# Intelligent Materials to Enable Wireless Brain-Machine Interface

## Prof. Sakhrat Khizroev

Department of Electrical and Computer Engineering
Department of Biochemistry and Molecular Biology Engineering
University of Miami

**Friday, October 8, 10:00 am US central time**
**Room: Zoom***

https://uofh.zoom.us/j/845619943?pwd=QlZvYUV6M2dxNDkvNWxBd3F2YzdJZz09
**Meeting ID: 845 619 943**
**Passcode: 016104**

| LECTURE ABSTRACT |

Khizroev and his team are working to build first wireless brain-machine interface (BMI) by using magnetoelectric nanoparticles (MENPs). One of the challenging aims of their research is to unlock unprecedented possibilities to control fundamental biological mechanisms by connecting the human brain to artificial intelligence (AI), thus elevating humans to the next level. This talk will discuss the key challenges of the ambitious project and the groundbreaking solutions they proposed based on the physics of MENPs. Their research has been supported through competitive contracts from Defense Advanced Research Projects Agency (DARPA), National Science Foundation (NSF), Air Force Office of Scientific Research (AFOSR), Office of Naval Research (ONR), and National Institutes of Health (NIH).

| SPEAKER BIOSKETCH |

Sakhrat Khizroev is a tenured Professor of Electrical and Computer Engineering at the College of Engineering, where he also chairs the Advanced Materials cluster. He holds a secondary appointment with the Department of Biochemistry and Molecular Biology and is a faculty member at the Miami

Project to Cure Paralysis and Sylvester Comprehensive Cancer Center. The main focus of his current research is to create wireless interface between the human brain and artificial intelligence (AI). From 2011 to 2018, he was a Professor of Electrical and Computer Engineering at Florida International University, with a joint appointment at the College of Medicine, where he co-founded and spearheaded the university-wide initiative on personalized nanomedicine. From 2006 to 2011, Khizroev was a tenured Professor of Electrical Engineering at the University of California, Riverside (UCR), where he worked with the late Chemistry Professor Robert Haddon to pioneer 3D nanoelectronic technologies. In collaboration with Prof. Ping Liang of UCR, his team has for the first time proposed and developed MENPs for medical applications including targeted drug delivery across the blood-brain barrier (BBB), high-specificity cancer treatment, HIV/AIDS, neuroimaging, wireless neural network stimulation, and others. Prior to joining academia, he spent four years with Seagate Research and one year with IBM Almaden Research Center. In 2012, he was elected a Fellow of National Academy of Inventors in the inaugural year of the Academy. Khizroev holds over 41 granted US patents, has authored over 160 refereed papers, 6 books and book chapters, has presented over 100 talks including many invited seminars and colloquia at international conferences, acted as a guest science and technology commentator on television and radio programs across the globe. He sits on Science Advisory Board of Neuroscience Centers of Florida Foundation. He received a PhD in Electrical and Computer Engineering from Carnegie Mellon University in 1999, a M.S. in Physics from the University of Miami in 1994, and B.S./M.S. degrees in Physics from Moscow Institute of Physics and Technology (Phystech) in 1992/1994.