



universität
wien

Fakultät für Mathematik

Mathematisches Kolloquium

Mittwoch, 17. Jänner 2024

Sky Lounge

EINLADUNG

Tatiana A. Bubba

(University of Bath)

**„Regularisation of tomographic inverse problems
through multiresolution systems “**

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Abstract:

Tomography is a very important inverse problem that allows to reconstruct images of hidden objects by taking projections thereof: it finds application in healthcare (medical imaging) and industry (production quality control), just to name a few. Like every inverse problem, tomography is ill-posed and very challenging to solve. In general, measurements are scarce and noisy, yielding an unstable problem which calls for accurate modeling and for complementing the insufficient data with some priori information which may be available on the solution. Traditionally this has been answered through regularisation theory, with sparsity promoting regularisation becoming dominant in the last decades. In this talk, I will focus on some applications of limited data tomography, where classical regularisation strategies can be coupled with ideas coming from data-driven techniques and multi resolution systems (such as wavelet and shearlets) to tackle the ill-posedness of the problem. The common denominator will be the interplay between sparse regularisation theory, harmonic analysis, microlocal analysis and machine learning, which allows to derive theoretical guarantees for the different case studies. I will also numerically demonstrate the approaches, on both simulated and measured data, to showcase the advantages of such strategies.

14.45 Uhr: Kaffeejause

15.15 Uhr: Vortrag

vinum cum pane im Anschluss

Otmar Scherzer
Radu Ioan Bot