# Master student thesis project

## Topic: Tissue Classification using Mass Spectrometry Imaging Data

Brief description:

Mass spectrometry imaging is a technique that allows the evaluation of molecules directly on tissue. This gives the opportunity to evaluate the distribution of a peptide/ protein, metabolite, glycan, or lipid on the tissue without requiring external labeling. Moreover, after processing, the samples can still be correlated with the histochemical characteristics. At the Institute of Pathology of the Technical University of Munich, we have been evaluating different tumor tissues with mass spectrometry imaging using state-of-the-art instrumentation and tackling some of the current bottlenecks of the diagnostic process.

For many years, our institute of pathology has been at the forefront of characterizing patient cohorts through in situ proteomics. This innovative approach allows us to analyze the protein composition within tissue samples directly, providing insights into the biological processes at play in various diseases. With a substantial collection of mass spectrometry data now collected, we would like to leverage this large amount of data for training large-scale machine learning models aimed at classifying patient-derived tissues. This project holds particular promise for enhancing our ability to identify tumors with unknown primary origins, a critical challenge in oncology.

During this project you will have the chance to gather a good understanding about mass spectrometry imaging, solid knowledge about proteomics, some insights into tumor pathology and develop new approaches for sample preparation.

Please note that these projects require availability for laboratory work (*in loco*) of at least 2 days a week.

If you are interested, send us an email introducing yourself and letting us know why you think this is a fitting project for you. If you have questions or would like further information about the projects, feel free to get in touch:

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Find more about our research!