SRI20: Student Research Innovations

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***Abstract*—The Student research Innovations Track (SRI20) celebrates student scholarship and research excellence. Providing students of all levels an opportunity to present their research to an international community of scholars. Research presentation is critical for researcher development. Student tracks, such as SRI20, at professional conferences provide students with an opportunity to share their research with others, while gaining valuable feedback on their work. Students who present at conferences advance their public speaking skills and professionalism, while building their professional network.**

Keywords- student; research; academisc; cybersecurity.

I. INTRODUCTION

Student research is a critical area within the world's academic system. The earlier a student starts learning and practicing research methodologies, the more likely they will continue conducting research at the graduate level. Students who do research are provided an opportunity to develop critical thinking skills, along with communication skills needed to be successful in their selected profession [1]. The research process, from the review of the literature to the development of a solution, is a valuable learning experience that has a lasting influence as a student prepares to enter the workforce. Additionally, by encouraging and providing student of all levels an opportunity to do research and present their work may help students refine their career goals, settle into a specific sub-discipline, or even help them realize that a particular discipline may not be what they really want to do after graduation [2].

For this special track, the solicited research from the following topics related to student research to provide a broad approach to student creativity covering the following aspects: Cybersecurity, Contrasting student and academic perspectives and experiences of student engagement, Smart Curriculum Design, Internet of Things in CS Education, Modeling Global Competencies for Online Education, Simulation/Virtual Reality, Blockchain, ePortfolios, Mobile Learning Tools, Cloud Computing, Virtual Exchanges, Global Teams, Simulations, and Computer Technology.

II. SUBMISSIONS TO STUDENT RESEARCH INNOVATIONS

In total, four papers are submitted to the SRI20 Track. Three of these papers were accepted for publication:

- *'Incorporating Cyber Competencies in K-12'*
- *'Exploitation of Radio Frequency Technologies Through the use of Microcontrollers'*
- *'Fingers and Toes: The Hidden Biometric Story'*

In the first paper, 'Incorporating Cyber Competencies in K-12' [4], the author presented a study that proposed an approach that primary and secondary education systems, known in the United States as K-12, might use to improve their students' knowledge of cybersecurity and online personal safety to reach the generations known as Generation Z and Generation Alpha. For years, members of these generations have been living in a digital world and sometimes expose themselves to digital predators without knowing they are welcoming a cyber-attack. Since the COVID-19 pandemic, more education systems are expecting students of all ages to spend more time online, which increase the opportunity for personal data to be stolen or cyber overload. This author has tested the proposed solution in the United States and it should be adaptable for use by other countries.

The second paper, 'Exploitation of Radio Frequency Technologies Through The Use Of Microcontrollers' [5], provides a detailed discussion on the history of radio frequency identification (RFID) and the opportunities it presents to cyber criminals to steel someone's credentials and gain access to normally restricted data and secure rooms. The undergraduate researcher uses publicly available devices, specifically the Arduino and an RFID reader/writer to attack public transportation RFID access cards. With the use of the open Python library the author is able to successfully, collect the RFID data from the tested wireless access cards. There is plenty of information on RFID in the computer science and engineering fields, however there is

less focus on common criminals use of attacks using free and publicly available tools.

The final paper, 'Fingers And Toes: The Hidden Biometric Story [6], explains how toeprints may be classified with the same classification system used for finger prints. The paper discusses how many countries have a fingerprint databases, but not toeprint databases. The importance of including toeprints into these databases is due to the increase use of using toes as replacements to fingers by the medical profession. This novice researcher explains how the data confirmed that fingerprints and toeprints are created during fetus gestation and that full-blooded siblings do have similarities in both types of prints. This information will provide data from a two part research study that supports the global criminal justice system expanding inclusion of toeprints and may support biometric researchers to do additional research in the toeprint area.

III. Conclusions

The SRI20 special track includes diverse approaches to the cybersecurity within the computer science field. It covers both academic and industry studies to provide solutions and ideas to that face all of us living in the digital world. Since the COVID-19 pandemic student researchers are facing additional challenges due to budget cuts and the limitations of social distancing regulations. The papers within SRI20 demonstrate the growing level of work being done by undergraduate college students through different approaches, with the singular desire to find a way to make the world a safer place for all.

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