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Editorial

Vishwani D. Agrawal[1]

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I am pleased to announce the *2023 JETTA-TTTC Best Paper Award*. The award selection committee consisted of Xiaoqing Wen, Chair (Kyushu Institute of Technology, Japan), Jiun-Lang Huang (National Taiwan University, Taiwan), Erik Larsson (Lund University, Sweden), Nicola Nicolici (McMaster University, Canada), and Adit Singh (Auburn University, USA). We congratulate the winning authors, Hui Jiang, Fanchen Zhang, Jennifer Dworak, Kundan Nepal, and Theodore Manikas. Their winning paper is, "Increased Detection of Hard-to-Detect Stuck-at Faults during Scan Shift," *Journal of Electronic Testing: Theory and Applications*, Volume 39, Number 2, pp. 227–243, April 2023. Please see the award and recipient details that follow this editorial.

Yervant Zorian, TTTC President, will announce the *2023 JETTA-TTTC Best Paper Award* at the Thursday Morning Plenary Session of the International Test Conference, San Diego, November 3–8. 2024.

This issue has eight articles. The topics discussed are single flux quantum (SFQ) logic – an emerging technology, physical faults, electromagnetic radiation damage, printed circuit board (PCB) testing, and low noise amplifier (LNA).

Single flux quantum (SFQ) circuits belong to an emerging technology that uses superconducting materials and cryogenic temperatures. The first paper introduces SFQ circuits and describes the design of test modules, which allow generation of test vectors. Relevant testability measures are also proposed. Authors are Qoutb and Friedman from University of Rochester, Rochester, NY, USA, and Kawa from Synopsys, Mountain View, CA, USA.

The second paper describes generation of synthetic layout test patterns to verify the physical design of a circuit. It uses a deep learning technique. Contributors are Mahmoud, El-Kharashi and Salama from Ain Shams University, Cairo and the American University in Cairo, Egypt.

The third and fourth papers explore the damage in electronic circuits caused by electromagnetic radiation. The first of these papers presents an equivalent circuit to study the effects of high-energy electromagnetic pulse (HEMP) on communication links of an electronic system. Authors are Feng, Sun, Lu, Li, Tian and Qiu from Xidian University, Xi'an, Shaanxi, China.

Continuing with the radiation damage theme, the fourth paper examines a radiation-hardened static random-access memory (SRAM) cell. The authors then propose a new 12-transistor radiation-hardened SRAM cell. This work is contributed by Ahirwar, Pattanaik and Srivastava from ABV-Indian Institute of Information Technology and Management, Gwalior, MP, India.

Next three papers, the fifth through seventh, address printed circuit board (PCB) testing. The fifth paper is authored by Yunpeng and Rui from Beijing Institute of Graphic Communication, China, Mingxu from Beijing Information Science and Technology University, China, and Sabah from Superior University, Pakistan and Beijing University of Technology, China. They show a way to derive tests for difficult to test components on a PCB by using a modified version of an algorithm known as YOLO or "you only look once".

The sixth paper continues with the PCB testing and is authored by Zhang, Shi, Qu, Xu and Chang from Shanghai University, Shanghai Key Laboratory of Intelligent Manufacturing and Robotics, Shanghai, China. Even though the operation of a PCB is electronic, defects often manifest themselves as mechanical or visual changes in components or interconnects. This paper uses a machine intelligence-based image recognition method to identify defects.

The seventh paper, also on PCB testing, is contributed by Wu, Chen, Wang, Tian and Shen from Nanjing University of Science and Technology, Nanjing, China. In their own words, "This paper presents a deep learning-based selective PCB image fusion method to address the challenges of identifying small components, such as resistors and capacitors, and detecting chip polarity during PCB repair."

✉ Vishwani D. Agrawal
agrawvd@auburn.edu

[1] Auburn University, Auburn, Alabama 36849, USA

The eighth paper describes reliability analysis of gallium-arsenide (GaAs) low noise amplifier (LNA) when used under elevated temperatures. The result offers useful guidance to the operation of this radio frequency (RF) device. The authors are Lin from Qinghai Minzu University, Xining, China, University of Electronic Science and Technology, Chengdu, China, and Tong Fang Electronic Technology Company, JiuJiang, China, and Wang from Qinghai Minzu University, Xining, China.