



İTÜ
FACULTY OF
MANAGEMENT
DATA SCIENCE AND
ANALYTICS
DEPARTMENT

DEPARTMENTAL
SEMINARS

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13:00-14:00



ISB 210



Dr. Emel SOKULLU

**From Physical Models to Intelligent Systems:
Artificial Intelligence-Based Approaches
in Biomedical Research**

ABSTRACT: This seminar addresses the transformation from classical physical modeling approaches to AI-supported intelligent systems from the perspective of biomedical research. The mathematical modeling of experimental data, understanding system dynamics, and measurement-based analyses are fundamental tools of physics. Today, these tools are combined with machine learning and deep learning methods, enabling more precise, scalable, and predictive analysis of biological systems. Within the scope of the seminar, emerging research areas for physics students will be discussed through topics such as imaging data analysis, biophysical modeling, validation processes, and AI-driven decision-making mechanisms. In addition, the critical role of an experimental physics background in biomedical AI applications will be demonstrated through example studies. In this context, the presentation aims to provide a perspective on the interdisciplinary research ecosystem of the future by combining the analytical power of physics with the computational capacity of artificial intelligence.

SHORT BIO: Emel Sokullu graduated from the Department of Physics Engineering at Istanbul Technical University. During her graduate studies, she worked on biomaterials, polymers, neural cell culture, ion implantation, and surface modification as part of projects conducted at the Alabama A&M University Research Institute and Lawrence Berkeley National Laboratory. She later continued her postdoctoral research at the Bioacoustic MEMS in Medicine Labs within the Health Sciences and Technology program at MIT Harvard Medical School, where she participated in brain tissue research using 3D hydrogels. In 2016, with the support of the TÜBİTAK BIGG program, she founded the SOLAB R&D company within Dokuz Eylül University Health Technopark. SOLAB has received numerous awards from organizations such as TTGV and the Acıbadem University Incubation Center. Selected for the Royal Academy of Engineering's Leaders in Innovation Fellowship program, Emel Sokullu has been continuing her research since September 2019 at Koç University School of Medicine, Department of Biophysics, and at the Koç University Translational Medicine Research Center (KUTTAM). Emel Sokullu is a member of the Society for Neuroscience, FENS, the Turkish Biophysical Society, and IEEE.