

# Development of a Portable Sensor based on Molecularly Imprinted Polymer for Detection of Aquatic Environment Pollutants

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## Summary

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*The overall objective of the PhD study is to design and synthesize molecularly imprinted polymer (MIP) endowed selectivity to a specific pollutant and its integration with a portable sensor platform in order to develop a cost-effective sensor for monitoring aquatic environment pollution.*

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| Research field:       | Chemical and Materials Technology   |
| Supervisors:          | Vitali Söritski<br>Jekaterina Reut  |
| Availability:         | This position is available.   |
| Offered by:           | School of Engineering<br>Department of Materials and Environmental Technology               |
| Application deadline: | Applications are accepted between May 03, 2021 00:00 and May 31, 2021 23:59 (Europe/Zurich) |

## Description

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The persistence and toxicity of antibiotics in the environment facilitate the expansion of antibiotic-resistant human pathogens causing serious public health challenges. Therefore, reliable, economical, and convenient analytical tools enabling fast real-time detection and sensitive quantification of specific environmental pollutants are required, in addition to the currently available methods.

Molecularly imprinted polymers (MIPs) are functional materials with antibody-like ability to bind and discriminate between molecules. Molecular imprinting can be defined as the process of template-induced formation of specific molecular recognition sites in the polymer material. We offer a 4-year PhD position in developing a portable MIP-based sensor for detection of environmental pollutants.

The overall objective of the study is to design and synthesize MIP endowed selectivity to a specific pollutant and its integration with a portable sensor platform in order to develop a cost-effective sensor for monitoring aquatic environment pollution.

### **Foreseen tasks within the PhD study:**

- rational selection of functional monomers using computational modeling and spectroscopic analysis
- finding an optimal polymerization method and an efficient procedure for targeting molecule removal to produce MIP
- adapting synthesis methods to generate MIP with enhanced specific surface area
- studying the analytical performance of the prepared MIP based sensors

The primary responsibilities of the PhD student will be:

- to actively participate in the experimental work, incl. design, synthesis and characterization of MIP materials and optimization of their selective properties as well as studying the analytical performance of the resulting MIP-based sensor
- to collaborate with internal and external groups
- to communicate results at meetings, conferences, and write reports and publications

### **Applicants should fulfil the following requirements:**

- MSc in the field of chemistry, analytical chemistry, or materials science
- excellent command of English (Level B2 or higher)
- practical experience in polymer synthesis, electrochemistry, nanofabrication
- good laboratory skills

- motivated and able to work independently, write up results of your own research and prepare for presentations

The top candidates for the position may be interviewed and asked to present their scientific work and experience.



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