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**Biomedical Engineering Section (BTI)**  
**INVITED LECTURE:**

## **“Brain-Computer Interface: Past, Present, and Future”**

**Lazar I. Jovanovic**

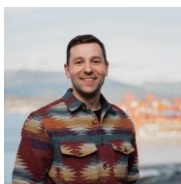
WearTech Labs, Simon Fraser University, Surrey, BC, Canada

**Abstract:** Over the last 50 to 60 years, brain-computer interfacing (BCI) technology has evolved from the realm of science fiction into research laboratories and clinical trials, and more recently, it has started heading toward the consumer market in the form of wearable devices. This lecture will trace the progress of BCIs, beginning with foundational discoveries in neural signal processing and their translation into practical systems.

The core of the lecture will highlight the use of BCI technology in rehabilitation, where I will focus on my research on BCI-controlled functional electrical stimulation therapy as a novel approach for restoring upper-limb motor function after stroke or spinal cord injury. My work demonstrated the feasibility and safety of using a non-invasive, single-channel electroencephalography (EEG)-based BCI to trigger electrical stimulation synchronized with the user’s intention to move, leading to clinically meaningful improvements in motor function.

Beyond the technical achievements and promising clinical results, the work underscores the importance of designing systems that prioritize user accessibility—streamlined setup, intuitive operation, and integration into existing rehabilitation workflows. Finally, I will explore the future of BCIs, envisioning their evolution into wearable devices seamlessly integrated into our digital ecosystem, and address the ethical considerations of having BCI technology become a regular part of our daily lives.

### **Short biography:**



**Lazar I. Jovanovic**, PhD, serves as the Director of Operations at WearTech Labs, Simon Fraser University. In this role, Dr. Jovanovic manages research operations and fosters collaboration between academia and industry to advance wearable technology. His primary research interests include accessible wearable technology, brain-computer interfacing, functional electrical stimulation, and the general use of technology to enhance health and wellness. Dr. Jovanovic earned his doctorate at the Institute of Biomedical Engineering, University of Toronto, where his thesis focused on integrating brain-computer interface and functional electrical stimulation technologies to aid arm and hand movement recovery in individuals with stroke and spinal cord injuries.