

PHD RESEARCHER
(m/f/d, 100%, E13 TV-L, temporary, initially until 12/25)

The University of Stuttgart represents outstanding, world-renowned research and first-class teaching in one of Europe's most dynamic industrial regions. As a reliable employer, the university supports and promotes the academic careers of its researchers. It is proud of its employees, who currently come from over 100 different countries. The university is a partner for knowledge and technology transfer and focuses on multidisciplinary.

The Cluster of Excellence "Data-Integrated Simulation Science" (EXC 2075) is an interdisciplinary research center with more than 200 scientists of different ages, gender identities, nationalities and different subject areas, jointly performing research towards a common goal: We target a new class of modeling and computational methods based on available data from various sources, in order to take the usability, precision and reliability of simulations to a new level.

The project/The position:

Combining Data and First Principles in the Synergy-Based Control of Soft Robotic Systems

The project focuses on the challenge of developing, modelling and robustly controlling hyper-actuated soft robotic systems; that is, fully amorphous robotic systems that are made from hundreds or thousands of soft, fluid-driven actuators and that can shape-shift in their entirety to perform a certain task. To facilitate the control of such robots, we seek to employ a small number of independent synergies that physically encode distributed behaviors within the robot and that can be combined additively. This approach inherently reduces the dimensionality of the modelling and control problem, which we seek to solve through a combination of first-principle and data-driven approaches.

You will be a member of Prof. Dr. C. David Remy's group at the Institute for Nonlinear Mechanics

Your tasks:

- **Component and System Development:** To enable the realization of hyper-actuated soft robotic systems, you will work on concepts and custom-made hardware implementations for individual actuator cells, as well as a complete soft robotic system. In this task, you will be supported by the technician and excellent (rapid)-prototyping facilities within the Institute for Nonlinear Mechanics.
- **Modelling and Control:** Combining data driven and first-principle-based approaches, you will develop new methods for the modelling and robust control of hyper-actuated soft robotic systems. This task will be conducted in close collaboration with the Institute for Systems Theory and Automatic Control and will constitute theoretical as well experimental components.
- **Application:** The concept of such hyper-actuated soft robotic systems will ultimately have to face the test of reality. To this end, you will work towards proof-of-concept applications that highlight the capabilities of the concept.
- **Dissemination of research results in high-impact scientific publications.**
- **Active participation in SimTech events (PhD Program, Status seminars, Project Network meetings, ...)**
- **Commitment to the research group and institute.**
- **Acting as teaching assistant for up to 2 SWS.**

Your qualifications:

- You are a talented, independent and driven person with a very good Master's degree in an engineering discipline with relation to robotics and control.
- Given the broad range of tasks, you have an equally broad range of interests, ranging from mathematical theory to hands-on hardware development.
- You are motivated to work in an interdisciplinary project team and want to foster collaborations between robotics and control theory.
- We search for an open-minded person with excellent communication skills.
- Proficiency in English is required, knowledge of German is welcome but not compulsory.

We offer:

- An established, inspirational and supportive research environment at the Institute for Nonlinear Mechanics and within the Cluster of Excellence SimTech.
- An excellent training opportunity towards becoming an independent researcher. This includes the exposure to the academic field via conference visits, research exchanges, as well as training programs to support your first steps as an early career scientist

Please submit your application (motivation letter, curriculum vitae, transcript of records and names of 2 references) until **December 17th, 2023** via the JoinUS portal (<https://careers.uni-stuttgart.de>, direct link: <https://bit.ly/3VuEzaF>). If you have any questions, do not hesitate to contact us via david.remy@inm.uni-stuttgart.de. Please be aware that we cannot reimburse any costs arising from the performance of job interviews.

At the University of Stuttgart and the Cluster of Excellence EXC 2075, we actively promote diversity among our employees. We have set ourselves the goal of recruiting more women scientists and employing more people with an international background, as well as people with disabilities. We are therefore particularly pleased to receive applications from such people. Regardless, we welcome any good application.

Women who apply will be given preferential consideration in areas in which they are underrepresented, provided they have the same aptitude, qualifications and professional performance. Severely disabled applicants with equal qualifications will be given priority.

As a certified family-friendly university, we support the compatibility of work and family, and of professional and private life in general, through various flexible modules. We have an employee health management system that has won several awards and offers our employees a wide range of continuing education programs. We are consistently improving our accessibility. Our Welcome Center helps international scientists get started in Stuttgart.

Information in accordance with Article 13 DS-GVO on the processing of applicant data can be found at https://careers.uni-stuttgart.de/content/privacy-policy/?locale=en_US