

Mark Adamiak - IEEE Fellow, Mark Adamiak is the Chief Application Architect for GE Grid Automation and is responsible for identifying, developing, and integrating new technology for GE's substation protection, control, and automation business.



Mark started his career in the utility business with American Electric Power (AEP) and in mid-career, joined General Electric where his activities have ranged from advanced development, product planning, application engineering, and system integration.

Mr. Adamiak is a member of the IEC61850 WG, a Fellow of the IEEE, the US Regular Member for the CIGRE Protection & Automation study committee, a registered Professional Engineer in the State of Ohio and a GE Edison award winner. In 2012, Mr. Adamiak was elected to the US National Academy of Engineering.

Mark received his Bachelor of Science and Master of Engineering degrees from Cornell University in Electrical Engineering and an MS-EE degree from the Polytechnic Institute of New York.

Motty Anavi serves as VP of Business Development for RFL since 2014. He previously served as VP of Business Development for RAD and held other management positions with RAD since 1993. He has participated in the creation of standards to facilitate interoperability between legacy and next generation networks in the MEF and IETF. He currently serves as chair of the cyber security committee in ENTELEC.



Dr. Alexander Apostolov, IEEE Fellow, received MS degree in Electrical Engineering, MS in Applied Mathematics and Ph.D. from the Technical University in Sofia, Bulgaria. He has more than 35 years experience in power systems protection, automation, control and communications.



Alex is Principal Engineer for OMICRON electronics in Los Angeles, CA. He is IEEE Fellow and Member of the Power Systems Relaying Committee and Substations C0 Subcommittee. He is past Chairman of the Relay Communications Subcommittee, serves on many IEEE PES Working Groups and is Chairman of Working Groups C2 "Role of Protective Relaying in Smart Grid" and D21 "Contribution to IEC TC 95 WG MT4 Protection Functions Testing". He is member of IEC TC57 and Convenor of CIGRE WG B5.27 "Implications and Benefits of Standardised Protection Schemes" and member of several other CIGRE B5 working groups. He holds four patents and has authored and presented more than 400 technical papers. Dr. Apostolov is Editor-in-Chief of PAC World.

Dr. Apostolov is IEEE Distinguished Lecturer and Adjunct Professor at the Department of Electrical Engineering, Cape Peninsula University of Technology, Cape Town, South Africa.

Maria Nohemi Arboleda is the Manager of the National Dispatch Center at XM Compañía de Expertos en Mercados S.A., the Colombian Independent System Operator and Market Administrator. Mrs. Arboleda has 26 years of experience in the power and energy industry and has previously been Director of operations planning, Director of market settlement operations and Director of economic dispatch at XM.



Maria Nohemi obtained her Electrical Engineering degree from Universidad Nacional and her Specialization and Master degree in Electrical Engineering from Universidad Pontificia Bolivariana. She attended a Training course in Sweden in Control and Operation of Power Systems and an Advanced Management Program at the Universidad de los Andes.

Gabriel A. Argüello is the CEO Executive Director of National Energy Control Center of Ecuador, CENACE, which is the independent system operator Ecuador National Power System. Since 1983, Mr. Arguello has been teaching power system analysis and power system operation at Escuela Politécnica Nacional, Quito-Ecuador.

Mr. Arguello received his Electrical Engineer degree from Escuela Politecnica Nacional, Quito Ecuador in 1974 and his Masters Degree in Electrical Engineering from the University of Idaho in 1975.

Mr. Arguello is also the Secretary of WORLD ENERGY COUNCIL- Ecuador from 2014 to present, and past president of CIER (Comisión de Integración Energética Regional) from 2007 to 2009.

Dr. Shay Bahramirad, IEEE Senior Member is a Manager of Smart Grid and Technology and



Innovation Ambassador at ComEd. Her responsibilities include leading the Smart Grid organization across ComEd, business case development and performance measures for Smart Grid technology deployments, and defining, developing, and implementing Microgrid and Smart City initiatives in ComEd's service territory. Shay holds multiple advanced degrees, including a Ph.D. in Electrical Engineering from the Illinois Institute of Technology. Dr. Bahramirad is the Chair of the IEEE PES Women in Power, Technical Chair of the 2016 IEEE PES T&D Conference, Advisory Committee Member of the Great Lakes Symposium on Smart Grid and the New Energy Economy, the editor-in-chief of

Asset Management in Smart Grid Transaction Journal, Vice Chair of 2030.7 Microgrid controller standard, Vice chair of IEEE PES Distribution Subcommittee and US Representative of C4.24 CIGRE Power Quality and EMC Issues Associated with Future Electricity Networks

James Barich - Principal Project Manager with 28 years of Utility experience at PGE, specializing in Information Technology Infrastructure projects.



James primary focus over the last 11 years has been support of PG&E's critical business system upgrades to the Energy Management Systems, Disaster Recovery and Pacific AC Intertie RAS. James manages the Network and overall implementation of Synchrophasor technology at PG&E.

He is a registered Project Management Professional (PMP) since 2005.

Dr. Juan de Bedout is the Chief Technology Officer for GE's Energy Management business, leading a team of 5,000 engineers in over 20 countries around the world. Energy Management is GE's electrification and automation business, a \$7.6BB division serving a diverse array of customer segments including electric power transmission and distribution, renewable energy, oil and gas exploration and production, metals, mining, marine electric propulsion, commercial buildings and data centers, among others. The business has a complete portfolio of products and service offerings, including generators, primary equipment for high voltage utility applications, turnkey electrical substations, distribution automation products, circuit breakers and switchgear, variable speed motor drives, electrical motors, and a thorough suite of utility and industrial automation products.

Under Juan's leadership, the engineering team is responsible for designing and producing world-class products and solutions for the Energy Management businesses.

Prior to this role, Juan served as the Technology Director for the Electrical Technologies & Systems organization at GE Global Research, reporting to the Senior Vice President of GE Global Research. In this role, he led a global team of approximately 550 scientists and engineers, responsible for advanced technology development in the areas of semiconductor devices and packaging, electronics, electrical power conversion, controls and signal processing, in support of GE's Energy, Oil & Gas, Aviation, Transportation and Healthcare businesses.

Juan obtained all of his degrees from Purdue, starting with a B.S.M.E degree in 1994, followed by an M.S.M.E. degree in 1996, and finishing with a Ph.D. in mechanical engineering in 2000.

Terry Boston has served for the past seven years as CEO of PJM Interconnection. Prior to joining PJM, Mr. Boston was the executive vice president, Power System Operations, of the Tennessee Valley Authority. In his 35 years at TVA, Mr. Boston directed divisions in transmission and power operations, pricing, contracts and electric system reliability. Mr. Boston is immediate past president of the Association of Edison Illuminating Companies and past president of GO 15. He also served as a U.S. vice president of the International Council of Large Electric Systems. In 2014 Mr. Boston was elected to the National Academy of Engineering. In 2011 he was honored with the 2011 "Leadership in Power" award from the IEEE Power and Energy Society. Mr. Boston led PJM to win *Platts* Global Energy Awards in Industry Leadership 2010 and Excellence in Electricity in 2012. Mr. Boston holds a Bachelor of Science in engineering from Tennessee Technological University and a Master of Science in engineering administration from the University of Tennessee.



David A. Bradley is the Manager of Technology Application for PG&E's Applied Technology Services Section. He is responsible for electrical testing and analysis and technology performance testing associated with PG&E's utility system.



Mr. Bradley joined PG&E in 1980 and has held a variety of Engineering and Operating positions. He has over 25 years of experience as a Distribution and Transmission Engineer and supervisor. He has also served as PG&E's Manager for its Vegetation Management program, and Manager for New Customer Connections. He has a total of 35 years of utility operations background.

Mr. Bradley currently leads a section which is composed of over 60 engineers, scientists and technicians. He is responsible for a High Voltage Test Dome capable of 720,000 volt testing, a High Current Test Yard capable of testing to 80,000 amps, and a new Distribution Test Yard for Smart Grid systems testing. Numerous projects have been completed including equipment testing and acceptance, event recreation, and incident investigations. Mr. Bradley's unit has experience in Distributed Generation equipment and integration as well as data acquisition projects.

Mr. Bradley holds a B.S. degree in Electrical Engineering from the South Dakota School of Mines & Technology in Rapid City, SD. He is a registered Professional Engineer in the state of California. He is a member of the IEEE – Power Engineering Society.

