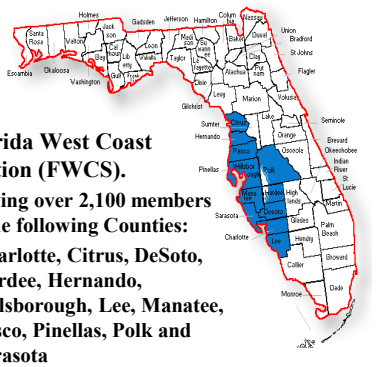

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The SunCoast Signal

The Institute of Electrical and Electronics Engineers, Inc.

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Tuesday, June 6, 2023
Google Meet
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PE Corner
Art Nordlinger, PE, Life Senior Member
Providing Laws and Rules Continuing Education

Chapters 61G15-22.0105 through 22.014 of the Florida Administrative Code contain the Continuing Education provider rules. IEEE is an "exempt" continuing education provider in that it is a nationally recognized professional society. What exactly is IEEE exempt from? We are exempt from having to have the Florida Board of Professional Engineers approve each of the technical continuing education courses that we provide and for which we award attendees Continuing Education Hours (CEH)s. Even though IEEE organizes itself into Sections and Chapters, the State of Florida thinks of IEEE as one entity and has assigned one provider number to us. Thus, it is incumbent on all IEEE entities that provide continuing education courses to abide by all of the Board's rules for continuing education providers. Any rule infraction affects us all in terms of our ability to award CEHs to our membership.

The Florida Statutes governing continuing education for licensure renewal for engineers require 16 technical hours, 1 hour of ethics and 1 hour of Laws and Rules pertaining to the practice of engineering in Florida. All providers wishing offer Laws and Rules continuing education courses, including IEEE and other exempt providers, are required to separately apply to the Board for approval and to have their Laws and Rules course approved. IEEE applied and was approved to provide Laws and Rules continuing education in 2016. Laws and Rules continuing education providers must renew their Board approval after the license renewal period each biennium. IEEE recently did so and is now approved to continue to provide our Laws and Rules course for another two years.

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The course was updated to include the latest changes in Florida Laws and Rules.

Up until the last renewal cycle this same application and renewal requirement was applicable to providers of Ethics continuing education courses in Florida. IEEE was approved to provide Ethics continuing education courses in 2016 as well. As of this recent renewal cycle, the requirement to reapply to provide Ethics continuing education courses was dropped. IEEE will continue to provide Ethics continuing education, usually in conjunction with the Laws and Rules continuing education course.

Your local chapter strives to provide seminars that both bring interesting and relevant continuing education content to our members as well as provide CEH credit for our Professional Engineer members who need these for license renewal. We welcome member feedback as to how we are doing in this regard and suggestions for course content as well.

Whether you are a PE looking to attain required CEHs, or an engineer looking to learn something new or keep current with the latest trends in the profession, IEEE has seminars that will meet your needs.

THE SUNCOAST SIGNAL, published monthly by the Florida West Coast Section (FWCS) of the Institute of Electrical and Electronics Engineers, Inc. (IEEE). **Please Note that the SUNCOAST SIGNAL is sent each month to ACTIVE members of the IEEE Florida West Coast Section. So to continue receiving the SIGNAL please keep your membership Active, meaning, renew your membership when it becomes due.** Annual subscription is included in the IEEE membership dues. The opinions expressed, as well as the technical accuracy of authors, advertisers or speakers published in this newsletter are those of the individual authors, advertisers, and speakers. Therefore, no endorsement by the IEEE, its officers, or its members is made or implied. All material for THE SUNCOAST SIGNAL is due in electronic form by the end of day of the 1st Monday after the 1st Tuesday of the month, i.e. the ExCom meeting, preceding the issue month.

Address all correspondence to: Michael Mayor
michael.mayor@ieee.org

FECA Florida Electric Cooperatives Association, Inc.

