



The IEEE Central Texas, Los Angeles, Switzerland, and Germany EMC Chapters,  
together with the Summa Foundation, are pleased to present the  
**LIVE webinar: EMP/IEMI Governance and Mitigation Strategies**

**Date:** Wednesday, November 11, 2020

**Time:** 10:30 am EST Welcome and Announcements, Professor Edl Schamiloglu,  
University of New Mexico  
10:35 am **EMP/IEMI Governance and General Mitigation Strategies**  
*By Joel Kellogg, Director of Healthcare, Industrial and Government Shielding,  
ETS-Lindgren, Austin, Texas*  
11:00 am **EMP Mitigation for Electrical Substations**  
*By Eric Easton, Ph.D., P.E., Director of Real-Time Operations,  
CenterPoint Energy, Houston, Texas*  
11:40 am Q&A with the speakers, moderated by Professor Schamiloglu  
***(See presentation abstracts and speaker bios below.)***  
12:00 pm Wrap Up/Final Comments

**Register:** [Click here](#) to register now on line or enter the following on your browser:  
<https://attendee.gotowebinar.com/register/1263385450100358671>

**Questions:** Janet O'Neil, ETS-Lindgren, cell (425) 443-8106, email [j.n.oneil@ieee.org](mailto:j.n.oneil@ieee.org)

## TECHNICAL PROGRAM

### **EMP/IEMI Governance and General Mitigation Strategies**

*By Joel Kellogg, Director of Healthcare, Industrial and Government Shielding, ETS-Lindgren, Austin, Texas*

**Abstract:** This presentation will begin with a review of electromagnetic pulse (EMP) and intentional electromagnetic interference (IEMI). Current governance and regulations will be discussed including their impact on industries defined by the US Government as critical infrastructure. The presentation will conclude with a general overview of mitigation strategies to protect against EMP and IEMI events, including some unique products and solutions deployed by some facilities identified as critical infrastructure.

### **EMP Mitigation for Electrical Substations**

*By Eric Easton, Ph.D., P.E., Director of Real-Time Operations, CenterPoint Energy, Houston, Texas*

**Abstract:** This presentation will provide an overview of the design and implementation of an EMP solution for electrical substations. The design process included the review of potential electromagnetic environments associated with Geomagnetic Disturbances (GMD), High-Altitude Electromagnetic Pulse (HEMP) and Intentional Electromagnetic Interference (IEMI). The final solution is a compact digital substation design which exceeds the attenuation levels of MIL-188-125. The cost effective design is applicable to new and retrofit applications and avoids compromising the reliability of existing power substation functions. Performance was confirmed with comprehensive testing at both the component and system level.

## SPEAKER BIOGRAPHIES



**Joel Kellogg** is the Director of Business Development for Healthcare, Industrial and Government shielding products and services with ETS-Lindgren, based at the company's headquarters in Cedar Park, Texas. He has over 20 years of design, production and management experience for healthcare, government and institutional projects. Joel's experience includes the development of EMI active cancellation systems for the reduction electromagnetic interference to MRIs and electron microscopy systems, the development of data acquisition systems for the measurements of EMI, vibrations, and acoustics, and the development of shielding products. Joel is also knowledgeable in many areas of site planning for radiology, laboratory and industrial equipment including electromagnetic (EMI), radio frequency (RF), and radiation shielding and environmental aspects including vibration, acoustic, and electromagnetic interference requirements. Currently, Joel's focus is advancing the shielding technology of products and services for Healthcare, Industrial, and Government customers along with driving shielding product roadmaps for ETS-Lindgren. He received his Master of Business Administration (MBA) from the Keller Graduate School of Management in 2007 and his Bachelor of Science, Electrical Engineering (BSEE) from the University of Wisconsin – Madison in 1998.



**Eric Easton, Ph.D., P.E.** has performed various roles in T&D System design and operations including T&D System Planning, System Protection, Asset Management and Substation Engineering. He is presently Director of the CenterPoint Energy Real-Time Operations organization responsible for Transmission System Operations. During his career Eric has led a number of design and process innovation initiatives including 3D substation design, relay panel redesign, IEC 61850, Asset Life Cycle Analytics, QA/QC program development, and EMP Mitigation. He received a Ph.D. in Systems and Engineering Management from Texas Tech University, Master of Business Administration from the University of Nebraska at Omaha and BS degree in Electrical Engineering from Prairie View A&M University. Eric is a registered Professional Engineer in the State of Texas. He is the author or co-author of several refereed papers on HEMP, EMP, and IEMI, including two that were designated as Best Paper Candidates at the 2020 IEEE International Virtual Symposium on Electromagnetic Compatibility and Signal/Power Integrity (EMC+SIPI).

## MODERATOR



**Edl Schamiloglu** received the B.S. degree from the Applied Physics and Applied Mathematics Department at Columbia University, NY, in 1979; he received the M.S. degree in Plasma Physics from Columbia University in 1981; he received the Ph.D. degree in Engineering (minor in Mathematics) from Cornell University, Ithaca, NY, in 1988. He joined the University of New Mexico (UNM) as Assistant Professor in 1988 and he is currently Distinguished Professor of Electrical and Computer Engineering and Associate Dean for Research and Innovation in the School of Engineering. He is also the Special Assistant to the Provost for Laboratory Relations. He lectured at the U.S. Particle Accelerator School (Harvard University in 1990 and at MIT in 1997). He coedited *Advances in High Power Microwave Sources and Technologies* (IEEE Press/Wiley, New York, NY, 2001) (with R.J. Barker), he has coauthored *High Power Microwaves, 3rd Ed.* (CRC Press, Boca Raton, FL, 2016) (with J. Benford and J. Swegle), and he is coediting *Advances in High Power Microwave Sources and Technologies using Metamaterials* (with J.W. Luginsland, J.A. Marshall, and A. Nachman) (IEEE Press/Wiley, New York, NY, 2021). He has coauthored over 165 refereed journal papers, over 265 reviewed conference papers, and 8 patents. His publications have been cited over 7400 times. His h-index is 37 and his i10-index is 133. Professor Schamiloglu is a Fellow of the IEEE, a Fellow of the American Physical Society, and an EMP Fellow (sponsored by the Summa Foundation). He is a Member of the Editorial Board of the *AIP Journal Matter and Radiation at Extremes*. He was awarded the 2013 IEEE Nuclear and Plasma Sciences Society's (NPSS's) Richard F. Shea Distinguished Member Award, the 2014 IEC '1906 Award', the 2015 IEEE NPSS PPST Peter Haas Award, and the 2019 (inaugural) IEEE NPSS Magne "Kris" Kristiansen Award.