Ron Chebra is an industry recognized thought leader in Smart Grid, AMI and connected devices. He has an extensive background in communication systems and telemetry services, with a specialty in business requirements and strategy. Currently, he is a Solutions Architect with Schneider Electric's Grid Automation Group where he is helping a number of clients with their business strategy and future direction. Ron was formerly a Vice President with KEMA's Management Operations and Consulting Business Line where he was responsible for their North American Advanced Metering Infrastructure/Smart Grid (AMI/SG) practice.



Dewey Day is the Principal Operational Technology Architect at Pacific Gas & Electric Company. He is responsible for designing PG&E's private communications network to meet the demands of the Electric Grid and Gas Distribution Systems. He has 20 years of experience installing Microwave, Fiber Optic, Wireless and Wired communications systems to meet the communications requirements of PG&E's critical operational assets. Dewey has a Bachelor of Science Degree in Electrical Engineering from California State University, Fresno.



Jeffery Dagle



has worked at the Pacific Northwest National Laboratory, operated by Battelle for the U.S. Department of Energy (DOE), since 1989 and currently manages several projects in the areas of transmission reliability and security, including the North American Synchro Phasor Initiative (NASPI) and cyber security reviews for the DOE Smart Grid Investment Grants and Smart Grid Demonstration Projects. He is a Senior Member of the IEEE and the National Society of Professional Engineers (NSPE). He received the 2001 Tri-City Engineer of the Year award by the Washington Society of Professional Engineers, led the data requests and management task for the DOE Infrastructure Security and Energy Restoration Division with on-site assessments in New Orleans following Hurricane Katrina in 2005. Mr. Dagle was a member of a National Infrastructure Advisory Council (NIAC) study group that was formed in 2010 to establish critical infrastructure resilience goals. In 2014 Mr. Dagle was invited to serve on a National Academy committee to provide recommendations for the analytical research foundations for the next generation electric grid. He is the recipient of two patents, a Federal Laboratory Consortium (FLC) Award in 2007, and an R&D 100 Award in 2008 for the Grid Friendly™ Appliance Controller technology. He received B.S. and M.S. degrees in Electrical Engineering from Washington State University in 1989 and 1994, respectively.

Kevin Dasso



is Senior Director of Technology and Information Strategy at Pacific Gas and Electric Company. Kevin has over 33 years of experience in the gas and electric utility business including engineering, operations, construction and asset management.

Kevin is currently responsible for developing and implementing strategy and policies for the utility related to the Smart Grid and transmission and distribution technology integration. He leads the company's Smart Grid team involving the Electric Operations, Customer Care, Energy Procurement and Information Technology departments.

Kevin is a member of the Board of the Gridwise Alliance and serves in an advisory role to a number of research and academic organizations. He is a former member of the Western Electricity Coordinating Council's Reliability Policy Issues Committee, and is former chair of the North American Electric Reliability Council (NERC) Planning Committee Reliability Assessment Subcommittee.

Kevin received a B.S. in Electrical Engineering at Iowa State University and a M.S. in Electric Engineering at Santa Clara University. He is a Registered Professional Engineer in California and is a member of the IEEE Power Engineering Society.

Bill Dickerson



is Chairman of the Board of Arbiter Systems, Inc. in Paso Robles, California. Bill received his BSEE from Washington University in St. Louis in 1975 and his Masters in Business Administration from the University of Michigan in 1979.

Bill worked at Hewlett-Packard Company in Palo Alto, California and Spokane, Washington from 1979 until 1986, when he and his current partners acquired Arbiter Systems, Inc. Bill is the original product designer for Arbiter's GPS timing product line and the Model 1133A Power Sentinel, the industry's most accurate Phasor Measurement Unit (PMU).

Mr. Dickerson is a member of the IEEE Power Systems Relaying Committee and Chairs multiple working groups working on Time tagging and timing Profile in Protection and Disturbance Recording of Intelligent Electronic Devices.

Dr. J. Patrick Donohoe



received the B.S. and M.S. degrees in Electrical Engineering from Mississippi State University in 1980 and 1982, respectively. He received the Ph.D. degree in Electrical Engineering from the University of Mississippi in 1987. Dr. Donohoe joined the Department of Electrical and Computer Engineering at Mississippi State University in 1986 where he is

currently holds the title of Professor and Paul B. Jacob Chair. His primary research interests include computational electromagnetics, radar, electromagnetic compatibility, electromagnetic properties of composite materials, geomagnetic disturbances, and lightning protection. Dr. Donohoe is a Senior Member of IEEE, a registered professional engineer in the state of Mississippi, and a member of Eta Kappa Nu.

Aaron Feathers is a Principal Engineer in System Protection at Pacific Gas and Electric Company, where he has been employed since 1992. He has 23 years of experience in the application of protective relaying and control systems on transmission systems. Aaron's current job responsibilities include design standards, wide area RAS support, NERC PRC compliance, and relay asset management support. He has a BSEE degree from California State Polytechnic University, San Luis Obispo and is a registered Professional Engineer in the State of California. He is also a member of IEEE and is on the Western Protective Relay Conference planning committee and the NERC Protection System Maintenance Standard Drafting Team for PRC-005.



Dr. Jerry FitzPatrick is the Leader of the Applied Electrical Metrology (AEM) Group which continues a legacy begun by NIST's predecessor, the National Bureau of Standards (NBS), which had supported the electric power industry from practically its inception. He joined NIST in 1988 as a project leader in the high voltage area and electrical insulation research. He received the B.S. degree in Physics from Rutgers University, the M.S.E.E. from the New Jersey Institute of Technology, and the Ph.D. degree in Electrical Engineering from the State University of New York at Buffalo. The AEM Group that he leads conducts research in electrical measurements, including synchro metrology, develops precision measurement techniques and offers measurement services for calibration of phasor measurement units (PMUs). A synchro metrology testbed was established in collaboration with the Department of Energy to develop protocols and standards for testing of PMUs. The AEM Group also conducts research in electric power and energy metrology, maintains the national standards, and provides measurement services for standard meters. Jerry also is part of the NIST efforts to fulfill its mandate given by the 2007 Energy Independence and Security Act (EISA) for the Smart Grid. He is the NIST co-lead on the Transmission and Distribution Domain Expert Working Group (DEWG) of the Smart Grid Interoperability Panel (SGIP) which is examining interoperability issues and standards for T&D. He leads an effort in the development of interoperability standards and tests for PMUs and smart sensors for the NIST SG Testbed. He has been active in IEEE and is Past Chair of the IEEE PES Power Systems and Instrumentation Committee. He began his career with Exxon Research and Engineering Company where he was part of team that conducted electro-optic studies of failure mechanisms in transformers and dielectrics research in high voltage cable insulation.



Shinji Fujiwara joined Hitachi, Ltd., Tokyo in 1990 where he was engaged in research and development of relational database system. He is now a chief engineer of database department of Hitachi Ltd., IT platform division Group.



Dr. Yong Fu is an Assistant Professor in the Electrical and Computer Engineering Department at Mississippi State University. He received his B.S. and M.S. degrees in Electrical Engineering from Shanghai Jiao Tong University, China, in 1997 and 2002, respectively. In 2006, he received his Ph.D. degree in Electrical Engineering from Illinois Institute of Technology, Chicago. From 2006-2009, he was a senior research associate at the Robert W. Galvin Center for Electricity Innovation at Illinois Institute of Technology, Chicago. He has over 15 years of research experience in the area of power system operation and control, and has published over 30 IEEE Transactions journal papers. He serves as a PI or co-PI on several projects including Smart Grid, Electric Ship Research, Micro-CHP, and Synchrophasor.



Dr. Fu is a recipient of the NSF CAREER Award in 2012. He serves as an editor for IEEE Transactions on Power Systems, IEEE Power Engineering Letters, and the Journal of Electric Power Components and Systems.

Cheryl Gessner is a Management Consultant to Pacific Gas & Electric leadership team as a Manager of Operations Support for the Smart Meter Operations Center in Concord, CA and the IT Enterprise Command Center in San Francisco. Her contributions to the PG&E team that launched the Smart Meter operations center originally defined and completed the process and organizational work streams leading, developing, and implementing the new operations center programs and practices.



