Taking the Stage at CPE-POWERENG 2018

Roughly 175 experts and practitioners in the fields of power electronics and engineering and the smart grid recently gathered in Doha for the 12th IEEE International Conference on Compatibility, Power Electronics, and Power Engineering (CPE-POWERENG 2018), chaired by Haitam Abu Rub, Sertac Bayhan, and Mariusz Malinowski. The IEEE Industrial Electronics Society (IES) Students and Young Professionals (SY&P) Activity during the conference was cochaired by Marek Jasinski, Dmitri Vinnikov, and Hani Vahedi [Figure 1(b)]. CPE-POWERENG 2018, the flagship conference of the IEEE IES, was organized by Texas A&M University at Qatar and the IES and sponsored by Qatar National Research Fund (QNRF) and OPAL-RT. Abu-Rub, conference chair and chair of the Electrical and Computer Engineering Program at Texas A&M at Qatar, said the conference was a great opportunity to promote Qatar and its advanced research and education activities. “Well-known scientists and researchers from more than 35 countries had the chance to visit Qatar and to take part in the conference’s rich technical, industrial and social activities,” Abu-Rub said. He added:

Attendees were engaged in discussions of ongoing and future
research toward next-generation power electronics, power energy, and smart grid. The event was very instrumental in drawing the attention of top world scientists to the outcomes of Qatar’s great research efforts. They were able to see the products of the QNRF research being conducted in the Smart Grid Center at Texas A&M University at Qatar.

The conference brought together leading scientists, researchers, and stakeholders from international and national research institutions, universities, and industry to exchange information about medium- to long-term research and the future challenges of power electronics, smart grid, and renewable energies. Attendees engaged in discussions of ongoing and future research toward next-generation power electronics, renewable energy technologies, and applications, which organizers said they hope would lead to research collaboration opportunities among participants.

It was an excellent place for students and young professionals to present their projects and meet with colleagues and mentors. For IEEE CPEPOWERENG 2018, 14 applications were submitted for the IEEE IES Students and Young Professionals Paper Assistance (IES SYPA) Award. The average weighted score was 6.65. The jury announced seven IES SYPA recipients, who each received a recognition diploma and up to US$2,000 in travel costs reimbursement. The recipients included:

1) Arvind Kadam, University of Ontario Institute of Technology, Canada, for the paper “Carrier-Based Power Balancing in Three-Level Open-End Drive for Electric Vehicles,” authored by Rishi Menon, Najath Azeez, Arvind H. Kadam, and Sheldon Williamson
2) Hani Vahedi, Ecole de Technologie Superieure, Canada, for the paper “Static VAR Compensator Using Packed U-Cell Based Multilevel Converter,” authored by Hani Vahedi, Ahmad Dehghanzadeh, and Kamal Al-Haddad
3) İker Şahin, Middle East Technical University, Turkey, for the paper “A New Model Predictive Torque Control Strategy with Reduced Set of Prediction Vectors,” authored by İker Şahin and Ozan Keysan
4) Naki Güler, Gazi University, Turkey, for the paper “Model Predictive Control of Grid-Tied Three Level Neutral Point Clamped Inverter Integrated with a Double Layer Multi-Input Single Output dc/dc Converter,” authored by Erdal Imam and Naki Güler
5) Negar Noroozi, Sharif University of Technology, Iran, for the paper “Comparison of Common-Mode Voltage in Three-Phase Quasi-Z-Source Inverters Using Different Shoot-Through Implementation Methods,” authored by Mohammad Reza Zolghadri and Mokhtar Yaghoubi
6) Ahmad Khan, Electrical Engineering Department, College of Engineering, Qatar University, for the paper “Novel Shunt-Less Filters for Grid-Connected Transformerless Photovoltaic Applications,” authored by Ahmad Khan and Frederik Blaabjerg
7) Farzaneh Bagheri, Department of Electrical and Electronic Engineering, Eastern Mediterranean University, Turkey, for the paper “Fixed Switching Frequency Sliding-Mode Control Methodology for Single-Phase LCL-Filtered Quasi-Z-Source Grid-Tied Inverter,” authored by Farzaneh Bagheri, Hasan Komurcugil, and Osman Kukrer.

All recipients presented 3-min speeches and published videos on the IEEE IES YouTube channel [1]. After the session, in a friendly atmosphere during an excellently organized gala dinner, they received congratulations and diplomas.

From the first to the last day of the conference, all attendees enjoyed the highly professional level of invited speakers for the keynotes in addition to the well-recognized researchers presenting at the student and Young Professionals tutorial and industry link sessions, such as:

1) “The Key Technology for Renewable Energy System Integration,”

![Figure 2](image-url)
optimal pulsewidth modulation can be achieved by offline optimized pulse patterns, combined with online optimization at transients. An alternative approach is predictive control, which is presently attracting the interest of many researchers. A predictive algorithm directly generates the firing pulses of the inverter as part of a closed-loop current control system, thus eliminating a pulsewidth modulator. A gate pulse is generated whenever a predefined current error is exceeded. That error is computed as the difference between a reference and an actual current space vector. The next switching state is then determined such that maximum time elapses until the error vector exceeds its limit again. This minimizes the switching frequency and also the switching losses. A smooth transition to full-wave operation produces maximum inverter output voltage.

A further reduction of switching losses is achieved by event-triggered closed-loop gate-charge control of medium-voltage IGBTs. Other than linear control, this method overcomes various nonlinearities of the devices at microsecond response time. Again, after the presentation, the benefits of IEEE membership were explained and a lively discussion followed (Figure 6).

Figure 6 – Discussions in Beijing.