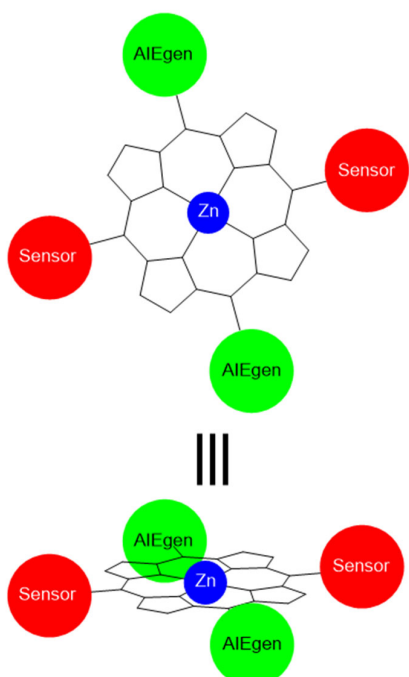


# Proposal for a Master Thesis Project

Title	Synthesis and Functionalization of Porphyrin-Based AIEgens for Sensing Applications
<b>Background</b>	<p>The increasing prevalence of metabolic disorders like diabetes calls for innovative technologies capable of enhancing monitoring and diagnosis. Porphyrin-based Aggregation-Induced Emission Generating Molecules (AIEgens) offer a unique approach to optical sensing due to their fluorescence in aggregated states, making them highly sensitive for use in sensing applications. This project will focus on the design, synthesis, and functionalization of novel porphyrin-based AIEgens. Porphyrins are well-known for their photophysical properties and their versatility in functionalization, making them ideal candidates for this type of sensing technology.</p>
<b>Project</b>	<p><b>Aim:</b> The aim of this project is the synthesis and characterization of novel trans zinc-porphyrins bearing AIEgens and glucose binding site to deliver a unique observable emission upon glucose binding, potentially applicable in optical sensing technologies. The student will focus on exploring the photophysical and structural properties of the porphyrin-sensor by screening for different linkers and moieties of the porphyrin scaffold.</p> <p><b>Methods:</b></p> <ul style="list-style-type: none"> <li>• <b>Literature Review:</b> Conduct a comprehensive review of current research on porphyrin-based AIEgens, focusing on their synthesis and functionalization for sensing applications.</li> <li>• <b>Synthesis of AIEgens:</b> Design and synthesize porphyrin-based AIEgens, optimizing their structural properties for aggregation-induced emission.</li> <li>• <b>Functionalization:</b> Develop protocols for the functionalization of synthesized AIEgens with surface-active molecules or nanoparticles to enhance their sensing capabilities.</li> <li>• <b>Characterization:</b> Characterize the synthesized AIEgens using spectroscopic techniques (e.g., UV-Vis, Fluorescence spectroscopy) and confirm their functionalization using appropriate analytical tools (e.g., NMR, electron microscopy).</li> <li>• <b>Preliminary Testing:</b> Explore preliminary sensing capabilities of the functionalized AIEgens in controlled laboratory conditions to assess their potential in detecting analytes.</li> </ul> <p><b>Potential:</b> The successful synthesis and functionalization of novel porphyrin-based AIEgens will pave the way for their application in advanced sensing technologies. This project could contribute to the development of more sensitive and selective tools for metabolite detection in medical diagnostics.</p> 
<b>Requirements</b>	<ul style="list-style-type: none"> <li>• Sound knowledge of organic chemistry, experience multistep organic synthesis is appreciated.</li> <li>• Familiarity with spectroscopic techniques and molecular characterization methods</li> <li>• Ability to perform detailed literature reviews and stay current with emerging research</li> <li>• Strong problem-solving skills and attention to detail</li> <li>• Willingness to collaborate in an interdisciplinary research environment</li> <li>• Potential travel to our partner lab in Boston, USA</li> </ul>
<b>Contact</b>	<p><b>Supervisor:</b> Prof. Dr. Lilian Witthauer Assistant Professor for Sensing Dr. Guglielmo Risi Postdoc at Samlab Department of Diabetes, Endocrinology, Nutritional Medicine and Metabolism Diabetes Center Berne Freiburgstrasse 3 3010 Bern Phone: +41 31 664 22 77 Email: <a href="mailto:lilian.witthauer@unibe.ch">lilian.witthauer@unibe.ch</a> <a href="https://samlab.org/">https://samlab.org/</a></p> 