Prior to joining PG&E in 2011, Cheryl has held several technical and leadership positions including Senior Director of Network Operations for Bright House Network Operations Center in Riverview, FL and in Network Operations Centers, Business & Residential Customer Care, Consumer Products Managing Retail Stores, Business Development, Contract Management and Vendor Management roles for Comcast Cable Corporation, AT&T Broadband, AT&T Consumer Products Divisions, and USWEST Communications.

Cheryl is a graduate of Regis University in Colorado where she earned her Bachelor's Degree for International Business Administration & Management. She also received certificate program recognition for Project Management professionalism from George Washington University, the DET NORSKE VERITAS quality systems ISO 9002 in 1994, and a Six Sigma Black Belt certificate from Villanova University in 2007.

Allen R. Goldstein is currently working in the electrical power synchro metrology lab at the National Institute for Standards and Technology. Since resigning his commission as a Naval Submarine Officer in 1987, Allen has led the formation of international electronics standards while also designing products which comply with these emerging standards. Allen has been involved with Musical Instrument Digital Interface (MIDI), the Digital Audio Interface standard (IEC 60968/AES3), Digital Video Disk (DVD), Firewire (IEEE 1394), Personal Video Recording systems, and Phasor Measurement for the Electrical Power System (IEEE C37.118).



Allen is chairman of the IEEE Conformance Assessment Program (ICAP) Synchrophasor Conformance Assessment Steering Committee, vice chair of the joint IEEE/IEC Synchrophasor Working Group (IEEE PSRC H11) and vice chair of the working group for mapping between IEEE C37.118 and IEC 61850 90-5 (IEEE PSRC H21).

Dr. Frank R. Goodman, Jr. is Team Lead for SDG&E's R&D program. He is responsible for developing, managing, and seeking funding for R&D activities in the areas of applied power electronics, networked distribution automation, and integration of renewable and distributed energy resources. He has over 35 years of experience in the electric utility business. He created and managed major programs in renewable resources and networked distribution automation, while in various prior positions at Electric Power Research Institute (EPRI) and Los Angeles Department of Water and Power.



He has chaired major international standards groups for IEC and IEEE. He holds BS, MS, and PhD degrees in Electrical Engineering, an MBA, and is a registered Electrical Engineer in California. He has been a Lecturer in engineering programs at University of Southern California, Loyola-Marymount University, and University of California at Santa Barbara.

Prasanth Gopalakrishnan is the founder and CEO of Kalkitech. Established in 1998, Prasanth is the founder of Kalkitech, with a vision to make it a technology leader in the field of energy optimization and communication solutions. *Over the years, he has assembled a strong management team and top engineering talent to establish Kalkitech as a specialized technology solutions provider for the energy industry. Prasanth has more than 18 years of*



experience in communication systems research and product development. His areas of specialization include standards based communication and optimization technology in the energy and utilities space. He is a member of IEEE and Bureau of Indian Standards (BIS) LITD 10. Prasanth holds a Under Graduate Degree in Electronics and Communication Engineering from National Institute of Technology, Calicut, India and a Graduate degree in Electrical Engineering from Colorado State University. Prior to founding Kalkitech, Prasanth worked at Robert Bosch India.

Lloyd Green is Director, Engagement Marketing & Creative Community Services for the IEEE. In this role Lloyd is responsible for developing, promoting and supporting conformity assessment activities based on IEEE standards He brings a wealth of technology related experience in the areas of strategic marketing, corporate communications, market intelligence, business development and product marketing. Lloyd is a frequent speaker for the IEEE-SA on conformity assessment initiatives covering areas including, power, timing and synchronization and mobile device image quality.



Scott Hayes received his BS in Electrical and Electronic Engineering from California State University, Sacramento in 1985. He started his career with Pacific Gas and Electric Company in 1984 as an intern. Since then he has held multiple positions in System Protection including supervisor, as well as Distribution Engineer, Operations Engineer, Supervising Electrical Technician, Supervising Engineer in Power Generation and is currently an Expert Protection Engineer focusing on standards, procedures and quality.



Scott has previously co-authored papers for the Western Protective Relay Conference, Georgia Tech, TechCon Asia Pacific, CEATI Protection and Control Conference and Transmission and Distribution World Magazine. Topics include Thermal Overload Relays for Intertie Lines, Data Mining Relay Event Files to Improve Protection Quality and Effects of CCVT Ferroresonance on protective relays.

Scott is a registered Professional Engineer in the state of California and has served as Chairman of the Sacramento Section of the IEEE Power Engineering Society.

William F. Hederman is the Deputy Director for Systems Integration and Senior Advisor to the Secretary. Mr. Hederman is a trained electrical engineer and public policy analyst with decades of executive experience in the private and public sectors. He began his professional career as a systems integration engineer at Bell Labs in the directorate that later developed the cell phone system. Mr. Hederman served on the RAND Corporation's research team that pioneered analysis of Federal technology demonstrations, worked as the Congressional Budget Office's first energy and science budget analyst, and led the establishment of the policy analysis department at INGAA (pipeline association), of the International Energy Agency's gas technology center, and of the Washington office for RJ Rudden Associates (now Black & Veatch).



Mr. Hederman was Vice President for Business Development and Strategic Initiatives at Columbia Transmission Companies on the management team that brought Columbia out of bankruptcy and sold it to another utility at an attractive price for shareholders. During the Enron and California crises, FERC Chairman Patrick Wood asked Hederman to join the agency and form the Office of Market Oversight and Investigations, which has been credited with playing a major role in the restoration of confidence in electricity and natural gas regulatory oversight.

Since FERC, Hederman has devoted his career to helping energy companies comply with new regulations while thriving in their business pursuits. He also co-founded a demand resource technology start-up. He holds engineering degrees from the Massachusetts Institute of Technology and the University of Notre Dame and a professional degree (M.P.P.) from the University of California at Berkeley. He is member of the IEEE and the Cosmos Club.

Dr. Juergen Holbach has more than 25 years of experience in design and application of protective relaying. He led the development project for the second generation of numerical line differential relays for a German relay manufacturer. As an application expert for transmission protection he was responsible for approval test of transmission relays with utility customer around the world. Since 2000 he works in the U.S. as a product manager for protection relays. Juergen was one of the lead engineers on the first IEC61850 based Protection and Control, Multi-Vendor Project in the United States (500KV Bradley Station-TVA). As Senior Director in the Protection & Automation group Juergen works on complex protection questions and utilizes the Quanta RTDS lab to test, investigate and develops new protection and control schemes.



Juergen contributed to several working groups in CIGRE as well as in IEEE-PSRC and is the chairman of the working group H5 “Common format for IED configuration data”. He is also member of the IEEE-PSRC subcommittees “Relay Practices” and “Relay communication”. He published over a dozen papers at the major relay conferences in North America. Juergen holds several patents in the area of protection relaying.

Prior to joining Quanta Technology, he was Product Lifecycle Manager at Siemens Energy Inc. in Wendell North Carolina. He was born in Germany and graduated from the University of Berlin with a PhD in Electrical Engineering. He joined Siemens AG in 1992 as a development engineer in Berlin Germany. In 1994 he moved to the product management group for protection relays in Nuremberg Germany. In 2000 he joined Siemens Power and Distribution in Wendell, NC as a product manager for transmission relays.

Dr. Anil Jampala (SM' 90) received his Ph. D. from University of Washington, Seattle and joined ESCA Corporation in 1986, which is currently part of Alstom Grid. He is a Principal Power Systems Engineer at Alstom Grid and worked on several major US and international projects. During 1997 to 2009, Anil worked in the Information Technology sector in India and received medals for his contributions. As a Vice-President of Satyam Computers, he was a principal contributor to India's first integrated Emergency Management System, which now covers one third of India. Anil also has a MBA from Seattle University. He is a Senior Member of IEEE and received its Millennium Medal in 2000. Anil is a registered Professional Engineer in the state of Washington. He also has a PMP certification from Project Management Institute



Dr. Arjen Jongepier (1966) holds an M.Sc (1989) and a Ph.D. (1996) degree in Electrical Engineering. Always focused on the technical and organisational behaviour of the energy system, he was involved in the development of (Risk Based) Asset Management, which should be interpreted as the optimization of functionality, reliability and affordability of the electricity transmission and production system. Started as a researcher in the field of applying artificial knowledge to, amongst others, adaptive protection in high voltage transmission networks, he also developed skills and knowledge in the distribution sector. He worked 20 years with KEMA as a consultant, and since 2008 he works with the Delta Networkgroup, the Distribution Network Operator in the South-Wets of the Netherlands



Arjen is responsible for the innovation and sustainability department. The impact of intermittent renewable energy sources and the rapidly changing behaviour of customers (great and small) receives his primary attention. The challenges should be mitigated by optimally combining traditional (and robust) network reinforcements and innovative smart technologies to stimulate and/or enforce desired customer responses (from the social optimal point of view). Arjen is the company's policy advisor to the asset managers and the corporate management.

