Title: Combining Non-Data-Adaptive Transforms for OCT Image Denoising by Iterative Basis Pursuit

Abstract:
"Optical Coherence Tomography (OCT) images, as well as a majority of medical images, are imposed to speckle noise while capturing. Since the quality of these images is crucial for detecting any abnormalities, we develop an improved denoising algorithm that is particularly appropriate for OCT images.
The essential idea is to combine two non-data-adaptive transform-based denoising methods that are capable to preserve different important structures appearing in OCT images while providing a very good denoising performance.
Based on our numerical experiments, the most appropriate non-data-adaptive transforms for denoising and feature extraction are the Discrete Cosine Transform (DCT) (capturing local patterns) and the Dual-Tree Complex Wavelet Transform (DTCWT) (capturing piecewise smooth image features). These two transforms are combined using the Dual Basis Pursuit Denoising (DBPD) algorithm. Further improvement of the denoising procedure is achieved by total variation (TV) regularization and by employing an iterative algorithm based on DBPD."

Supervisor: Prof. Dr. Gerlind Plonka-Hoch

Presenter (poster): Raha Razavi