

Technical Presentation Session

Sponsored by IAS Young Professionals and Alumni of CMD

POWER AND ENERGY

Keynote Lecture



[Wei-Jen Lee](#), PhD, PE | Professor and Director, Energy Systems Research Center, The University of Arlington | IAS President Elect 2019-2020

Biography: Professor Lee received the B.S. and M.S. degrees from National Taiwan University, Taipei, Taiwan., and the Ph.D. degree from the University of Texas, Arlington, in 1978, 1980, and 1985, respectively, all in Electrical Engineering.

In 1986, he joined the University of Texas at Arlington, where he is currently a professor of the Electrical Engineering Department and the director of the Energy Systems Research Center.

He has been involved in the revision of IEEE Std. 141, 339, 551, 739, 1584, and 3002.8 development. He is the President Elect of the IEEE Industry Application Society (IAS) and an editor of IEEE Transactions on Industry Applications and IAS Magazine. He is a member of IEEE Fellow Committee. He is the project manager of IEEE/NFPA Collaboration on Arc Flash Phenomena Research Project.

Prof. Lee has been involved in research on Utility Deregulation, Renewable Energy, Arc Flash Hazards and Electrical Safety, Smart Grid, MicroGrid, Industrial Internet of Things (IIoT) and Virtual Power Plants (VPP), AI for Load, Price, and Wind Capacity Forecasting, Power Quality, Distribution Automation, Demand Response, Power Systems Analysis, Short Circuit Analysis and Relay Coordination, Distributed Energy Resources, Energy Storage System, PEV Charging Infrastructure Design, AMI and Big Data, On Line Real Time Equipment Diagnostic and Prognostic System, and Microcomputer Based Instrument for Power Systems Monitoring, Measurement, Control, and Protection. He has served as the primary investigator (PI) or Co-PI of over one hundred funded research projects with the total amount exceed US\$17 million dollars. He has published more than one hundred and seventy-five journal papers and two hundred ninety conference proceedings. He has provided on-site training courses for power engineers in Panama, China, Taiwan, Korea, Saudi Arabia, Thailand, and Singapore. He has refereed numerous technical papers for IEEE, IET, and other professional organizations.

Prof. Lee is a Fellow of IEEE and registered Professional Engineer in the State of Texas.

Keynote Lecture 3

Arc Flash Hazard and Electrical Safety - The New Revision of IEEE Std 1584

Power Point Presentation, 30 min

Abstract

Though electrical incidents represent a relatively small percentage of all work-related incidents, they are disproportionately fatal. In the case of burn injury, it may result in extended hospitalization and rehabilitation. Proper protection is the key to reduce casualties during these incidents. IEEE 1584 and NFPA 70E are developed to protect the safety of the workers.

For better understanding of the arc flash phenomena, the IEEE and the NFPA (National Fire Protection Association) have joined forces on an initiative to fund and support research and testing to improve the understanding of arc flashes. The results of this collaborative project will provide information that will be used to

improve electrical safety standards, predict the hazards associated with arcing faults and accompanying arc blasts, and provide practical safeguards for employees in the workplace. The identified areas include but are not limited to: 1) Heat and Thermal Effects, 2) Blast Pressure, 3) Sound, and 4) Light intensity.

This presentation will cover the heat and thermal related arc flash hazards. It will include the basic understanding of the arc flash, performing the arcing current and incident energy estimation, and brief introduction to newly released IEEE Std. 1584 – 2018, IEEE Guide for Performing Arc-Flash Hazard Calculations.

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Lectures of IAS YPs and CMD Alumni

Harmonic distortion in LV networks with photovoltaic penetration

Power Point presentation, 30 min



[Johanna Castellanos](#), PhD Student in the area of power and energy, Pontificia Universidad Javeriana (PUJ), Colombia) | Former IAS SB Chapters Area Chair Region 9 | Former Chairwoman of Colombia Section IAS Chapter | Founder Chairwoman of Pontificia Universidad Javeriana SB IAS Chapter

Biography: Johanna Castellanos is a PhD student in Engineering at PUJ in Colombia. She is a Mechatronics Engineer from the Military Nueva Granada University (UMNG) in 2008. During her undergraduate, she made a university exchange at the Polytechnic University of Valencia (UPV) in Spain. He received his Master's degree in Electronic Engineering at PUJ in 2012. From 2012 to 2016, she joined at Halliburton Latin-American as Field Professional in the Wireline & Perforating area. Her current research interest areas are related with smart grids, DERs, high PV penetration and control systems.

She has been a volunteer IEEE member for 14 years working in student and professional volunteering. A part to IAS positions, she was student branch and chapter chair at UMNG (2008), SAC Team Colombia in (2009), founding and secretary of the professional chapter of the Colombian professional chapter of Robotics and Automation (2010-2012), founding vice chair of the professional chapter of Control Systems (2010-2012). She was the founder chair of the Santanderes subsection in the IEEE Colombia Section (2018-2020).

Abstract: Photovoltaic generation in low voltage networks has been increasing exponentially around the world, and this behavior will continue for the next years. In the electric grid, the high penetration of distributed generation has negative effects which affect the quality and stability of the network. The increasing inclusion of PV system into the distribution networks has important challenges in the area of power quality (PQ) such as harmonics, supra-harmonics, fast/slow voltage variations, voltage unbalance, overloading of the components, among others. The harmonic distortion of the current and voltage waveform in the context of penetration of photovoltaic systems is becoming an increasingly important point when it comes to discussing about power quality. Inverters are primarily responsible to distort the current waves into the grid, which generate distortion in the voltage waveform, and then the total harmonic distortion (THD) in the system. In this lecture, an assessment of the harmonic distortion in a CIGRE Benchmark LV Network in European configuration which was modified with the purpose of aggregate PV generation.

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The 1st Fuel – Energy, Energy Efficiency and Sustainability

Power Point presentation, 30 min



[Pía Torres](#), Electronics Eng. | Project Management, Entrepreneurship & Innovation Professor at Favaloro University (Argentina) | Consultant in Energy Efficiency, Process Automation, Optimization & Sustainability IEEE Industry Applications Society Standing Committee for Equity Diversity and Inclusion Chair

Abstract: Why is Climate Change produced? Emissions of (CO₂) modify the composition of the atmosphere, increasing the temperature of the Earth and causing a distortion in the global climate system.

From the industrial revolution until today, the burning of fossil fuels (oil, coal and gas), which are used to produce energy, releases greenhouse gases (CO₂) into the atmosphere, increasing the temperature of the Earth and causing a distortion in the global climate system.

Our Challenge: achieve a sustainable energy model and commit to an energy revolution capable of reducing CO₂ emissions to avoid out of control climate change. Change the way we produce and use energy. The replacement of dirty energy sources (coal, gas, oil) with clean ones (solar and wind). Saving Energy is a Must and Technology is the best tool.