

## Master student thesis project

### Topic: Impact of tissue fixation for mass spectrometry imaging analysis

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.

Tissue fixation is a fundamental process in pathology that significantly influences the quality of molecular information obtained from tissue samples. This procedure is crucial for preserving tissue morphology and preventing autolysis, but it can also impose limitations on the types of analyses that can be performed, particularly in the context of advanced techniques like mass spectrometry imaging.

While fixation is essential for preparing tissues for histological evaluation, it can limit the accessibility of specific molecular targets. For example, formaldehyde fixation has been shown to induce cross-linking of nucleic acids, which can lead to non-reproducible sequence alterations during downstream applications such as PCR. This alteration may result in artificial mutations that complicate genetic analyses and hinder accurate identification of biomarkers.

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:

Dr. Juliana Gonçalves ([juliana.goncalves@tum.de](mailto:juliana.goncalves@tum.de)) or Dr. med. Dr. Kristina Schwamborn ([kschwamborn@tum.de](mailto:kschwamborn@tum.de))

Technical University of Munich  
Pathology Institute (*Klinikum Rechts der Isar*)  
Trogerstr. 18, München

Find more about our [research!](#)