IEEE Florida West Coast Section

IEEE PES Power & Energy Society®

Protection Systems of Solar Collector Substations and Principles of Fiber Optics
In-Person Event – 2023 FECA Engineers Conference

Date: Monday, June 12, 2023
Time: 8:00am – 5:00pm
Speaker: David Bousot, PE - Fellow - Supervisor of System Security, Relay and Control
TECO Mike Cunningham – Communications Consultant - Qualus
Location: SandPearl Resort - 500 Mandalay Ave., Clearwater Beach, FL 33767
Cost: $150 Members, $220 Non-Members, $20 Students
CEH Credits: Eight (8) CEHs provided for this event. Florida provider #0003849.
RSVP: Online at: https://events.vtools.ieee.org/m/356351
Questions: Robert DeMelo - Robert.demelo@ieee.org

Abstract: Protection System of Solar Collector Substation - high penetration of substation grade solar generation fields, during the last few years, have imposed over the electrical power system the need to reevaluate or redefine, in some instances, protection systems. In this seminar, we will present a síntesis of typical substation protection schemes and its related equipment. We'll also review some of the technical particularities of Inverter Based Resources (IBR) and how they interact with the power system. We'll be exploring NERC PRC standards that regulate over solar generation protection and its interconnection with the power system.

- System protection review. Principles, and equipment: CTs, PTs, relays, DC system, telecommunications and SCADA.
- Solar generation vs rotating machine generation
- Solar Stations typical designs and protection schemes
- NERC PRC standards overseeing solar substations
- Principles of Fiber Optics – topics during this session will cover safety and work practices, media converters, testing standards and equipment, fiber principles, cleaning and inspecting, pushing light, lessons learned (fiber done right and wrong), fiber optic components, and fiber terminations

Speakers

David Bousot, PE is a Fellow Engineer and currently the Supervisor of System Security, Relay and Control for Tampa Electric (TECO). David has 20 years in the industry and is currently mainly involved with relay settings and system operation troubleshooting in transmission networks 69 kV through 230 kV and generation. Licensed by the Florida Board of Professional Engineers. IEEE member and participant of PES PSRC, including groups D36, C18 and H22.

Mike Cunningham is a communications consultant with Qualus. Mike has vast experience in the communication space working at various organizations such as TRC, E&T Engineering, Fennel Engineering, Power Grid, and Bell Labs. Mike has worked on three Library of Congress/ARRA National Projects, he is a member of Governors High Technology Council, and member of IEEE and Florida Telecommunication Managers. Mike is a certified fiber optic engineer and in his spare time is a musician and bandleader.

IEEE Florida West Coast Section

One Engineer's Journey

Date: Friday, June 23, 2023
Time: Webinar: 12:00PM – 1:00PM (EST/EDT)
Speaker: Theresa Brunasso, Founder of D&S Microwave
Location: Online – meeting invitation will be emailed to attendees prior to seminar
Cost: Free
CEH Credits: No CEH's provided for this event.
RSVP: Online at: https://events.vtools.ieee.org/m/360184
Questions: Diane Aristizabal, dianaaristizabal@ieee.org

When Theresa was young, she thought her career would be a simple progression. First college, then graduate school, then working for a company and moving up the ranks. Along the way she would learn more and take on leadership roles. It didn't exactly work that way. Her career had unexpected twists, turns, challenges, and obstructions.

It was both more difficult than she expected and more interesting. Join Theresa as she takes you over the path of her career, starting in Los Angeles with stops in Florida, Utah, Georgia, and Mars. It wasn't what she expected, and it wasn't always easy, but she wouldn't change a thing

Theresa Brunasso, founder of D&S Microwave, is a 30-year veteran in the field of Electrical Engineering. Prior to starting D&S Microwave, she spent more than 20 years at EMS Technologies. At EMS, Theresa served as Microwave Engineering Manager, Director of Technology Development, and provided innovative design and development expertise for numerous programs, including JSTARS, XM Radio, DirectTV, DarkStar, NSTAR, Milstar, Advanced EHF, IntelSat, and the Mars Science Lab.

Theresa holds an Engineer's Degree and M.E. in Electrical Engineering from the University of Utah, and a B.S. in Physics from the University of West Florida. She has served as the IEEE Atlanta Section Secretary, Vice Chair and Chair, and currently serves as the Director for the Southeastern US Region.