During his study, he already got acquainted with the theory of Phasor Measurements. Currently, his company is experimenting with the application of this technique in a distribution environment.

Dr. Farid Katiraei is director of Renewable and Sustainable Technology Integration for Quanta Technology. He has more than 14 years of professional experience in the areas of distributed generation interconnection, power electronics and modeling and analysis of system transients and dynamics. In the recent years, Farid has been the technical leads for design, development and testing of several pilot projects for utilities in North America involving renewable technologies, advanced distribution automation, energy storage and microgrids.



Farid has received his PhD from university of Toronto in 2005. He is a Senior Member of IEEE, Steering committee member of the international microgrid symposium, and active participants in several technical working groups and standards development task forces within IEEE, IEC and CIGRE.

Dr. Maryam Khanbaghi received her Bachelor's degree from Universite de Nice – Sophia Antipolis, France, and M.Sc.A and Ph.D from École Polytechnique, Montreal, Canada in Electrical Engineering. She worked several years for Pulp and Paper Research Institute of Canada as a research engineer. She then joined Corning Inc. in 2000, as Sr. Research Engineer.



Maryam was the corporate champion for the analysis and design of advanced control systems and in 2004 established the advanced control group. In 2009, She moved to a commercial position as the technical liaison between Corning and the West Coast major high tech companies. In 2012, she joined Santa Clara University as a full time faculty in the electrical engineering department, where she teaches undergraduate and graduate courses. Her area of research is control system design/optimization for large systems such as power plants.

Maryam during her corporate career, worked in R&D, corporate engineering, manufacturing and commercial technology where she gained experience in innovation, product development and marketing to highly demanding customers. She is using her corporate experience to guide her research program in control systems where direct impact to our society can be measured. She has published over thirty papers in journals, conference proceedings and company internal research papers. She has one Patent and one Patent Application.

Dr. Roger King – IEEE Fellow is Executive Director of the Institute for Computational Research in Science and Engineering (ICRES), a William L. Giles Distinguished professor, and holds the CAVS Endowed Chair in Engineering.



King received his BS in electrical engineering from West Virginia University in 1973, a MS in electrical engineering from the University of Pittsburgh in 1977, and a doctorate from the University of Wales in the United Kingdom in 1988.

As the Executive Director of ICRES, King leads an organization that strives to be a world-class center of excellence for research, technology and education equipped to address engineering challenges facing the nation's industrial base. Utilizing high performance computational resources and state-of-the-art analytical tools for modeling, simulation, and experimentation, ICRES will provide a distinctive, interdisciplinary environment that will support economic development and outreach activities throughout the State of Mississippi and beyond. The Institute is composed of three MSU research/economic development centers - Center for Advanced Vehicular Systems (CAVS) in Starkville MS; Center for Advanced Vehicular Systems Extension (CAVS-E) in Canton, MS; and the Institute for Systems Engineering Research (ISER) in Vicksburg, MS.

Dr. Yutaka Kokai joined Hitachi, Ltd. in Tokyo in 1981, where he engaged in power system analysis and development of EMS/SCADA and stability control systems. In 1995, he developed the world first On-line TSC (transient stability control) system for Chubu Electric Power Company in Japan. He is now the VP of Hitachi America, Ltd. in New York.



John Ku is a Manager of Strategy and Planning for Smart Grid & Technology Programs at PG&E where he is focused on the development of smart grid technology roadmaps and strategy. He has also held roles as a program manager in Customer Care for Energy Efficiency Financing developing residential loan offerings.



Prior to joining PG&E, John worked in various roles within the distributed generation (DG) resources industry, creating a roadmap for a wind turbine rollout in India and helping to build a residential solar lease offering at a major solar developer.

John earned his MBA from NYU and his Bachelor of Science in Finance and Information Systems from the University of Maryland.

Steven A. Kunsman Vice-President and General Manager, ABB Power Systems - Substation Automation Products North America is an active member of the IEEE Power Engineering Society PSRC including past working group chairperson for H13 working on cyber security, an IEC TC57 US delegate in the development of the IEC61850 communication standard and UCA International Users Group Executive Committee co-chairperson.



His areas of expertise include: 30 years experience in substation automation, protection and control applications, communications technologies (IEC 61850 and DNP), cyber security for substation automation, and Relion product family of protection and control relays.

Gregg Lemler is vice president of Transmission Operations for Pacific Gas and Electric Company. His current responsibilities include providing leadership and direction to the company's 24/7 Transmission Control Center operations, transmission lines and substation-related engineering/design, operations, construction, reliability, and strategy functions.



With over 30 years of experience at PG&E, Lemler has served in various senior level and management positions in engineering, planning, maintenance, construction and project management at the transmission and distribution levels, and managed the San Francisco Bay and various hydroelectric power plants. His most recent role was as the senior director of Electric Transmission System Operations, responsible for operating PG&E's electric transmission grid — a system consisting of over 18,000 miles of electric transmission line (60kV to 500kV) and 960 transmission and distribution substations throughout Northern and Central California.

Lemler is a registered engineer in the state of California and received his bachelor's degree in Mechanical Engineering from the University of Wisconsin, Madison. He also received his MBA from California State University, Fresno and is a recent graduate of the executive business administration and management program at the Tuck School of Business at Dartmouth College.

Ramon Leon is currently Senior Executive for new business development at XM S.A. (an affiliate of Grupo ISA), in charge of the design and structuring of new business opportunities for the company, based on the advanced management of real-time systems and market platforms. He has 16 years of experience in the strategic planning of energy systems, the management of research and development projects, and the structuring of corporate entrepreneurship projects based on innovation. Mr. Leon is also a member of the advisory board of the Colombia's National Research Program on Energy and Mining. Mr. Leon is an Electrical Engineer from Universidad Tecnológica de Bolívar and has a Masters Degree in Electrical Engineering from Iowa State University. He also has a Certificate in Modern Power System Protection from the University of Wisconsin-Madison and a Certificate in Operations Research from Universidad Nacional de Colombia. He is a Fulbright-Colciencias scholarship recipient and a senior member of the Power and Energy Society of the IEEE.



Dr. Yilu Liu IEEE Fellow - is currently the Governor's Chair at the University of Tennessee, Knoxville (UTK) and Oak Ridge National Laboratory (ORNL). She is the deputy director of the NSF/DOE Engineering Research Center -CURENT. Prior to joining UTK/ORNL, she was a Professor at Virginia Tech. She led the effort to develop the North America power grid monitoring network now operated at UTK and ORNL as FNET/GridEye (Fnetpublic.utk.edu). Her current research interests include power system wide-area monitoring applications and large interconnection level dynamic modeling and simulations.



Dr. Vahid Madani, IEEE Fellow – is a technology leader for advanced power systems applications at PG&E (Pacific Gas and Electric), headquartered in San Francisco, California. His most recent assignments are associated with grid modernization, reactive compensation, advanced control technology, Integration of Protection & Automation for T & D, wide-area advanced warning systems in disaster recovery environment, and deployment of emerging technology including Synchrophasor systems and Geomagnetic disturbance resiliency. Dr. Madani is actively involved in leading the electric utility industry on technology, reliability, and development of industry standards for use in large scale production grade smart grid systems. He has been a business and technical leader in charge of developing process and roadmaps for several large scale projects.



Mr. Madani received his Ph.D. from Mississippi State University in Power systems with specialty in advanced warning systems for transmission systems. He has a doctoral diploma from the University of Washington (UW, Seattle), in Smart Grid technology for distribution systems, and M.S. and B.S. Degrees from University of Idaho.

Dr. Madani is contributor to three text books and three reference handbooks. He is the Chair of the IEEE Fellos Committee, has been Guest Editor of three IEEE Transaction Special Publications and the recipient of the 2013 IEEE Transactions Prize Paper Award. He is recognized by *Intelligent Utility* magazine for leadership and benchmark achievements and contributions in technology advancements in large investor-owned electric utilities industry.

