Relays,” *IEEE Transactions on Power Delivery*, Vol. 15, No. 3, 2000, pp. 876–87.

Deborah Frincke, Paul Oman, and Edmund O. Schweitzer, III, “Concerns About Intrusions Into Remotely Accessible Substation Controllers and SCADA Systems,” presented at the 27th Annual Western Protective Relay Conference, Spokane, WA, October 2000.

Paul Oman, Edmund O. Schweitzer, III, and Jeff Roberts, “Safeguarding IEDs, Substations, and SCADA Systems Against Electronic Intrusions,” presented at the 3rd Annual Western Power Delivery Automation Conference, Spokane, WA, April 2001.

Paul W. Oman, Jeff Roberts, and Edmund O. Schweitzer, III, “Tools for Protecting Electric Power Systems From Electronic Intrusions,” presented at the 4th Annual Western Power Delivery Automation Conference, Spokane, WA, April 2002.

Paul W. Oman, Allen D. Risley, Jeff Roberts, and Edmund O. Schweitzer, III, “Attack and Defend Tools for Remotely Accessible Control and Protection Equipment in Electric Power Systems,” presented at the 55th Annual Conference for Protective Relay Engineers, College Station, TX, April 2002.

Gabriel Benmouyal, E. O. Schweitzer, III, and Armando Guzmán, “Synchronized Phasor Measurement in Protective Relays for Protection, Control, and Analysis of Electric Power Systems,” presented at the 29th Annual Western Protective Relay Conference, Spokane, WA, October 2002

Stanley E. Zocholl and Edmund O. Schweitzer, III, “Introduction to Symmetrical Components,” presented at the 58th Annual Georgia Tech Protective Relaying Conference, Atlanta, GA, April 2004.

A. Guzmán, D. Tziouvaras, E. O. Schweitzer, III, and Ken E. Martin, “Local and Wide-Area Network Protection Systems Improve Power System Reliability,” presented at the 31st Annual Western Protective Relay Conference, Spokane, WA, October 2004.

Edmund O. Schweitzer, III and David E. Whitehead, “Real-Time Power System Control Using Synchrophasors,” presented at the 34th Annual Western Protective Relay Conference, Spokane, WA, October 16–18, 2007.

Edmund O. Schweitzer, III, and David E. Whitehead, “Real-World Synchrophasor Solutions,” Proceedings of the 35th Annual Western Protective Relay Conference, Spokane, WA, October 20–23, 2008.

Armando Guzmán, David Whitehead, Edmund O. Schweitzer, III, Yanfeng Gong, and Marcos Donolo, “Advanced Real-Time Synchrophasor Applications,” presented at the 35th Annual Western Protective Relay Conference, Spokane, WA, October 2008.

E. O. Schweitzer, III, A. Guzmán, H. J. Altuve, and D. A. Tziouvaras, “Real-Time Synchrophasor Applications for Wide-Area Protection, Control, and Monitoring,” Created for 3rd International Conference on Advanced Power System Automation and Protection Seogwipo, Jeju, South Korea, 2009.

Edmund O. Schweitzer, III, David Whitehead, Greg Zweigle, Krishnanjan Gubba Ravikumar, and Greg Rzepka, “Synchrophasor-Based Power System Protection and Control Applications,” presented at the 36th Annual Western Protective Relay Conference, Spokane, WA, October 2009.

Edmund O. Schweitzer, III, Allen Risley, Rhett Smith, and David Whitehead, “How Would We Know?” presented at the 37th Annual Western Protective Relay Conference, Spokane, WA, October 2010.

Edmund O. Schweitzer, III, Normann Fischer, and Bogdan Kasztenny, “A Fresh Look at Limits to the Sensitivity of Line Protection,” presented at the 37th Annual Western Protective Relay Conference, Spokane, WA, October 2010.

