Vortrag von Peter Maass am 1. Juni 2021 im Mathematischen Kolloquim

joint work with
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We start with a basic introduction on deep learning approaches to inverse problems. We then focus on the learned ISTA concept and describe it as a method for learning a data dependent optimized Tikhonov functional.

The main part of the talk is on learning with few data. In particular we investigate deep prior networks for solving inverse problems. Using the LISTA architecture in a deep prior network allows to proof equivalences to classical regularization schemes.

On the experimental side we focus on low dose CT reconstructions. We present a standardized data set and perform a numerical comparison of different deep learning concepts. The comparison is in terms of accuracy but also in terms of the amount of test data needed for training.

We close the talk with an overview of our plan for future research (DL for parametric PDEs, magnetic particle imaging).