COLLEGE OF ENGINEERING
BRADLEY DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
VIRGINIA TECH

PEC
Power and Energy Center

PEC Quarterly Newsletter • 2025 Quarter 2

power.ece.vt.edu

Director's Message

THIS edition of the PEC Quarterly Newsletter comes to you during the sizzling summer days of Blacksburg. Despite the heat—and the continued uncertainties many of us face—PEC faculty and students continued to work toward making the power grid more resilient, secure, and efficient. Several of these projects were showcased by our students at the **PEC Annual Conference** on April 17 (and thank you again for attending the conference despite scheduling challenges). As discussed in the closing session, we will shift to a **1.5-day format**: Thursday noon to Friday afternoon. This increases networking time, simplifies travel, and avoids overlap with CPES Conference banquet while keeping our joint PEC-CPES sessions.

PEC continues to grow:

- **Prof. Muataz Boker**, an ECE faculty in Arlington, has joined PEC. His research is on analysis and control of power systems and state estimation and sensor placement. Welcome onboard **Muataz**!
- Our **tenure-track faculty search** is nearing completion. An offer has been made, and we look forward to welcoming our new tenured associate professor in January 2026.
- As approved at the PEC IAB meeting, we now have an **inaugural group of PEC affiliate faculty**—VT professors outside power area who actively collaborate with PEC faculty: Professors Jeff Reed (wireless), Shima Shahab (wireless power transfer), Ron Meyers (renewables siting), Harpreet Dhillon (wireless), Lingjia Liu (wireless), John Ignosh (agrivoltaics), and Robin White (sustainable agriculture). This reflects our growing interdisciplinary engagement and impact.

Happy fourth of July!

Ali Mehrizi-Sani
Professor and Director

PEC-IAB Engagement

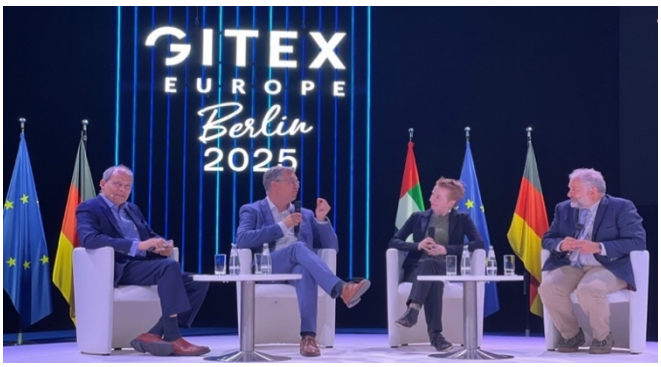
- **Dominion Energy**, **AEP**, and **MEPPI** serve on the advisory board of a DOE-funded project entitled HVDC-Learn. This project creates training modules for HVDC technologies with a focus on offshore wind. The first short course was offered in May in Ames, IA, at Iowa State University (project prime).

Faculty Highlights

- Our star assistant professor, **Prof. Ming Jin**, has received a new NSF award for optimal decision making under uncertainty. NSF awards are more competitive than ever. Congratulations **Ming**!
- **Prof. Muataz Boker** has joined PEC.
- **Prof. Chen-Ching Liu** was invited to give the keynote presentation, "AI in Smart Grids," at the Workshop on AI in Sustainable Energy, IEEE Conference on Artificial Intelligence (CAI), Santa Clara, CA, May 5, 2025. He was also an invited speaker and panelist for the workshop "Cyber Security

Perspectives on Regulation, Standards and Technical Development," at the CIGRE Symposium, Trondheim, Norway, May 2025.

- Profs. **Richard Zhang** and **Chen-Ching Liu** serve as members of the Energy Working Group of the Virginia Academy of Science, Engineering and Medicine. The inaugural meeting of the EWG was held on June 3, 2025. Dr. Liu was elected to chair the EWG.
- **Prof. Saifur Rahman** was a keynote speaker at the IEEE Asia Conference on Power and Energy (ACPEE) in Beijing, China on 15-18 April 2025. He was also a keynote speaker at the 8th IEEE International Electrical Energy Conference in Changsha, China of 16-18 May 2025. He also chaired a panel at the Gitex, Europe Green Digital Action Summit in Berlin, Germany.