Edmund O. Schweitzer, III, David Whitehead, Hector J. Altuve Ferrer, Demetrios A. Tziouvaras, David A. Costello, and David Sánchez Escobedo, “Line Protection: Redundancy, Reliability, and Affordability,” presented at the 37th Annual Western Protective Relay Conference, Spokane, WA, October 2010.

Armando Guzmán, David E. Whitehead, Edmund O. Schweitzer, III, Marcos Donolo, Roy Moxley, and Yanfeng Gong, “Applied Synchrophasor Solutions and Advanced Possibilities,” presented at the 2010 IEEE PES Transmission and Distribution Conference and Exposition, New Orleans, LA, April 19–22, 2010.

E. O. Schweitzer, III, A. Guzmán, H. J. Altuve, D. A. Tziouvaras, and J. Needs, “Real-Time Synchrophasor Applications in Power System Control and Protection,” presented at the 10th International Conference on Developments in Power System Protection, 2010.

Edmund O. Schweitzer, III, Dale Finney, and Mangapathirao V. Mynam, “Applying Radio Communication in Distribution Generation Teleprotection Schemes,” presented at the 38th Annual Western Protective Relay Conference, Spokane, WA, October 2011.

Edmund O. Schweitzer, III, Ken Fodero, Paul Robertson, and David Whitehead, “Merging SONET and Ethernet Communications for Power System Applications,” presented at the 38th Annual Western Protective Relay Conference, Spokane, WA, October 2011.

Edmund O. Schweitzer, III, Dale Finney, and Mangapathirao V. Mynam, “Applying Radio Communication in Distribution Generation Teleprotection Schemes,” presented at the 38th Annual Western Protective Relay Conference, Spokane, WA, October 2011.

Edmund O. Schweitzer, III, David Whitehead, Shankar Achanta, and Veselin Skendzic, “Implementing Robust Time Solutions for Modern Power Systems,” presented at the 14th Annual Western Power Delivery Automation Conference, Spokane, WA, March 27–29, 2012.

Edmund O. Schweitzer, III, Dale Finney, and Mangapathirao V. Mynam, “Communications-Assisted Schemes for Distributed Generation Protection,” presented at the 2012 IEEE PES Transmission and Distribution Conference and Exposition, Orlando, FL, May 7–10, 2012.

Edmund O. Schweitzer, III, David Whitehead, Ken Fodero, and Shankar Achanta, “Designing and Testing Precise Time-Distribution Systems,” presented at the 39th Annual Western Protective Relay Conference, Spokane, WA, October 16–18, 2012.

Edmund O. Schweitzer, III, Armando Guzmán, Mangapathirao V. Mynam, Veselin Skendzic, Bogdan Kasztenny, and Stephen Marx, “Locating Faults by the Traveling Waves They Launch,” presented at the 40th Annual Western Protective Relay Conference, Spokane, WA, October 15–17, 2013.

E. O. Schweitzer, III, A. Guzmán, M. V. Mynam, V. Skendzic, B. Kasztenny, and S. Marx, “A New Traveling Wave Fault Locating Algorithm for Line Current Differential Relays,” presented at the 12th International Conference on Developments in Power System Protection, Copenhagen, Denmark, March 31–April 3, 2014.

Edmund O. Schweitzer, III, Bogdan Kasztenny, Armando Guzmán, Veselin Skendzic, and Mangapathirao V. Mynam, “Speed of Line Protection – Can We Break Free of Phasor Limitations?” presented at the 41st Annual Western Protective Relay Conference, Spokane, WA, October 14–16, 2014.

Edmund O. Schweitzer, III, David E. Whitehead, Greg Zweigle, Veselin Skendzic, and Shankar V. Achanta, “Millisecond, Microsecond, Nanosecond: What Can We Do with More Precise Time?” presented at the 42nd Annual Western Protective Relay Conference, Spokane, WA, October 20–22, 2015.

Edmund O. Schweitzer, III, Bogdan Kasztenny, and Mangapathirao V. Mynam, “Performance of Time-Domain Line Protection Elements on Real-World Faults,” presented at the 42nd Annual Western Protective Relay Conference, Spokane, WA, October 20–22, 2015.

