

The IEEE Signal Processing Society Germany Chapter is pleased to announce an upcoming presentation by Dr. Mariya Doneva, Philips Innovative Technologies Hamburg, on **December 3rd, 14:15-15:45**, in **room W30-0-33/34** at the University of Oldenburg on

### **Enhancing Magnetic Resonance Imaging: From Model-Based Reconstruction to Machine Learning**

We cordially invite all members of the IEEE Signal Processing Society Germany Chapter, as well as students, faculty, and staff from the University of Oldenburg and its partner institutions, to join us for the presentation and discussion, followed by a social gathering with coffee and cake.

#### **Abstract:**

Over the past two decades, the significance of magnetic resonance image (MRI) reconstruction has tremendously increased, enabling reduced scan time, improved image quality, and extraction of additional information from the measured data. During this period, MRI has witnessed extensive developments in advanced computational algorithms for image reconstruction, many of which have been fueled by signal processing advances, including multi-channel sampling, compressed sensing, dictionary learning, low-rank and structured low-rank methods. Recently, also neural networks have been employed for image reconstruction, achieving further improvements in scan time and image quality. Most importantly, some techniques have found their way in the products of MRI vendors and show significant impact in clinical practice. These developments, together with advancements in computational hardware, have opened a new research field of MRI reconstruction as a computational imaging problem. In this presentation, I will discuss the framework of MRI reconstruction as a computational imaging problem and the advantages it provides in enhancing the MR performance thereby addressing important clinical needs.

#### **Biography:**

Dr. Doneva is a Senior Scientist at Philips Innovative Technologies, Hamburg, Germany, which she joined in 2010. She received her MSc degree in Physics from the University of Oldenburg in 2007, and her PhD degree in Physics from the University of Lübeck in 2010. She was a Research Associate at UC Berkeley between 2015 and 2016. Dr. Doneva's research interests include methods for efficient data acquisition, image reconstruction and quantitative parameter mapping in the context of magnetic resonance imaging. Her work involves developing mathematical optimization and signal processing approaches that aim at improving the MR scan efficiency and obtaining robust and reliable (multi-parametric) quantitative information for diagnostics and therapy. Dr. Doneva was Guest Editor of the IEEE Signal Processing Magazine Special Issue on "Computational MRI: Compressive Sensing and Beyond", editor of a comprehensive reference book on Quantitative Magnetic Resonance Imaging as well as a reference book on MR image reconstruction, and editorial board member of Magnetic Resonance in Medicine and IEEE Transactions on Computational Imaging. She has been granted over 35 patents for her work in MR imaging.



#### **Moderators:**

Prof. Dr. Simon Doclo, Prof. Dr. Gerald Enzner  
(IEEE SPS Germany Chapter & University of Oldenburg)

#### **Directions:**

NESSY (W30) building, K pkersweg 74, 26129 Oldenburg