Dr. Madani is an IEEE Distinguished Lecturer, an adjunct faculty at Mississippi State University, and a registered Electrical Engineer in California, USA.

Dr. A.P. Sakis Meliopoulos (M '76, SM '83, F '93) was born in Katerini, Greece, in 1949. He received the M.E. and E.E. diploma from the National Technical University of Athens, Greece, in 1972; the M.S.E.E. and Ph.D. degrees from the Georgia Institute of Technology in 1974 and 1976, respectively. In 1971, he worked for Western Electric in Atlanta, Georgia. In 1976, he joined the Faculty of Electrical Engineering, Georgia Institute of Technology, where he is presently a Georgia Power Distinguished Professor. He is active in teaching and research in the general areas of modeling, analysis, and control of power systems. He has made significant contributions to power system grounding, harmonics, and reliability assessment of power systems. He developed the Macrodyne PMU based harmonic monitoring system for the NYPA transmission system in the period 1993-1998 with Dr. Cokkinides, the smart ground multi-meter which is now commercially available, the distributed state estimator technology and the dynamic state estimation based protective relay (setting-less protection). He is the author of the books, *Power Systems Grounding and Transients*, Marcel Dekker, June 1988, *Lightning and Overvoltage Protection*, Section 27, Standard Handbook for Electrical Engineers, McGraw Hill, 1993-2012, and *Applications of Time-Synchronized Measurements in Power System Transmission Networks*, (coauthors: M. Kezunovic, V. Vittal and V. Venkatasubramanian), Springer 2014. He holds three patents and he has published over 300 technical papers. Among his major awards are: in 2005 he received the IEEE Richard Kaufman Award and in 2010 the George Montefiore Award. Dr. Meliopoulos is the Chairman of the Georgia Tech Protective Relaying Conference, a Fellow of the IEEE and a member of Sigma Xi.



Scott R. Mix, CISSP, joined NERC in October 2006 following more than 25 years of experience working in various facets of the electricity industry, including as a consultant with KEMA, Inc., Infrastructure Security Manager with the Electric Power Research Institute (EPRI), Senior Security Analyst at the PJM Interconnection, and more than ten years with Leeds & Northrup Co. as a programmer/analyst and systems architect. For more than fifteen years, he has focused on the areas of Computer and Infrastructure Security for the Electricity Sector. At NERC, he is responsible for Critical Infrastructure Protection issues, primarily as they relate to Real Time and Control System Security, and the development of the revisions to the NERC CIP Standards. He has also been the NERC Staff Facilitator for the Critical Infrastructure Protection Committee (CIPC) and several of its working groups and task forces.



Throughout his career, Mr. Mix has worked closely with numerous industry and government organizations, including NERC's Critical Infrastructure Protection Committee (CIPC) and its working teams, and is the former convener of the Control System Security Working Group, has been an active and vocal observer to the NERC Cyber Security Standards Version 1 Drafting Team (and the NERC 1200 process before that), and is a former member of the OASIS "How" Working Group. He has also worked with the Department of Energy, the Department of Homeland Security, the FBI's National Infrastructure Protection Center, and the Federal Energy Regulatory Commission dealing with specific Electric Sector Security Issues. He has organized and presented at numerous industry symposia, both domestically and internationally. He has been a member and chapter secretary of the Philadelphia Chapter of InfraGard, is a member of the ISA and has participated in the ISA99 and ISA100 standards activities, and is a member of the IEEE as well as its Computer Society, Power Engineering Society, and Standards Association. He is a Certified Information Systems Security Professional (CISSP).

Mr. Mix is a graduate of the Bloomsburg University of Pennsylvania with a Bachelor of Science degree in Computer & Information Science and Chemistry.

Dr. Robert J. Moorhead II, received a BSEE from Geneva College in 1980 and a MSEE and his Ph.D. in Electrical and Computer Engineering from North Carolina State University in 1982 and 1985 respectively. He is currently the Billie J Bill Professor of Electrical and Computer Engineering at Mississippi State University, as well as Director of both the Geosystems Research and Northern Gulf Institutes. He has published over 160 papers, 70 of which are refereed, is the lead author on one patent, is the author of one book, has been the editor for 5 other books, and is the author of 7 book chapters. He has been the major professor for 10 PhD students. He has been the major professor for 19 MS thesis students and major professor for 21 non-thesis MS students. He has received the Career Achievement Award and the Outstanding Engineering Research Award from the Bagley College of Engineering at Mississippi State University. He on the Board of Directors of the IEEE Computer Society's Technical Committee on Visualization Conference Chair over the past 20 years. He has lead visualization research and development efforts in support of many geospatial problems (physical oceanography, disposal of dredged materials, coastal / severe weather, etc.). Over the past 5 years, he has developed an unmanned air / surface vehicle program focused on precise agriculture and watersheds.



Dr. Thomas Morris – Director of the Critical Infrastructure Protection Center (CIPC) and at Mississippi State University (MSU). He is also a faculty member for the Center for Computer Security Research (CCSR) at MSU, and is active researcher in the industrial control system and Smart Grid cybersecurity domain.



Dr. Morris works to develop control system vulnerability and exploit taxonomies which are used to in control system cybersecurity solutions. His research has led to the development of a control system network traffic data logger to support post incident forensic analysis and the development of a security retrofit architecture for adding intrusion detection and authentication features to legacy control systems. He has also created a Private

Computing on Public Platforms (PCPP) system called. PCPP encapsulates and isolates applications from all other processes running on the same platform, including isolation from processes executing with root or supervisor privileges.

Prior to joining MSU, Dr. Morris worked at Texas Instruments (TI) for 17 years in multiple roles including circuit design and verification engineer, applications engineer, team leader, and program manager. Dr. Morris received his Ph.D. in Computer Engineering at Southern Methodist University in Dallas, TX with a research emphasis in cyber security.

Dr. Samiha Mourad IEEE Fellow., William and Janice Terry Engineering Professor, earned her PhD in Nuclear Energy in the 70's, joined the School of Engineering, at Santa Clara University, in late 80's. She became the first Claire Boothe Luce Professor in 1989. In 1993 she became the first woman to be named as Associate Dean for the School. Dr. Mourad is currently the Chair of the Electrical engineering Department.



Prior to joining Santa Clara University, she was with the Center of Reliable Computing at Stanford University where she conducted research in Digital Testing and served as the Associate Director. Samiha has engaged in cutting-edge research in the area of digital testing and design for testability. Her research expertise, which spans the domain of

electronic devices from the logic level to the silicon level, has been sponsored by grants from the National Science Foundation.

Dr. Mourad has published over 50 papers, a book on Field Programmable Gate Arrays (Prentice Hall 1984), and a book on Digital testing (Wiley 2000). Recently in the 21st century, she established the Sustainable Energy Master degree, that she consider her best contribution to the engineering profession.

Paul Myrda is a Technical Executive with the Electric Power Research Institute working in the Power Delivery and Utilization Sector. Currently he is program manager for the Information and Communications Technology for Transmission. In this role Paul facilitates activities across the EPRI organization related to transmission Smart Grid. He is also responsible for the future looking Grid Transformation project investigating the needs of the next generation EMS and also protection systems. Paul is also involved in cyber security activities as an External Advisory Board (EAB) member of the Trustworthy Cyber Infrastructure for the Power Grid (TCIP-G) Center. Paul represents EPRI on the Industrial Advisory Board for the Power Systems Engineering and Research



Consortium and the Center for Ultra-Wide-Area Resilient Electric Energy Transmission Networks (CURENT).

Previously, Paul was Director of Operations and Chief Technologist overseeing planning and asset management functions for Trans-Elect's operating companies. He championed an innovative protection and control system upgrade project for the Michigan Electric Transmission Company an affiliate of Trans-Elect. Paul has over 35 years of experience including leading edge technology implementations. His diverse background includes planning, engineering, information systems and project management. He has an MBA from Kellogg (2000) and MSEE and BSEE from Illinois Institute of Technology (1980 and 1977, respectively). He is a licensed professional engineer, and an active member of CIGRE and senior member of the IEEE.

Dr. Masoud Nazari is a Post-Doctoral Fellow in Electrical Energy in the School of Electrical and Computer Engineering at Georgia Tech. He is also a Research Associate Consultant at Gridquant Technologies. He obtained his dual PhD in Electrical and Computer Engineering (Power Systems) and Engineering and Public Policy (Energy Policy) from Carnegie Mellon University through CMUPortugal program in 2012. He was awarded the five-year international FCT fellowship in 2007 and was a visiting PhD student at MIT Energy Initiative in 2010. Dr. Nazari has several publications in the subject of smart grid and distributed energy systems.



