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Disruptive Technologies in Information Sciences II

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Introduction

The 2019 SPIE Disruptive Technologies for Information Sciences conference organizers would like to thank all the program committee members, authors, presenters, students, and SPIE staff members who made this conference such a huge success. On 15–16 April 2019 the conference convened for the third successful year; hosting engaging presentations from government, industry, and academia. In addition, the conference highlighted a student panel and a student poster session that focused on the vision of the next generation of information science professionals. The topics were chosen from a competitive selection process in which students from 8 different universities submitted what they felt represented the most disruptive technologies of the future. Financial sponsorship for these students was provided by the United States Air Force, the Army Engineer Research and Development Center (ERDC) (United States), and the Army Research Laboratory (United States).

Additional conference highlights included keynote talks from Dr. Raju Namburu from ERDC (United States), Dr. Mike Baker from the U.S. Army Research Laboratory (United States), and Dr. Venkateswara Dasari from the Army Research Laboratory (United States). Their talks focused on the needs and requirements of the Army's future command, along with the Engineer Research and Development Center (ERDC) (United States).

Some pervasive themes recurred in the presentations and discussions as international experts presented their work and key findings on emerging topics like; autonomy, artificial intelligence, data science, networking, quantum science, sensors, and hardware architectures.

There were several talks on using blockchain technologies and other advanced machine learning based tools and methods to deal with deception in social media and network operations. Another thread attempted to address the challenges resulting from the increasing number of sensors and intelligence sources. There are increasing demands for methods to process all the data these sensors collect in a manner that is timely and secure. Researchers addressed these challenges through talks on real-time data fusion with advanced feature analysis, correlation techniques, modeling and simulation. Tools and techniques using artificial intelligence and machine learning showed how we incorporate human guided learning approaches and advanced statistical analysis to make the best use of all this data, at the right time, and in the right locations. Computer security was a pervasive theme that presented its own unique challenges and opportunities. National experts are becoming increasingly aware that not all machine learning methods are created equal. Adversarial machine learning techniques force experts to give careful consideration to the robustness and trustworthiness of their methods. New encryption schemes and obfuscation

strategies were presented that will help us protect sensitive information, intellectual property, human and computational resources.

Advanced computing architectures were pervasive throughout many talks. Computer processing demands increase with the amount of data a system is processing combined with the increasing demand for speed of response. New advanced computing architectures which provide higher processing speeds with lower power requirements were presented. These presentations included sessions on quantum computing and neuromorphic designs.

Quantum science goes beyond applications to hardware architectures, which is why we saw some novel techniques on quantum communications and networking. These tools and techniques will be game changers in the world of networking and information dissemination.

Next year, we plan to offer the student sponsorship program once again. Please encourage the college students in your life to submit a paper and attend this amazing conference.

As leaders in the field of information sciences, we all strive to make the world a better place. That starts with understanding the technology gaps, challenges, and in understanding what advances in technology might help us address them. Please pick up a copy of our conference proceedings to take a first step in understanding these disruptive technologies. We will look forward to your submission to next year's as these technologies inspire you to advance the scientific field even further.

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