IEEE Florida West Coast Section

Motor Bus Transfer (MBT) Seminar
IEEE Std. C37.96-2012
IN-PERSON

Date: Friday, August 25, 2023
Time: 9:00am – 4:30pm (Eastern Time - New York)
Speaker: Tom Beckwith – Former CEO, Beckwith Electric Co, Inc.
Presentation: Motor Bus Transfer (MBT) Seminar - IEEE STd. C37.96-2012
CEH Credits: Seven (7) CEHs
Cost: Members: $100/Non-members: $200/Students: $10
RSVP: Register at https://events.vtools.ieee.org/m/360236
Location: Seminole Electric Cooperative, Inc. – 16313 North Dale Mabry Hwy, Tampa, Fl 33618
Questions: Robert DeMelo robert.demelo@ieee.org

This seminar will explore several new findings from recent research regarding motorbus transfer. Recent IEEE PSRCC work has demonstrated that a long-held transfer acceptance criterion has poor correlation to motor torque and gives passing grades to severely excessive torques upon transfer. Time-based transfer criteria are ineffective and permit severely out-of-phase transfers or conversely may preclude perfectly good synchronous transfers. A Motor Bus Torque Ratio metric is proposed as the aggregate peak torque at transfer expressed as a multiple of the aggregate load torque prior to transfer and displays a high correlation to the phase angle at transfer with little effect from voltage or frequency difference at transfer. If it is torque that reduces the life expectancy and damages motors or driven equipment, or both, as suggested in industry standards, then the industry must use a torque-based criterion to assess if transfers are being completed within acceptable torque limits.

The seminar will cover the following:

- Why Transfer Motor Load Sources
- Basic Applications: Primary-Backup, Main-Tie-Main, Multiple-Option Source Selection
- IEEE Std C37.96-2012 Motor Bus Transfer Classification – Methods & Modes
  - Automatic and Manual
  - Closed Transition Method – Hot Parallel Transfer
  - Open Transition Method - Fast, In-Phase, Residual Voltage
  - Open Transition Modes – Simultaneous, Sequential
- IEEE Std C37.96-2012 Conditions Across Normally Open Startup or Bus Tie Breaker
  - Effects of a Fault
  - Out-of-Step (OOS) Generator Trip
  - System Separation between Incoming Supply Sources
  - Supply Source Transformer Winding Phase Shift
  - Transient Effects upon Disconnect of Motor Loads
  - Motor/Load Characteristic Effects on MBT

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- Failed Residual Voltage Transfer – Case Study
- Transfer Initiate, Inadvertent External Operation, Lockouts
- Load Shed During Transfer
- ANSI/NEMA Standard C50.41-2012 Resultant per unit V/Hz Limits
- Bus Transfer Spin Down Testing, Acceptance Testing, Setting Considerations
- Spin Down Analysis & Settings Calculations – Case Study
- Sequential vs. Simultaneous Transfer, The Need for Speed – Case Study
- IEEE Fast Transfer Sync Check Relay Performance Test Protocol Results
- IEEE Residual Voltage Transfer Relay Performance Test Protocol Results
- Motor Bus Transfer System Dynamic Performance Test Protocol Results and Observations
- A Motor Bus Transfer Torque Ratio Criterion applied to Live Open Transition Transfers Under Normal Operating Load Conditions - Observations and Conclusions
- Test Results from Modeling of Transient Currents and Torques on Motors during Residual Voltage Motor Bus Transfer

Tom Beckwith - Tom has over fifty years' experience in the electric power industry. As CEO of Beckwith Electric Co. from 2009 to 2020, Tom provided the leadership to develop and implement strategies for product development, marketing, sales, manufacturing, quality control and staffing.

Through the Beckwith Electric Center for Learning, he has travelled around the U.S. and the world presenting Protection & Control seminars to power companies and industrials.

Tom has a Bachelor of Science degree in Electrical Engineering (BSEE) from Case Western Reserve University and a Master of Business Administration (MBA) degree from the University of South Florida. He is a member of the IEEE PES/IAS, Petroleum & Chemical Industry Committee, and has co-authored three papers for the IEEE Transactions on Industry Applications.

Since 1972, he has served on working groups in the IEEE PSRC, Transformers Committee and the IEEE IAS Industrial & Commercial Power Systems Committee. He is co-inventor of a U.S. patent on a Multifunction Protective Relay System.