Dr. Damir Novosel IEEE Fellow - is president of Quanta Technology, a subsidiary of Quanta Services, a Fortune 500 company. Previously, he was vice president of ABB Automation Products and president of KEMA T&D US. He has led development and implementation of a number of pioneering concepts, methods, and products that improved reliability and efficiency of power grids.



Damir is elected to National Academy of Engineers in 2014. Dr. Novosel is IEEE PES President Elect. He served as chair of the PES Technical Council, Vice President of Technology, and a member of the PES Governing Board from 2010 to 2012. Damir is also member of the CIGRE US National Committee.

Damir holds 16 US and international patents and published over 100 articles in Transactions, Journals and Proceedings, receiving PES 2011 and 2013 Prize Paper Awards. He has led or participated in numerous IEEE standards, publications and other initiatives.

He holds PhD and MSc degrees in electrical engineering from Mississippi State University, where he was a Fulbright scholar, and the University of Zagreb, Croatia, respectively.

Dr. David Ortiz is Deputy Assistant Secretary for Energy Infrastructure Modeling and Analysis (EIMA) in the Department of Energy's Office of Electricity Delivery and Energy Reliability.



The EIMA Division supports cutting-edge research and development that is focused on enabling new ways of delivering and managing electricity for a reliable, secure, resilient, and advanced U.S. energy infrastructure. The Division's activities include advanced modeling and visualization, energy infrastructure risk analyses, reliability assessments, and synchrophasor-based tool development.

Prior to joining OE, Dr. Ortiz was a Senior Engineer and Policy Analyst at the RAND Corporation and a professor at the Pardee-RAND Graduate School. At RAND, Dr. Ortiz built a multi-million dollar program of research and analysis in energy technology and policy.

In 2006, in response to hurricanes Katrina and Rita, he led the RAND team that demonstrated a new approach to coastal planning for the U.S. Army Corps of Engineers and the State of Louisiana. The State of Louisiana subsequently adopted the approach, it to develop its 2012 Louisiana Master Plan for a Sustainable Coast. In support of the 2012 Master Plan, David led a team of RAND researchers and modelers to develop a flood risk model.

David earned the Ph.D. degree from the University of Michigan in Electrical Engineering in signals and systems. He graduated cum laude from Princeton University, earning the B.S.E. degree in Mechanical and Aerospace Engineering. David is a member of IEEE, the IEEE Control Systems Society, and the IEEE Power and Energy Society.

Dr. Manu Parashar is a Corporate Power Systems Engineer at ALSTOM Grid Inc in Redmond, WA, where he is leading the research and development of ALSTOM's Online Stability Solutions (OSS), including synchrophasor applications, and is directly involved in delivering these applications to the North American customers.



Prior to joining ALSTOM, he was with Electric Power Group where he was responsible for all synchrophasor related research & development initiatives, including leading the development of the real time and offline synchrophasor applications.

Manu has been actively involved in various technical forums in North America such as the North American SynchroPhasor Initiative (NASPI) and IEEE Power Systems Relaying Committee (PSRC), and has numerous publications including a co-author of the "Wide Area Monitoring and Situational Awareness" chapter of the Electric Power Engineering handbook. Manu received his BS, MS, and PhD degrees in Electrical Engineering from Cornell University, Ithaca, NY, in 1997, 1999, and 2003, respectively.

Dr. Arun Phadke – IEEE Life Fellow worked in the Electric Utility industry for 13 years before joining



Virginia Tech 1982. He became the American Electric Power Professor of Electrical Engineering in 1985 and held this title until 2000 when he was recognized as a University Distinguished Professor. He became University Distinguished Professor Emeritus in 2003, and continues as a Research Faculty member of the Electrical and Computer Engineering Department of Virginia Tech. Dr. Phadke was elected a Fellow of IEEE in 1980. He was elected to the National Academy of Engineering in 1993. He was Editor in Chief of Transactions of IEEE on Power Delivery. He became the Chairman of the Power System Relaying Committee of IEEE in 1999-2000. Dr. Phadke received the Herman Halperin award of IEEE in 2000.

Dr. Phadke has also been very active in CIGRE. He has been a member of the Executive Committee of the US National Committee of CIGRE, and was the Chairman of their Technical Committee. He was previously the Vice President of USNC-CIGRE and served as Secretary/Treasurer. In 2002 he was elected a “Distinguished Member of CIGRE” by the Governing Board of CIGRE. Dr. Phadke was active in CIGRE SC34 for several years, and was the Chairman of some of their working groups. In 1999 Dr. Phadke joined colleagues from Europe and Far East in founding the International Institute for Critical Infrastructures (CRIS). He was the first President of CRIS from 1999-2002, and currently serves on its Governing Board.

Dr. Phadke received the “Doctor Honoris Causa” from *Institute National Polytechnic de Grenoble (INPG)* in 2006. He received the Distinguished Alumnus Award from IIT Kharagpur, India.

In March 2008 Dr. Phadke received (with Stanley H. Horowitz) the Karapetoff award from the Honor Society HKN, and in April 2008 Dr. Phadke (with James S. Thorp) received the Benjamin Franklin Medal.

Joseph Rebboh obtained his BSc from Concordia University in Montreal. After working at Cooper



Power Systems for 6 years he joined VIZIMAX INC where he is currently employed as Director of Business Development for North America. In his work, Joseph takes great pride in offering the highest levels of customer service and comprehensive solutions. He cycles to work; enjoys cooking, playing percussion instruments, and carpentry. He lives in Montreal with his wife and two teenage boys.

Dr. Gert Rietveld received the [M.Sc.](#) (cum laude) and Ph.D. degrees in low temperature and solid state physics from the Delft University of Technology, Delft, The Netherlands, in 1988 and 1993, respectively. In 1993, he joined VSL, Delft, The Netherlands, where he is a senior scientist in the DC/LF Electricity group of the Research & Development Department. He is involved in the development of power measurement systems and electrical primary quantum standards, such as the quantum Hall resistance standard. He recently has coordinated a 22-partner joint research project on Smart Grid Metrology. His present research focuses on PMU testing and application of PMUs in distribution grids, PQ testing and PQ propagation in grids, and accurate measurement of losses in power transformers.



Dr. Rietveld is a member of the International Committee of Weights and Measures (CIPM) and president of its Consultative Committee for Electricity and Magnetism (CCEM). He is co-author of the 2015 IEEE Synchrophasor Measurement Test Suite Specification, member of the joint IEC/IEEE WG 60255-118-1, and secretary and member of several other IEEE, CIGRE, and CENELEC working groups.

He recently has coordinated 22-partner European research project on Smart Grid metrology. He is an active member of the IEEE both within the I&M society and the PES, where he is among others member of the working groups related to PMU standardization

Maria E. Ruiz is the iSAAC project leader at XM Expertos en Mercados S.A, the Colombian Independent System Operator and Market Administrator. She has worked as expert in market transactions for 18 years and management project in power and energy industry. She has worked as a member of the Working Group Operators & Administrators International Market in the Regional Energy Integration Committee - CIER (Colombian Section).



Maria E. Ruiz obtained her Electrical Engineering degree from Universidad de Antioquia and her Magister degree in Finance, Specialization degree in Industrial Organization and Economical Regulation, and Marketing, from Universidad Eafit. She has also worked as a specialist in market transactions for 14 years in XM S.A. E.S.P., the Electricity Market Operator and Administrator in Colombia.

Jeff Shiles nearly 25 year career has spanned across a variety of technical leadership and managerial roles at Southern California Edison, where he is currently the Principal Manager of Protection & Automation Engineering. He has a solid background in transmission, subtransmission, and distribution system planning, as well as strong working relationships with stakeholders throughout the end-to-end capital project life cycle, including sponsors, engineers, project management, construction, and operations. Jeff has a broad perspective of the T&D organization at SCE with an emphasis on teamwork, collaboration, and integrating work activities across different functional areas. In addition to his system planning experience, Jeff has also worked in various business planning, strategic planning, and asset management roles in T&D at SCE. Jeff earned his Bachelor of Science Degree in Electrical Engineering with emphasis in power systems from Cal Poly San Luis Obispo and is also a registered Professional Engineer in the State of California.



