Julia Hein:

Prostate Cancer (PCa) is the most often cancer in men in the western world. Although there are a lot of diagnostic tools for PCa like Prostate-Specific Antigen (PSA), Digital Rectal Examination (DRE), Transrectal ultrasound (TRUS) and Prostate biopsy, they are not satisfying enough. For example the results of prostate biopsies are often false negative.
Therefore our research aim is to develop less invasive and more reliable and informative prognostic tools. I took part in three major projects:

Project 1: Biopsy project
Our aim is to investigate metabolite profiles of the prostate and find a definition of cancer signatures. This would allow (non-invasive) diagnosis of PCa as well as prognostication and prediction of PCa stage from biopsy. My part of the project was to test and verify the discovered metabolite profiles with clinical biopsies and evaluate these profiles for their relationship with quantitative pathology. Mainly I did the data analysis with "MATLAB" and created a database for principle component analyzing.

Project 2: African American Project
Due to the question if race-related cellular metabolic differences exist, we set out to compare PCa tissue of African Americans with those of Caucasians. Therefore we scanned tissues with a 14T scanner, did data analysis with MATLAB and quantitative histopathology. Finally a comparison of the clinical data with spectroscopy and pathology status is planned to be performed. Due to technical issues I could not complete this project as my doctoral thesis.

Project 3: 7T project
This project has the aim to find a way to do both, imaging and spectroscopy and the correlation of spectroscopy with pathology. If this is possible we could investigate metabolite profiles of cancerous tissue, in vivo MRS guided prostate biopsy and perhaps diagnosis without biopsy, only by metabolite profiles. Therefore we scanned an entire prostate from prostatectomy and compared the spectroscopy data with clinical data and pathology status.