IEEE FWCS PES/IAS and WIE
Officer Training
Monday June 26 @ 7:30 pm - 9:00 pm
Virtual
https://events.vtools.ieee.org/m/360153

Contact/Questions: Robert DeMelo, robert.demelo@ieee.org

IEEE FWCS PES/IAS ExCom
Thursday, June 29, 6:30 am – 7:30 am
In Person
Village Inn, 215 North Dale Mabry Hwy, Tampa, Florida, United States
https://events.vtools.ieee.org/m/333495
Contact/Questions: Robert DeMelo, robert.demelo@ieee.org

IEEE WiE Events

In December 2022, Ammara Mehd Ghani, Vice Chair of Florida West Coast Section's IEEE Women in Engineering (WiE) & Young Professional (YP) affinity groups, attended and participated in two IEEE WiE events hosted by universities in Islamabad, Pakistan.

The first event "Women in Tech Talk Show" was held on December 4, 2022 and was hosted by FAST University. Ammara participated in a Q&A with students geared towards motivating female engineering students. She discussed why she chose engineering, what challenges she faced in university and her career, how she managed those challenges, and navigating a healthy work-life balance!

The second event was a "WIE Talks" seminar, held on December 15, 2022, and was hosted by the IEEE WiE NUST section. This seminar invited esteemed female speakers to share their experiences, aiming to inspire a future generation of women in tech. Ammara spoke on Post Pandemic Opportunities for Women in Tech. The Pandemic brought lots of challenges including social distancing, losing loved ones, layoffs, businesses declaring bankruptcy, and other negative circumstances but what was unexpected in that chaotic environment were the opportunities out there. It took a while for everyone to understand the disease and how to manage the problems associated with it. There were many new businesses that became popular and people got used to the new norm. Ammara's talk focused on the opportunities which were created during the pandemic and how it is very beneficial for women in tech specifically to maintain a great work life balance.

IEEE Aerospace and Electronics Systems Society | IEEE Computer Society | IEEE Florida West Coast Section | IEEE Signal Processing Society | IEEE ComSoc IEEE Communications Society

Deep Learning for mmWave and THz Beamforming Applications

Date: Friday, July 14, 2023
Time: 6:00 pm – 7:30 pm
Speaker: Dr. Kumar Vijay Mishra, Ph.D, US Army Research Laboratory
Location: In Person: USF Marshall Student Center, 4103 USF Cedar Cir, Tampa, FL 33620
Virtual: Link will be provided to registrants
Cost: No Cost
Register: Online at https://events.vtools.ieee.org/m/360664
Questions: Kumar Vijay Mishra - vizziee@gmail.com

Abstract: The millimeter-wave (mm-Wave) massive MIMO communications/radar employ hybrid analog-digital beamforming architectures to reduce the cost-power-size-hardware overheads. Lately, there is also a gradual push to move from the millimeter-wave (mmWave) to Terahertz (THz) frequencies for short-range communications and radar applications to exploit very wide THz bandwidths. At THz, ultra massive MIMO is an enabling technology to exploit even wider bandwidth while employing thousands of antennas. The design of the hybrid beamforming techniques requires the solution to difficult nonconvex optimization problems that involve a common performance metric as a cost function and several constraints related to the employed communication regime and the adopted architecture of the hybrid systems. There is no standard methodology for solving such problems and usually, the derivation of an efficient solution is a very challenging task. Since optimization-based approaches suffer from high computational complexity and their performance strongly relies on the perfect channel condition, we introduce deep learning (DL) techniques that provide robust performance while designing a hybrid beamformer. In this lecture, the audience will learn about applying DL to various aspects of hybrid beamforming including channel estimation, antenna selection, wideband beamforming, and spatial modulation. In addition, we will examine these concepts in the context of joint radar-communications architectures.

Kumar Vijay Mishra (IEEE S'08-M'15-SM'18) obtained a Ph.D. in electrical engineering and M.S. in mathematics from The University of Iowa in 2015, and M.S. in electrical engineering from Colorado State University in 2012, while working on NASA's Global Precipitation Mission Ground Validation (GPM-GV) weather radars. He received his B. Tech. summa cum laude (Gold Medal, Honors) in electronics and communication engineering from the National Institute of Technology, Hamirpur (NITH), India in 2003.

