February 2nd (Wednesday)

[WebEx (Click here)](#)

Dr. Elisa Kallioniemi

Postdoctoral Research Fellow in the Department of Psychiatric **University of Texas Southwestern Medical Center, Dallas**

Transcranial Magnetic Stimulation – A Unique Tool to Study and Treat the Brain

Abstract

Transcranial magnetic stimulation (TMS) is a non-invasive, low-risk electromagnetic brain stimulation method. Depending on how TMS is applied, it can activate or modulate brain activity. The modulatory effects of TMS could either be short- or long-term. These features allow using TMS to study functional systems' state and dynamics or use it as a treatment tool. Thus, TMS is a powerful technique that combines engineering with neuroscience and offers numerous applications. Despite the great possibilities, we still have very little understanding of how we should apply TMS to receive specific effects. In this talk, I aim to summarize the fundamental principles of TMS and present an overview of the various neuroscientific and clinical applications. First, I review the technical background of TMS and the basic neural responses induced by TMS. Then, I show how the basic responses can be used to develop more advanced methods to study the brain. In the second part of the talk, I will present how TMS could treat the brain and what kind of neural effects the treatments could have. Finally, I will give the vision of my independent research program and which gaps in the field I aim to fill with my research.

About the Speaker

Dr. Elisa Kallioniemi (she/her) is a Postdoctoral Research Fellow in the Department of Psychiatry at the University of Texas Southwestern Medical Center, Dallas. She received her Bachelor's and Master's degrees in Electrical Engineering from Aalto University, Finland, in 2012 and her Ph.D. in Applied Physics from the University of Eastern Finland in 2016. Dr. Kallioniemi's research focuses on the mechanisms of transcranial magnetic stimulation (TMS) and developing TMS methods to study and treat the brain.