

PhD Position (m/f/d)

Chemical Process Engineering & Laboratory Automation

June 2026 | The Kurt-Schwabe-Institute for Sensor Technologies (KSI) invites applications for a PhD position in chemical process engineering, laboratory automation, and analytical system integration. The successful candidate will contribute to the development of a modular robotic platform for automated biomolecular conjugation reactions. The system will integrate preparative laboratory modules, analytical readouts, standardized digital interfaces, and Python-based control routines to enable machine-learning-guided closed-loop reaction optimization.

The project addresses key challenges in autonomous bioconjugation chemistry, including the integration of robotic liquid handling, spectroscopy, chromatography, device communication, and automated data analysis. The doctoral researcher will develop and validate workflows for bioconjugation reactions, compare automated optimization experiments with manual reference experiments, and evaluate process robustness, and optimization efficiency.

The position is embedded in an interdisciplinary research environment at KSI in the group of Prof. Dr. Ulrich Rant and is carried out in close collaboration with an industrial partner. The PhD degree will be awarded by Technische Universität Dresden, one of Germany's Universities of Excellence.

Candidates should have a background in chemical engineering, process engineering, biotechnology, analytical chemistry, automation technology, physics, electrical engineering, or a related field. Programming experience, preferably in Python, and an interest in laboratory automation, robotics, analytical methods, and machine-learning-guided experimentation are highly desirable.

About

The Kurt Schwabe Institute for Sensor Technologies is a non-profit research institute in Saxony, Germany, near Dresden, Leipzig, and Chemnitz, dedicated to applied and fundamental research in chemical, biological, and physical sensor technologies. With expertise spanning micro- and nanotechnology, materials science, bioanalytics, and scientific instrumentation, the institute develops innovative measurement technologies for applications in health, environment, industry, and life sciences.

TU Dresden is one of Germany's leading universities and a University of Excellence, offering a highly interdisciplinary research environment across engineering, natural sciences, life sciences, medicine, and digital technologies. As the degree-awarding university, TU Dresden provides PhD researchers with access to a broad academic network, structured doctoral support, and excellent opportunities for scientific training and collaboration.

The lab of Prof. Ulrich Rant at KSI and TU Dresden develops advanced bioanalytical measurement technologies at the interface of nanotechnology, biophysics, and sensor science. Its research focuses on single-molecule and nanoscale methods for studying biomolecular interactions, protein conformational changes, nanopore sensing, and automated analytical workflows for next-generation biotechnology and diagnostics.

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