ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

# Invitation to the Defense

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**"Parameter identification from optimized measurements, with applications in acoustics"**

N.1.43 | Wednesday, 1 October 2025 | 3:00 p.m.

## Abstract

In this talk, we advance various aspects of inverse problems in acoustics, ranging from the Bayesian approach to solving inverse problems to the optimization of experimental conditions. We begin by studying an application of the acoustic inverse problem in the context of photoacoustic tomography. In this setting, we employ the Bayesian framework to optimize a condition of the experimental setup, namely, the illumination function, which describes how optical energy is delivered into the tissue. Second, our next application focuses on optimal experimental design for identifying sparse signals. To guide the optimization of sensor placement, we introduce a suitable quantity that quantifies the quality of the reconstruction, which serves as the basis for defining an optimal design criterion. Finally, we introduce a suitable framework for an infinite-dimensional Bayesian inverse problem, in which the parameter of interest belongs to a space of measures representing sparse signals. This framework provides a rigorous foundation for analyzing and solving a broad class of inverse problems involving sparse

parameters, including those encountered in acoustic applications.

Andrei Asinowski and the Department of Mathematics look forward to seeing you at the talk!