Alison Silverstein is a consultant, lecturer and writer on electric transmission and reliability, energy efficiency, smart grid, renewable energy and technology adoption issues. Silverstein serves as project manager for the North American SynchroPhasor Initiative (a collaboration between DOE and the electric industry) and recently facilitated the multi-stakeholder Reliability Standards Working Group in Hawaii. She also advises a variety of private and governmental clients on technology, regulatory and other issues. She has worked as Senior Energy Policy Advisor to Chairman Pat Wood, III, at the Federal Energy Regulatory Commission from July 2001 through July 2004, co-chairing the Electric Systems Investigation for the US-Canada Joint Power System Outage Task Force and writing the reports on the 2003 Northeast blackout. She has also worked at the Public Utility Commission of Texas, Pacific Gas & Electric Co., ICF Inc., the Environmental Law Institute, and the U.S. Department of Interior.



Silverstein is President of the Board of the American Council for an Energy Efficient Economy and serves on the Board of Economic and Environmental Systems of the National Research Council and the Board of the Health Alliance for Austin Musicians. She is a member emeritus of the GridWise Architecture Council. She has a BA in Economics from the Johns Hopkins University, an MSE in Systems Analysis from Johns Hopkins, and an MBA from Stanford University. She lives with her family near Austin, Texas.

Dr. Dejan J Sobajic, is the President and Founder of Grid Consulting LLC from San Jose, CA. He has over markets operations, control-center technology, operator training and IT design. His areas of expertise include SCADA/EMS design and real time system applications development; power system modeling, stability and control, and intelligent systems applications.



Dr. Sobajic has 14 years of academic experience including the appointments at Case Western Reserve University and Stanford University. In 1988 he pioneered the use of neural net technology in the field of power system engineering. Dr. Sobajic has edited the first textbook on the subject of use of neuro-computing in power system engineering entitled "Neural Network Computing for the Electric Power Industry"(1993).

He is the Chairman of the International Steering Committee for the International Workshop on Electric Power Control Centers – EPCC (www.epcc-workshop.net). Dr. Sobajic is IEEE Fellow and Member of CIGRE. He is the author/co-author of over 100 technical papers in power system analysis, stability, system operation and markets, control and computational intelligence. He can communicate in English, Russian, German and Serbian language.

Bob Stuart has 45 years of engineering, operation and protection experience with electric production, transmission, systems protection and control and substation design. He is a recognized expert in transmission system operation and system protection design and application for generation, transmission and distribution. Mr. Stuart retired as Manager of Operations Engineering from PG&E after thirty-five years in April of 2004. During his distinguished PG&E career, he led major initiatives in system protection, transmission operation, control, and disturbance analysis.



Throughout his career, Mr. Stuart has been an innovator and has successfully championed the application of microprocessor technology for system protection and in the use of fault tolerant remedial action schemes. While working at PG&E, Mr. Stuart was involved in several projects related to power system reliability, design and review of protection standards and has led the effort to design and implement special protection and remedial action schemes to prevent blackouts. He was responsible for the development of unique operating procedures utilizing the dispatch of generation for San Francisco Bay Area reliability and helped in the development of PG&E's three stage electric emergency plan.

Mr. Stuart served as the transmission team lead for the North American Electric Reliability Council (NERC) in investigating the August 14th 2003 NE Blackout which interrupted power to 60 million people in the Northeastern part of the United States and Canada. Mr. Stuart also chaired an operating capability study group, after the August 10th blackout on the Western grid in 1996 that developed the methodology and procedures to restore the reliable operation of the Western United States electrical grid. He won the WECC outstanding contributor award for his work on that committee.

Chase Sun received a B. S. in Electrical Engineering and Computer Science, Power Option, from UC Berkeley, where he learned about alternative energy and electric power systems. He is a licensed Electrical Engineer in California, since 1981.



He joined PG&E in 1977 and worked in various departments including, distribution planning, switchyard engineering, alternative energy engineering, power plant engineering, station construction, project management, substation asset management, distribution protection, substation maintenance, and transmission planning,. He was the electrical engineer on various power generation projects, both large and small. He developed a balance of plant cost estimate and associated conceptual design for a 1.2 MW modular PV central station power plant in 1982, while he was working in the alternative energy engineering group. He also worked on the design changes for the 2.5 MW Solano Wind Turbine (Boeing Mod 2) before it was dismantled due to wind shear concerns in the late 1980's. He coordinated the first complete set of PG&E generator interconnection requirements in 1984. He also designed the electrical system and control logic for an 125 kW R&D Turbo-expander induction generator in the early 1990's where he learned about self-excitation of induction generator during start-up. He was on the team that drafted and issued the PG&E Interconnection Handbook for both load and generation in 1997. He was on the IEEE-929, and Rule 21 working groups where the certification concept and streamlined review/approval process for the small PV inverters were developed about 15 years ago. While he was in distribution substation asset management, in the 1990's, he was responsible for the distribution protection standards/guidelines and developed the protection requirements for the new and replacement distribution substation transformers and breakers.

He is a principal engineer in Distribution Planning at PG&E, responsible for assessing system-wide DG issues, and representing PG&E, on various IEEE-1547, UL-1741, California Rule 21, CEC/CPUC Smart Inverter working groups.

Joseph E. Svachula, is vice president of Smart Grid and Technology at ComEd. As Vice President of Smart Grid and Technology, Mr. Svachula has a key role in developing the strategic direction for Smart Grid technologies, not only at ComEd, but in collaboration across Exelon Utilities so that customers fully experience the benefits that this technology promises.



Prior to his current role Mr. Svachula served as Vice President of Distribution System Operations and Vice President of Field Operations. He began his professional career at ComEd in 1988 in a variety of testing engineer positions and has more than 25 years of utility industry experience, including key manager positions in Transmission & Substations, Work Management, Distribution Operations, Operational Strategy & Business Intelligence, and Customer Operations Strategies & Support.

Mr. Svachula serves on the Board of Directors for Chicago Special Olympics and Special Children's Charities. He is currently serving as the co-chairman of the 2014 IEEE T&D Conference in Chicago. He is the past president of the St. John Brebeuf Athletic Board, a parochial grammar school in Niles, Illinois, and volunteers for various special recreation activities in his community.

Mr. Svachula holds a Bachelor of Science in Electrical Engineering from the University of Illinois Chicago and a Master of Engineering Management from Northwestern University.

Jonathan Sykes is Sr. Manager of System Protection at Pacific Gas and Electric Company in San Ramon California. Jonathan graduated from the University of Arizona in 1982, is a Professionally Licensed Electrical Engineer, and has 30 years of engineering experience in System Protection. He is active on several committees in the Western Electric Coordinating Council and is past Chairman of the North American Electric Reliability Corporation System Protection and Control Subcommittee. Jonathan has authored and co-authored papers for conferences and publications and is an active senior member of IEEE and regularly contributes to the Power System Relay Committees. Jonathan has been involved in 500kV protection and control for over 15 years and established standards in EHV relaying and SPS/RAS design and implementation. Jonathan has been active in NERC and WECC standards interpretation and development and is a subject matter expert in the interpretation of various protection and critical infrastructure related standards.



Erik Takayesu is the Director of Electric System Planning for Southern California Edison. The organizations he oversees include, Grid Modernization, Distribution System Planning and Engineering, Distribution Automation, Power Quality, Transmission and Interconnection Planning, and Generation Interconnections. He has held various roles at SCE, including managing Grid Operations, Reliability Engineering, and Asset Management.



Erik has a bachelor's degree in Electrical Engineering from the California State University at Long Beach, is a licensed PE, and holds his master's degree in Organizational Leadership from Gonzaga University.

Chifong Thomas is the Director, Transmission Planning and Strategy at Smart Wire Grid, Inc. (SWG), where she supports the various applications and deployment of distributed series reactors and other developing smart grid products. Prior to joining SWG, she manages transmission interconnections at BrightSource Energy, Inc. for the development of utility scale solar thermal power plants ranging from 200 MW to 1,000 MW. She has more than 42 years of electric utility experience, more than 37 of which in electric transmission planning for the Pacific Gas and Electric Company (PG&E) transmission system from 60 kV to 500 kV. She has both conducted and supervised transmission planning studies to develop plans for the PG&E transmission system. She has served as expert witness in various regulatory and judicial forums; and participated in developing planning methodologies, processes and criteria for PG&E and WECC. She is the past secretary of the WECC Planning Coordination Committee and past chair of the WECC Technical Studies Subcommittee. She has also served on various WECC task forces,



NERC Standards Drafting Teams, on Industry Advisory Committees of the California Energy Commission and of EPRI and on the Technical Advisory Committee (Electrical Engineering) to the California Board of Registration for Professional Engineers and Land Surveyors. Ms Thomas holds a Bachelor of Science Degree in Electrical Engineering from Washington State University and is a registered Electrical Engineer in the State of California. She is also a senior member of the Institute of Electrical and Electronics Engineers (IEEE).

