

From the EIC

Designing Autonomous Systems



■ **AUTONOMOUS SYSTEMS CAN** be found in areas such as automotives, robotics, avionics, industry automation, and many more. Such systems become increasingly “intelligent” with the rise of machine learning techniques. Designing such systems has, therefore, become even more complex since new parameters significantly increase the design space and capabilities of such systems. An overview of this complex design process that also includes test, verification, and so on is brought to us by the guest editors of this special issue, Selma Saidi, Dirk Ziegenbein, Jyotirmoy V. Deshmukh, and Rolf Ernst. The guest editors have selected four articles for this special issue. They also introduce the readers to this field in their overview article titled “Autonomous Systems Design: Charting a New Discipline,” which lays the foundation for understanding and awareness of the complexity when designing and testing autonomous systems. Thanks to the guest editors for this special issue that covers the *IEEE Design&Test* topical area “systems of systems.”

This issue also presents four general interest articles. Two articles, “Design and Test of Innovative Three-Couplers-Based Bandpass Negative Group Delay Active Circuit,” by Wan et al., and “Design and Test of Crab-Shaped Negative Group Delay Circuit,” by Ravelo et al., focus on novel approaches of the design of bandpass-type negative group delay circuits. In “Toward Agile Hardware Designs With

Chisel: A Network Use Case,” Bruant et al. introduce their novel distributed denial-of-service system that comprises architecture of high-performance field-programmable gate arrays (FPGAs) and central processing units (CPUs). In “A Novel Method for Scalable VLSI Implementation of Hyperbolic Tangent Function,” Chandra presents a method for tuning accuracy and precision in the design of deep neural networks.

The International Symposium on Low Power Electronics and Design (ISLPED’21) took place on July 26–28, 2021, as an online symposium. Thanks to the general chairs, Yiran Chen and Sherief Reda, for the report. The 2021 Embedded Systems Week (ESWEEK’21) took place on October 9–14, 2021, also as an online event. Thanks to the general chairs, Andreas Gerstlauer and Aviral Shrivastava, for their report. We also present a report on the 58th Design Automation Conference (DAC 2021) that was held in San Francisco, CA, USA, on December 5–9, 2021. Thanks to our conference report editor Massimo Poncino for acquiring the reports.

I hope you enjoy reading this issue of *IEEE Design & Test*. ■

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