Fully funded PhD-Research Position on Analysis of Nonlinear Dynamics for MEMS Scanners in Automotive Applications

A fully funded research position (full-time, 40 hours/week) at the PhD-student level is offered in the group of Prof. Georg Schitter at the Automation and Control Institute (ACIN) of the Vienna University of Technology.

Project goal:
This PhD-project aim to develop analysis of complex nonlinear dynamics of single mode and multimodal MEMS (micro-electromechanical system) mirrors under harsh automotive environment such as vibrations, shocks and temperature fluctuation. Scanning mirrors based on MEMS technologies are regarded as a promising solution for various automotive applications such as lidars, augmented reality head-up display (AR HUD), and smart headlights. The main challenge of the project is precise and accurate identification of the complex dynamics of the MEMS scanners with various automotive environment and its actuation and sensing concept development design, enabling compact and high quality lidar sensing or stable projection of AR display for automotive market. In addition, due to the nature of the optical MEMS scanning systems, the project consists of multidisciplinary research topics in the field of physics, optics, as well as mechanical, electrical, and system engineering, while providing opportunities to gain experiences in those various fields during the project.

As the first step, dynamic behaviors of nonlinear MEMS mirrors are studied to evaluate influences of the environmental conditions and to draw requirements considering automotive standards. Based on the models and requirements, the actuation, sensing and control concepts for MEMS mirrors are investigated for compact and simple MEMS scanning solution while robustly operating the MEMS mirrors against harsh environmental conditions. The designed MEMS scanning systems are also tested with the end applications such as lidars and MEMS projectors to verify the identified model and developed sensing and actuation.

The starting date is planned as soon as possible, depending on the availability and preference of the successful candidate.

Requirements:
We are looking for candidates holding an MSc degree in Physics, Electrical or Mechanical Engineering, Aerospace Engineering, Cybernetics, or equivalent, preferably with a strong background in at least one area of multimodal dynamics, mechanical design, mechatronics, actuation and sensors, precision engineering, measurement systems, scientific instrumentation, actuation, and MEMS.
Good fundamentals, excellent grades, and interest in mathematics and physics are prerequisites. Motivation to pursue novel research in close collaboration with well-reputed international industry partners and research universities is essential. Thus good communicational skills, fluency in English or German, and a goal-oriented work attitude as member of a dynamic international research team are expected.

Conditions of employment:
The appointment will be for a period of up to four years. As an employee of the TU Vienna you will receive a competitive salary as well as excellent secondary benefits package, including a flexible work week, health insurance, social security, and additional company retirement benefits. Salary and benefits are in accordance with the Collective Labor Agreement for Austrian universities.
The annual gross salary of a research assistant (PhD student) in the first year starts at **€ 37.751**, and grows to **€ 44.846** in the 4th year of the appointment.
We offer the opportunity to perform scientifically challenging research in a multi-disciplinary research environment, with a group of international researchers and strong collaboration with industrial, governmental, and university research laboratories. Further career growth in all teaching, research, and industrial applications is provided.

How to apply:
To apply for this position, please email your application in pdf-format to yoo@acin.tuwien.ac.at:

- a cover letter, including a statement that gives your motivation for this position
- a full CV, and your grades
- an abstract of your MSc thesis and a list of your publications (if any), and
- the names and contact information of two professional references

The position will remain open until filled, but an early date for application is preferred and encouraged.
For more information about the ACIN department and Vienna University of Technology, please visit our website http://www.acin.tuwien.ac.at/fileadmin/acin/files/IATpositions_webpage.pdf and http://www.tuwien.ac.at.
Further information about Vienna, the city with the highest quality of living worldwide (https://en.wikipedia.org/wiki/Mercer_Quality_of_Living_Survey), can be obtained at http://www.wien.gv.at/.