Jerry Timiraos - IEEE Senior Member, is the Sr. Manager of Substation Test at PG&E – He has 29+ years of experience in maintenance, construction and engineering at PG&E. Prior to joining PG&E, he spent 15 years at United Illuminating Co., a Southern Connecticut electric utility where he started as a Test Engineer leading his career to the Substation Supervisor.



Jerry has a Master of Business Administration (MBA) from the University of Phoenix, a Master of Science, Computers and Information Science from the University of New Haven, and a Bachelor of Science, Electrical Engineering from the University of New Haven. Jerry is a Professional Engineer in the State of California.

Dr. Vaithianathan "Mani" Venkatasubramanian IEEE Fellow - received his B.E. (Honors) degree in Electrical and Electronics Engineering from Birla Institute of Technology and Science, Pilani, India in 1986, and M.S. degrees in Systems Science and Mathematics from Washington University, St. Louis, MO, in 1989 and 1992 respectively.



He is a Professor at Washington State University in Pullman, WA.

Jan Vorrink is the manager of the National Control Centre of TenneT TSO BV which is the Dutch Transmission System Operator.



Mr. Vorrink has graduated as a Master in Business Administration and is an Engineer. He is working for Ten-neT since 2002 as a Manager in several departments. The activities of his department include the operational Planning processes, Real-time processes and the settlement processes.

Mike Voss is currently a meteorologist and principal at PG&E, responsible for guiding the development and operation of PG&E's weather forecasting systems and outage prediction models. Mike first started developing forecasting systems for PG&E in 2006, and then came on full time in 2010. Prior to PG&E, Mike spent 15 years at San Jose State University teaching weather analysis and developing meteorological information systems. He is a founding member of the Utility Meteorologist Group (Utilimet), a national group of meteorologists organized to solve weather challenges specific to the utility industry. Mike has a bachelor's degree in economics and business from U.C.L.A., and master's degree in atmospheric science From U.C. Davis.



Dr. Chuck Wells is OSIsoft's visiting scholar at UC San Diego (UCSD). He has over thirty years of experience in real-time control and monitoring, published over fifty technical papers, awarded ten US Patents, and co-authored two textbooks. At UCSD he is involved in microgrid research involving phasor measurement units (PMU) as applied to control and monitoring. Working with UCSD faculty members, he applied innovative new methods for real time event detection and on-line parameter identification. He led a new data mining project that includes anomaly detection algorithms developed using Big Data Analytic (BDA) tools taught at university (550 Gbytes of historical data). This work was done on the San Diego Super Computer Hadoop cluster. The software tools used included methods published by UCSD faculty. He is also working with multiple energy storage systems on campus providing peak shifting and regulation functions. He has worked in steel, paper, power systems, waste



water, food processing and transportation systems. He has a PhD in Electrical Engineering, Masters and Bachelor's degrees in Chemical Engineering and is registered Professional Engineer in Chemical and Control Systems Engineering.

Dr. Carl J. Williams is Chief of the Quantum Measurement Division of the Physical Measurement Laboratory, National Institute of Standards and Technology (NIST). He is a Fellow of the Joint Quantum Institute (<http://www.jqi.umd.edu>) and Adjunct Professor of Physics at the University of Maryland (UMd). He coordinates Quantum Information Science and Quantum Based Measurement program across NIST and co-chairs an interagency effort in support of these activities under the Committee of Science of the National Science and Technology Council (<http://www.whitehouse.gov/administration/eop/ostp/nstc/committees/cos>). The division provides measurement and data support for a broad range of national needs, supports the determination and global dissemination of fundamental constants, disseminates electrical, mass, and force units, and conducts research to enable next generation quantum based measurements.



Dr. Williams received his B.A. in Physics from Rice University in 1981, his Ph.D. from the University of Chicago in 1987, joined NIST in 1998 becoming coordinator of the NIST Quantum Information Program in 2000 and Chief of the Atomic Physics Division of the NIST Physics Laboratory in 2004 before being appointed Chief of the Quantum Measurement Division of the NIST Physical Measurement Laboratory in 2011. In 2006, Dr. Williams helped establish the Joint Quantum Institute (JQI), became a founding Fellow of the JQI, and the first NIST co-Director of the JQI – a position he held until spring 2011. Dr. Williams worked as a senior policy analyst within the Office of Science and Technology Policy (OSTP), Executive Office of the President from April 2008 until July 2010. He is a Fellow of the American Physical Society, the American Association for the Advancement of Science, and the Washington Academy of Science. He received the Department of Commerce Silver Medal in 2003 for his leadership of the NIST Quantum Information Program, the Department of Commerce Gold Medal for science in 2008 for scientific contributions and was awarded the 2005 Arthur S. Flemming Award for Scientific Excellence in Government Service for his contributions to quantum physics. He is an Associate Editor of the Journal of Quantum Information and Computation, has authored over 100 scientific publications, and has been a speaker at numerous national and international conferences.

Erick Zbinden holds an electrical engineering degree from the University of Santiago de Chile (USACH, 2003) and a diploma in industrial engineering from Universidad Tecnica Federico Santa Maria (UTFSM, 2011).



From 2003 to 2011, he worked in different engineering companies, including CAM-ENERSIS Holding (2005-2007) and Ingendesa – ENERSIS Holding (2007-2011), as a specialist on protection, control systems, primary equipment and commissioning and Technical Inspector Delegate for SAT and FAT. In 2011, he joined CDEC-SING, the system operator of the Chilean Northern Interconnected System, as a power systems senior engineer where he holds the position of Head of the System Integrity Unit, in charge of the revision of engineering design and power system studies associated to new projects connecting to the system, and leading the development of new technologies' studies, including SCADA and WAMS among others.

Mr. Zbinden has participated in several national and international seminars, including Protection, Control & Automation PACW 2014 (Zagreb, Croacia) and IEEE PES Conferences (USA 2011-2012).



Pacific Gas and Electric Company, incorporated in California in 1905, is one of the largest combination natural gas and electric utilities in the United States. Based in San Francisco, the company is a wholly owned subsidiary of PG&E Corporation.

There are 21,000 employees who carry out Pacific Gas and Electric Company's primary business — the transmission and delivery of energy. The company provides natural gas and electric service to approximately 15 million people throughout a 70,000-square-mile service area in northern and central California.

PG&E customers include:

- 20,850 schools
- 3,250 hospitals
- 20,700 high-tech companies
- 768 military facilities

Pacific Gas and Electric Company and other utilities in the state are regulated by the California Public Utilities Commission. The CPUC was created by the state Legislature in 1911.

Fast Facts

- Service area stretches from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east.
- 935 Transmission and Distribution Substations
- More than 139,000 circuit miles of electric lines (60, 70, 115, 230, and 525kV).
- More than 70% of 500kV lines are compensated
- More than 45,800 miles of natural gas pipelines
- 5 million electric customer accounts.
- 4 million gas customer accounts.
- Peak System Load – 30 GWH

Environmental Commitment

Pacific Gas and Electric Company has long been recognized as an environmental leader by providing safe, economical and reliable products and services in a responsible and environmentally sensitive manner. Doing more so that our impact on the environment is less drives us to adopt new technologies, improve our environmental management practices, build strong ties with local communities, reach out to stakeholders to address challenges and contribute to the development of public policies that raise the bar for our industry. The Pacific Forest and Watershed Lands Stewardship Council was created in 2004 to oversee the implementation of the Land Conservation Commitment, wherein PG&E will either donate or create conservation easements to preserve and enhance over 140,000 acres of PG&E's watershed lands and 655 acres in the Carizzo Plains. The Pacific Forest and Watershed Lands Stewardship Council will also oversee the implementation of the Environmental Opportunity for Urban Youth Program, which will provide inner city children with wilderness experiences and new urban parks and recreation facilities.