He is currently Senior Fellow at the United States Army Research Laboratory (ARL), Adelphi; Technical Adviser to Singapore-based automotive radar start-up Hertzwell and Boston-based imaging radar startup Aura Intelligent Systems; and honorary Research Fellow at SnT - Interdisciplinary Centre for Security, Reliability and Trust, University of Luxembourg. He is the recipient of U. S. National Academies Harry Diamond Distinguished Fellowship (2018 -2021), Royal Meteorological Society Quarterly Journal Editor's Prize (2017), Viterbi Postdoctoral Fellowship (2015, 2016), Lady Davis Postdoctoral Fellowship (2017), DRDO LRDE Scientist of the Year Award (2006), and NITH Director's Gold Medal (2003).

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He is Vice-Chair (2021-present) of the newly constituted IEEE Synthetic Aperture Standards Committee of the IEEE Signal Processing Society.

Since 2020, he has been Associate Editor of IEEE Transactions on Aerospace and Electronic Systems for which he was awarded Outstanding Associate Editor recognition in 2021. He has been elected Vice Chair (2021-2023) and Chair-designate (2023-2026) of International Union of Radio Science (URSI) Commission C. He is the lead/corresponding co-editor of three upcoming books on radar: Signal Processing for Joint Radar-Communications (Wiley-IEEE Press), Next-Generation Cognitive Radar Systems (IET Press Radar, Electromagnetics & Signal Processing Technologies Series), and Advances in Weather Radar Volumes 1, 2 & 3 (IET Press Radar, Electromagnetics & Signal Processing Technologies Series). He is also the founding member of IEEE Communications Society Integrated Sensing and Communications Emerging Technologies Initiative (ISAC-ETI). He has won many Best Paper prizes, including IET Premium Award (2021). His research interests include radar systems, signal processing, remote sensing, and electromagnetics.

Brief History of the US Army Research Laboratory

Before the forming of the ARL, the United States Army had research facilities dating back to 1820 when the laboratory at Watertown Arsenal, Massachusetts, studied pyrotechnics and waterproof paper cartridges. This facility would evolve into the Materials Technology Laboratory. Most pre-WWII military research occurred within the military by military personnel, but in 1945, the Army published a policy affirming the need for civilian scientific contributions in military planning and weapons production. Non-military involvement before this time was frequent; however, methods for contribution to warfare technology was on limited and incidental basis. On June 11, 1946, a new research and development division of the War Department General Staff was created; however, due to internal forces within the military which supported the traditional technical service structure the division was closed. A variety of reorganizations took place over the next four decades, which put many organizations in command of Army research and development.[3] Often commanders of these organizations were advocates of the reorganization, while some middle level management was opposed to the change.

The ARL represents the realization of a memorandum dated January 6, 1989 from the LABCOM Commander recommending integrating the corporate laboratories into a single entity. As part of the Base Realignment and Closure of 1989/1991, the consolidated research facilities would be located primarily at Adelphi Laboratory Center and Aberdeen Proving Ground. This would also relocate the majority of operations at MTL to APG. The Federal Advisory Commission reviewed and accepted the creation of ARL in 1992.

Federated Laboratories Beginning in 1996, the Army Research Laboratory entered into innovative cooperative agreements with industrial and academic partners to form "federated laboratories," or "FedLabs", to perform research in broad areas important to the U.S. Army where the ARL could extract significant leverage from work being performed in the commercial and academic arenas. The first three FedLabs were in Advanced Displays, Advanced Sensors, and Telecommunications. Each FedLab was a large consortium of companies, universities, and non-profit organizations, with both an overall industrial leader and an ARL leader. The cooperative agreements forming the FedLabs were somewhat unusual in that the ARL was not a mere funder of research, but an active consortium participant.

Insights by a Senior Electrical Engineer on the Future of the Industry, Education and Experience

An Interview with Dr. Stephen Skrzypkowiak, IEEE Senior Life Member and Electrical Engineer

By Evan Vaske, a third-year Electrical Engineering student at the University of South Florida

Dr. Stephen Skrzypkowiak is an IEEE Senior Life Member with nearly 50 years of experience in Electrical Engineering. His wide expertise in his field and excellent character made our conversation a rich and rewarding one. Stephen is not only an experienced industry leader, but also a wise and understanding mentor.