- **Prof. Ming Jin**'s group (Ming Jin, Lanxiao Huang, and Jai Kumar Sharma) won the 2025 CyberFarm Competition. They developed an LLM-based cyberattack detection systems with capability to explain mitigation strategies to farmers for agricultural water systems. Dr. Jin's survey paper (sole author), "Reinforcement Learning Meets the Power Grid: A Contemporary Survey with Emphasis on Safety and Multi-agent Challenges," will appear in the journal Foundations and Trends® in Electric Energy Systems.
- **Prof. Ali Mehrizi-Sani** received the College of Engineering Dean's Excellence in Research Award.
- PEC professors, **Liu, Rahman, Mehrizi-Sani, Mili**, were celebrated at the VT Authors Recognition Event for their newly published books:
  - **C.-C. Liu**, A. Srivastava, S. Chanda, "Resiliency of power distribution systems," Wiley, 2024.
  - **L. Mili,** M. Netto, J. Zhao, "Robust Dynamic State Estimation of Power Systems," Elsevier, 2023.
  - C.-W. Ten**, A. Mehrizi-Sani**, T. Gonen, "Electric Power Distribution Engineering," CRC, 2024.
  - **A. Mehrizi-Sani**, T. Gonen, "Electrical Machines and Their Applications," CRC, 2024.
  - A. Parizad, H. Baghaee, **S. Rahman**, "Smart Cyber-Physical Power Systems," Wiley-IEEE, 2025.
- PEC collaborated with two other VT centers, CAIA and CFWPP, to coauthor a report on Advancing Agrivoltiacs in Virginia, sponsored by 4-VA. The report is the result of two workshops. It is available at https://ralphphall.com/2025/06/13/white-paper-advancing-agrivoltaics-in-virginia

Graduate Student Achievements

Milad Beikbabaei (PhD, Ali Mehrizi-Sani) presented at the CCI Symposium, Richmond, VA in April 2025 on "Model-Free Cyber-Resilient Coordinated Inverter Control in a Microgrid" and were a recipient to the "CCI SWVA Cyber Innovation Scholar in 2025" scholarship. Their papers "Physics-Informed Cyber-Resilient Grid-Forming and Grid-Following Inverter Control" and "Pilot Detection and Location of Broken Conductor Faults for Tapped Transmission Lines" were accepted in IEEE Power & Energy Society General Meeting (PESGM), Austin, Texas, Jul. 2025 and Electric Power Systems Research, Jun. 2025 respectively • **Akila Herath** (PhD, Chen-Ching Liu) presented the paper, A. Herath, C. C. Liu, J. Hong, and M. Girdhar, "An Advanced Cyber-Physical System Security Testbed for Substation Automation," at CIGRE Symposium in Trondheim, Norway, May 2025.

Current Research Sponsors

New Projects Starting in This and Last Quarters

Faculty	Project Title	Sponsor	Start	Budget
Ming Jin	Embodied Optimization for Decision-Making and Uncertain Environments	NSF	May 2025	$454,953
Lamine Mili And Muataz Boker	Sensor Placement, Monitoring, and Data Analytics Platform (Sensor-MAP), Sensor Placement and Optimization Tool for the integration of Solar Systems	DOE (through NREL)	Aug. 2025	$3,000,000
Ali Mehrizi-Sani	Developing Real Time Simulator Models of inverter-based resources (IBRs)	EPRI	May 2025	$40,000
Ali Mehrizi-Sani and Chen-Ching Liu	IRES: U.S.-Australia Program for Research In grid-forMing bAttery inVERters for grid Applications (PRIMAVERA)	NSF	Jan. 2025	$450,000
Ali Mehrizi-Sani	Virginia International Research on Technology and Unified Cybersecurity in Electric Systems (VIRTUE)	CCI	Jan. 2025	$10,000