Connected [Editor's Column]

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Our world is currently dominated by the COVID-19 pandemic and its consequences. Not only do travel bans, school closures, and working from home send shock waves through our society and economy, the crisis also triggers a debate about globalization, connectedness, dependencies, and risk. The resiliency of our critical supply lines for power, water, food, medication, and daily goods requires a critical review.

Industrial electronics is not exempt from such a critique: a cyberinduced power system blackout could lead to far more serious problems than we are experiencing right now. The global engineering community has been asked to provide solutions to our problems, and everyone can contribute. I was inspired when I saw that M.Sc. students at TU Delft, The Netherlands, are developing a low-cost respiratory support machine and designing the hardware and software in an open-source fashion. This is the IEEE slogan, "Advancing Technology for Humanity," at its best!

At the same time, many IEEE Industrial Electronics Society (IES) volunteers are busy transforming numerous activities—conferences, workshops, and events—into online and virtual variants. We will face a period of increased online participation in conferences. Maybe this will be partially continued after the crisis because lower travel emissions, better accessibility for developing nations, and reduced overall costs are among the few positive consequences. We will stay connected face to face and virtually. This crisis forces us to explore alternative formats, and some will be continued. Still, the lively discussions in conference session rooms, which are sometimes continued in the evenings over a beer, are hard to beat. I am confident that the successful tradition of IES conferences will continue soon.

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This issue features five great articles that span from power system components to artificial intelligence (AI). "IEC 61850-Based Communication Layer Modeling for Electric Vehicles," by Aftab et al., discusses the cyberlayer of smart electric vehicle (dis)charging, based on an open International Electrotechnical Commission standard. This vehicle-to-grid capability might develop into an important player in the future power system.

"A State-of-the-Art 500-kV Hybrid Circuit Breaker for a dc Grid," by Zhang et al., presents a breathtaking new circuit breaker for dc grids. Let's not forget: opening a dc breaker in the 100 s of the kilovolt range is—in terms of energy—equivalent to stopping a freight train within milliseconds. DC circuit breakers are one of the missing links for a resilient power system of the future because it will increasingly contain high-voltage dc elements. "Real-Time Simulation-Based Testing of Modern Energy Systems," by Benigni et al., complements this with powerful methods to test and validate modern power system concepts using real-time simulators. This flexible setup allows for affordable experiments in a very complex domain.

A promising idea is presented in "Supercapacitor-Based Long Time-Constant Circuits" by Kularatna and Jayananda. By allowing longer time constants, the design assumptions for power converters become different, which could lead to more efficient or more reliable converters in the end. Finally, "Toward Intelligent Industrial Informatics," by de Silva et al., gives a great overview and introduction into one of the hottest topics of our times: AI and how it could affect our businesses. This article assesses the opportunities and impact AI might have on industrial electronics.

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