You are invited to the 55th edition of the **PRAGUE COMPUTER SCIENCE SEMINAR**

JAN ANTOLÍK

Talking to the brain in its own language: from simulations to cortical implants

The lecture will be followed by a discussion

**June 8, 2023
4:15pm**

Auditorium KN:E-107,
FEL CTU, Karlovo nám. 13,
Praha 2

ABSTRACT

While substantial progress has been made in the past 80 years of intense research, the principles by which our brain encodes visual information, even at the earliest stages of processing, remains poorly understood. Concurrently, the emerging field of brain prosthetic implants for vision restoration is heavily dependent on a precise understanding of visual coding in cortical networks.

In this presentation, I will first illustrate how large-scale, biologically nuanced simulations of cortical networks can synthesize fragmented experimental data, thereby enhancing our grasp of visual information encoding principles in our brain. Subsequently, I will discuss how such simulations can be instrumental in devising stimulation protocols for cortical visual implants. Finally, I will present a newly devised method, born out of insights from these simulations, which estimates the visual coding beneath the implant along with its validation on data collected from blind implanted volunteers.

ABOUT THE PRAGUE COMPUTER SCIENCE SEMINAR

The seminar takes place once a month on Thursdays at 4:15pm (except June to September, and December) alternately in the buildings of Faculty of Electrical Engineering, Czech Technical University in Prague, Karlovo nám. 13, Praha 2 and Faculty of Mathematics and Physics, Charles University, Malostranské nám. 25, Praha 1. Its program typically consists of a one-hour lecture followed by a discussion. The lecture is based on an (internationally) exceptional or remarkable achievement of the lecturer, presented in a way which is comprehensible and interesting to a broad computer science community. The lectures are in English.

Jan Antolík is a computational neuroscientist based in Prague where he leads the Computational Systems Neuroscience Group at the Faculty of Mathematics and Physics of Charles University. Jan obtained his PhD at University of Edinburgh followed by post-doc at University College London and CNRS, France, before returning back to his alma-mater. His main research interests are systems neuroscience, visual system, sensory coding and prosthetic sensory restoration. He seeks to understand how visual information is transformed as it passes through the various stages of visual processing to form what we experience as our everyday visual perception of the world. Recently he has been increasingly focused on applying this basic research to the problem of designing future neural-prosthetic systems for vision restoration.

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