The Automation and Control Institute (ACIN) at TU Wien is offering the following

PhD-Position (m/f/d) in Industrial Robotics: AI-Enhanced High-Accuracy Robotics for Industrial Applications

The Project

Join the team of the Complex Dynamical Systems Group (Prof. Andreas Kugi) at TU Wien in Vienna, Austria! This FFG-funded project aims to unlock a new class of high-precision industrial robot applications by achieving sub-10 µm path accuracy under real production conditions. The solution delivers ultra-precise motion without external measurement systems, while robustly handling small geometric path variations. This significantly expands the usability of robots in precision manufacturing.

This project builds upon existing high-profile works and infrastructure, see [1], [2], and [3].

The Goal

This precision is achieved by combining AI-based learning methods for path optimization and error compensation with a new generation of low-friction, high-precision cycloidal drive modules and integrated joint-side encoders. The robot's drivetrain errors are identified and compensated in a self-learning manner, enabling a substantial reduction of random path deviations and a decisive increase in achievable accuracy.

Your Profile

- Master's degree in mathematics, automatic control, computer science, mechatronics, robotics, electrical engineering or mechanical engineering
- Excellent technical understanding and analytical capabilities
- Background in machine learning advantageous
- High commitment and motivation, willingness to contribute to academic teaching
- Team spirit, strong communication skills, goal orientation, structured, and responsible way of working
- Very good command of written and spoken English, basic skills in German favorable

We Offer

- Future-oriented research and innovative solutions for the latest problems
- Scientific freedom and time to author a PhD dissertation
- Solid training and continuing education as well as participation in international conferences
- Promotion, support, dialog, and cooperation in a motivated and interdisciplinary team
- Cooperation with a renowned, internationally active, industrial research partners
- Secured funding and well-equipped infrastructure, see https://www.acin.tuwien.ac.at/en/industrial-robotics/
- Employment contract for 3 years (40 hours a week) with option for extension
- Gross salary of € 52.865,40 p.a.

We are looking forward to receiving your application including the usual documents via e-mail sent to Dr.techn. Christian Hartl-Nesic, hartl@acin.tuwien.ac.at.

[1] M. Garstenauer, C. Mittermayer, and M. Schwegel, Shopfloor-Ready High Accuracy Robotics – Mark II, in European Robotics Forum 2025, 2025, p. 22–28.

[2] B. Bischof, T. Glück, M. Böck, and A. Kugi, A Path/Surface Following Control Approach to Generate Virtual Fixtures, IEEE Transactions on Robotics, vol. 34, iss. 6, p. 1577–1592, 2018.

[3] M. Schwegel and A. Kugi, A Simple Computationally Efficient Path ILC for Industrial Robotic Manipulators, in Proceedings of 2024 IEEE International Conference on Robotics and Automation (ICRA), Yokohama, Japan, 2024, p. 2133–2139.

About us

The Automation and Control Institute (ACIN) belongs to the Faculty of Electrical Engineering and Information Technology of TU Wien. At ACIN, more than 80 researchers conduct basic research, solve challenging practical problems, cooperate with industrial research partners, develop innovations, and offer students excellent academic teaching in the fields of systems theory, automation, and control engineering. More info at https://www.acin.tuwien.ac.at/komplexe-dynamische-systeme-cds/.