

## REPORT ON WORK MISSION AT THE FEDERAL UNIVERSITY OF UBERLÂNDIA

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The primary goal of my visit to the Federal University of Uberlândia (UFU) was to strengthen collaboration between researchers from Brazil and Lithuania, focusing on developing new technologies for Parkinson's disease (PD) rehabilitation. This visit aimed to encourage joint research applications and enhance the involvement of both Brazilian and Lithuanian researchers and students in collaborative projects. Throughout the trip, I engaged in productive discussions, explored UFU's advanced facilities, and presented my ongoing research in wearable technology and machine learning.

During my stay, I visited the **training center for hospital personnel**, a facility dedicated to providing practical training for medical professionals. During the visit, we observed how the facility operates and discussed the challenges faced in training medical staff, as well as potential improvements. Furthermore, we visited the **Hospital de Clínicas of the Federal University of Uberlândia (HC-UFU)**, where we explored the newly established facilities and discussed future plans for training and research that could be conducted using this advanced infrastructure.

Additionally, I had the opportunity to present my research on Wearable Technology and Machine Learning to the UFU community. My presentation showcased how wearable sensors can be used for continuous health monitoring, enabling more personalized treatment approaches. I also addressed the current research challenges we face and outlined the future directions we aim to explore, especially for predicting migraine. Moreover, I participated in the presentations of master, doctoral and postdoctoral students, sharing insights on their research, and later incorporated our discussions into my presentation, which proved to be particularly engaging for the students.

One of the most productive outcomes of the visit was the formulation of a joint research direction with postdoctoral and doctoral students from UFU. Together, we developed a plan to process the data collected in the lab related to Parkinson's disease (PD) patients. Our collaboration will focus on combining computer vision tools for the classification and prediction of Freeze of Gait in PD patients, an important area of research that has great potential for improving patient outcomes. Moreover, master's students from Vilnius Tech will also be involved in this collaborative effort, contributing to the processing and analysis of data, alongside a doctoral student who will work specifically on the integration of data from wearable electronics.

In addition to the visits at UFU, I had the opportunity to attend the **Brazilian Congress of Biomedical Engineering (CBEB 2024) in Ribeirao Preto**. At CBEB, I presented my research and engaged in meaningful exchanges with a broad spectrum of researchers. My technical speech, which focused on rehabilitation measurements using computer vision techniques, generated significant interest. The congress offered an excellent platform to not only showcase my work but

also to connect with other experts and students, further expanding the reach and impact of our research initiatives.

In conclusion, the visit to UFU was highly productive, achieving its main goal of fostering collaboration between researchers from Brazil and Lithuania. The mutual exchange of knowledge, particularly in the fields of biomedical signal processing and wearable technology, promises to lead to innovative rehabilitation methods for PD patients. The experience has paved the way for future joint research efforts and highlighted the potential for international academic mobility, benefiting both institutions in the long term.

Prof Dr Vytautas Abromavičius





# INTERNATIONAL RESEARCH SEMINAR

Friday, 30 August 2024 - 9am  
Seminar Hall 1E  
Faculty of Electrical Engineering

**Slawomir  
Nasuto**

United Kingdom



Prof. Slawomir Nasuto received an MSc in Mathematics and a PhD in Cybernetics. He leads the Brain Embodiment Laboratory (BEL), an interdisciplinary research group within the School of Biological Sciences (University of Reading), focusing on neuroengineering and cognitive neuroscience, alongside complex science approaches to information processing in the brain. His research on phase synchronisation, functional connectivity and complex evolving networks informs interrogating cognitive processes and the nervous system. He applies these approaches in brain computer interfaces (BCI), neurofeedback and neurorehabilitation.

**Presentation title:** *Complex brain dynamics for brain computer interfaces*

**Sami  
Rahman**

United Kingdom



Sami Rahman is a Computational Psychologist and Data Professional pursuing a part-time PhD at the University of Reading. He serves as the Director of Data at Hypebeast and holds additional roles as a Non-Executive Director at Confinity AI and a Trustee at the For Baby's Sake Trust. Sami's academic background includes an Advanced Diploma in IT Systems Analysis and Design, an MSc in Countering Organised Crime and Terrorism, and a BSc (Hons). He investigates the symbiotic relationship between artificial and human intelligence, virtual reality gaming and therapy, and the study of Parkinson's and motor neuron diseases.

**Presentation title:** *Harnessing VR and AI for neurotherapy in Parkinson's disease*

**Vytautas  
Abromavičius**

Lithuania



Prof. Vytautas Abromavičius received his Bachelor's degree in Electronics Engineering, and both his Master's and Ph.D. in Electronics Engineering. He investigates wearables and heart rate monitoring for subjective and objective measurements, Human Pose Estimation for rehabilitation purposes, signal processing and deep learning. Since 2015, he has served as an Assistant Professor, and since 2022, as an Associate Professor with the Department of Electronic Systems at Vilnius Tech University. In 2023, he was appointed Vice-Dean for International Affairs at the Faculty of Electronics.

**Presentation title:** *Advances in wearable technology and machine learning: predicting migraine onset, exam stress, sepsis, and enhancing rehabilitation*