As a child, Stephen had always known he wanted to be an engineer. He was fascinated with the 1969 moon landing and wanted to find a way to help out in the space program. Stephen began his college education at the University at Buffalo with his BSEE in Electrical Engineering, focusing on Communications as well as Digital Switching Theory, a form of circuit optimization. There, Stephen became familiar with vacuum tubes, which would help him later in his career. After graduating from the University at Buffalo in 1975, Stephen thereafter worked for a variety of small companies, perfecting his skills in communications and radar systems. Stephen then decided that he wanted to pursue a master's degree in electrical engineering.

In 1982, Stephen started working on his MSEE at the University of South Florida. Due to his experience with circuit design at the time, Stephen performed his master's thesis on defining a new model for SPICE circuit analysis, presenting and publishing papers on his approach. Stephen also registered as a Professional Engineer with the state of Florida in 1983 while obtaining his MSEE.

After completing his MSEE, Stephen pursued a Ph.D. at the University of South Florida in the areas of Signal Processing and Communications. Stephen began working on digital signal processors, including the Texas Instruments TMS32010 - the first processor with a "multiply-and-accumulate" function. Stephen spent three years as a research assistant, programming the TMS32010 and other processors as they were released, and writing papers and implementation techniques.

Stephen paused his Ph.D. studies for a brief time to work in the industry. At TSI Precision Software as the Chief Scientist, he developed one of their first voice-response units and pay-per-view system, as well as supported the development of a six-chip MPEG encoder. Stephen then moved over to Velo Research as a Chief Scientist to work further with MPEG encoding and decoding, which lead to the development of a second generation of pay-per-view systems.

Stephen realized during his work at TSI that he did not want to live his life regretting not getting his PhD dissertation. This led him to leave the industry to complete his Ph.D. dissertation at the University of South Florida in 1996, focusing on machine learning to develop a motion estimation algorithm run on a neural network. Stephen applied this algorithm to the MPEG standard, finding that his new process was more accurate and more efficient than standard processes for encoding.

Once Stephen completed his Ph.D., he took a job opening at a then-local company called L3 Communications. L3 needed a software engineer to program a CT-based explosives detection system. There, after realizing how much experience Stephen had, he was made the project engineer for the L3 Communications eXaminer 3DX 6000 projects. The eXaminer 3DX 6000 was the first explosive detection system (or EDS) that performed full volumetric 3D reconstruction and explosive detection – and all within 2 seconds. Stephen considers the 3DX 6000 his greatest achievement; through this EDS device, Stephen and his team were able to make the world a safer place. A picture of this device is shown below in Figure 1.

Stephen also brought up some mistakes he'd like up-and-coming engineers to be wary of. Stephen wishes he had obtained his graduate degree much earlier in his career, as the world can look at those who take a long time to get that degree in a different way. He also regrets not taking more English writing courses in college, as professional communication is critical in the engineering discipline, and he did not anticipate writing as many technical reports as he has. Finally, Stephen wanted to publish more papers and research, but being classified had inhibited his ability to do so.

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For predictions for the future of engineering, Stephen views artificial intelligence as the next big thing for the discipline. “The challenge, for my field, and for the electrical engineers, is to apply it with knowledge – knowing the problem,” Stephen told me. Artificial intelligence, in the next ten to twenty years, is being looked at as the answer to everything. Stephen implores engineers to know why they are using it in order to utilize AI more effectively.

Stephen also greatly appreciates IEEE helping him during his career. He considers IEEE's technical and research articles second to none because they are written by electrical engineers from the start. Stephen also values the conferences and symposiums IEEE conducts. These conferences offer the “latest and greatest” information, where other engineers and companies present new, novel technology. He also appreciates the professional members he gets to meet with and talk with in his area.

After discussing Stephen's fruitful and illustrious career, I wanted to ask him for some advice. First, Stephen implored engineers to be more hands-on with their learning, saying that the engineers of the future "have to be more hands-on and understand what the real workings of things are". Hands-on experience is very important to building knowledge in your expertise area, but also being a well-rounded engineer in other fields is incredibly important as well. "I thought vacuum tubes were out of my area in undergraduate school", Stephen recalled. "Then here I go into CT systems, and I have an x-ray tube. And guess what? We're going to put a control grid into the X-ray tube, so I could stop the emissions. That's the basic trial theory from the early 70s, and that's what we're doing now. So, it's this background, this diversity, which really helps you moving forward."

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