E. O. Schweitzer, III, A. Guzmán, M. Mynam, V. Skendzic, B. Kasztenny, C. Gallacher, and S. Marx, “Accurate Single-End Fault Location and Line-Length Estimation Using Traveling Waves,” presented at the 13th International Conference on Developments in Power System Protection, Edinburgh, Scotland, United Kingdom, March 7–10, 2016.

E. O. Schweitzer, III, B. Kasztenny, M. Mynam, A. Guzmán, and V. Skendzic, “New Time-Domain Line Protection Principles and Implementation,” presented at the 13th International Conference on Developments in Power System Protection, Edinburgh, Scotland, United Kingdom, March 7–10, 2016.

Edmund O. Schweitzer, III, Bogdan Kasztenny, Mangapathirao V. Mynam, Armando Guzmán, Normann Fischer, and Veselin Skendzic, “Defining and Measuring the Performance of Line Protection Relays,” presented at the 70th Annual Georgia Tech Protective Relaying Conference, Atlanta, GA, April 20–22, 2016.

Edmund O. Schweitzer, III, Bogdan Kasztenny, Mangapathirao V. Mynam, Armando Guzmán, Normann Fischer, and Veselin Skendzic, “Defining and Measuring the Performance of Line Protective Relays,” presented at the 43rd Annual Western Protective Relay Conference, Spokane, WA, October 18–20, 2016.

Edmund O. Schweitzer, III and Bogdan Kasztenny, “Distance Protection: Why Have We Started with a Circle, Does It Matter, and What Else Is Out There?” presented at the 44th Annual Western Protective Relay Conference, Spokane, WA, October 17, 2017.

Edmund O. Schweitzer, III, Veselin Skendzic, Armando Guzmán, Mangapathirao V. Mynam, Jean León Eternod, and Yanfeng Gong, “Mystery Solved: Five Surprises Discovered With Megahertz Sampling and Traveling-Wave Data Analysis,” presented at the 45th Annual Western Protective Relay Conference, Spokane, WA, October 16, 2018.

Edmund O. Schweitzer, III and David E. Whitehead, “Resetting Protection System Complexity,” presented at the 46th Annual Western Protective Relay Conference, Spokane, WA, October 22, 2019.

Edmund O. Schweitzer, III, David E. Whitehead, Michael Thompson, Krishnanjan Gubba Ravikumar, Austin Wade, Bruce Hall, and Sean Robertson, “Combining Battery and AC Sources for More Reliable Control Power,” presented at the 47th Annual Western Protective Relay Conference, Spokane, WA, October 22, 2020.

Books

H. J. Altuve Ferrer and E. O. Schweitzer, III (eds.), *Modern Solutions for Protection, Control, and Monitoring of Electric Power Systems*, Schweitzer Engineering Laboratories, Inc., Pullman, WA, 2010.

H. J. Altuve *Ferrer*, E. O. Schweitzer, III, G. C. Zweigle, S. M. Manson, S. K. Raghupathula, and D. E. Whitehead (eds.), *Wide-Area Protection and Control Systems –A Collection of Technical Papers Representing Modern Solutions*, Schweitzer Engineering Laboratories, Inc., Pullman, WA, 2017.

E. O. Schweitzer, III, D. E. Whitehead, Dennis L. Gammel, George W. Masters, and H. J. Altuve Ferrer (eds.), *Sensible Cybersecurity for Power Systems –A Collection of Technical Papers Representing Modern Solutions*, Schweitzer Engineering Laboratories, Inc., Pullman, WA, 2018.

E. O. Schweitzer, III, B. Kasztenny, A. Guzmán, V. Mynam, and H. J. Altuve Ferrer (eds.), *Locating Faults and Protecting Lines at the Speed of Light –Time-Domain Principles Applied*, Schweitzer Engineering Laboratories, Inc., Pullman, WA, 2018.

Patents

234 patents: 104 U.S. patents and 130 foreign patents