

LINK: https://meetings.siam.org/sess/dsp_programsess.cfm?SESSIONCODE=75427

Tuesday, February 28

MS120

EU-MATHS-IN: Success Stories of Mathematical Technologies in Societal Challenges and Industry, Part I

2:15 PM - 3:55 PM

Room: Auditorium

For Part II, see [MS154](#)

The field of signal and image processing were traditionally dominated by rigorous analytical approaches which rely on mathematical and physical models of the real world. However, in the past decade, there has been a considerable shift towards data-driven techniques due to the revolutionary advances in Artificial Intelligence and Deep Learning (DL). Although these methods achieved a huge performance gain in many applications, they are essentially treated as black box models. As a consequence, the output of DL methods is usually unexplainable and unpredictable, which is crucial in many applications, such as autonomous driving, and biomedical engineering, where the decisions must be explainable.

This minisymposium focuses on the understanding of the relationship between DL architecture and performance by utilizing design and analysis methods of deep neural networks (DNN). In this regard, model-driven learning is an emerging topic, where the network topology is inspired by the numerical solution to some inverse problems, such as signal/image retrieval, and parameter estimation. Generally, this learning strategy fuses iterative numerical methods with DL techniques to maintain both efficiency and interpretability. Contributions will cover state-of-the-art research in this direction as well as tools to analyse the output of such DL models including case studies in telecommunications, autonomous driving, and medical sciences.

Organizer: Péter Kovács

Eötvös Loránd University, Hungary

Matthias Ehrhardt

Universität Wuppertal, Germany

Pilar Salgado

Universidade de Santiago de Compostela and CITMaga, Spain

2:15-2:30 Deep Unfolding for Data Estimation in Wireless Communication Systems [abstract](#)

Mario Huemer and Stefan Baumgartner, Johannes Kepler Universität, Linz, Austria

2:35-2:50 Variable Projection Networks in Autonomous Driving [abstract](#)

Gergo Bognár and Péter Kovács, Eötvös Loránd University, Hungary

2:55-3:10 Examination of a Deep Neural Network for Biosignal Classification Reveals Features Similar to Clinical Criteria [abstract](#)

Nicolai Spicher, Georg-August-Universität Göttingen, Germany

3:15-3:30 Fusing Model- and Deep Learning-Based Methods for Thermographic Imaging [abstract](#)

Péter Kovács, Eötvös Loránd University, Hungary; Gergő Galiger, Babes-Bolyai University, Romania

Cancelled 3:15-3:30 Interpretability in Multimodal Sensing-Based AI Methods for Evidence-Based Personalized Health Support

Nagarajan Ganapathy, Indian Institute of Technology Hyderabad, India; Vishal Singh Roha, Indian Institute of Technology Patna, India; Bhavnoor Singh Marek, Indian Institute of Technology Bombay, India

[CSE23 Home 2023](#)

[Program](#)

[Speaker Index](#)

SIAM Conference Participation System

Corrections or problems using this system? Email meetings@siam.org.