

LARM² SEMINAR

Room meeting B9 of the teaching Engineering Building
Online in Teams link: [Generale](#) | [LARM² Seminars](#) | [Microsoft Teams](#)
Monday 7-September 2026 at 11.00-12.30

Mechanism design for backrest of a wheelchair

Prof. Erwin-Christian Lovasz, Visiting professor, Department for Mechatronics, Politehnica University of Timisoara, Romania

Abstract: Wheelchairs are an indispensable way of helping people with disabilities or paraplegia. The presentation shows the theoretical background for implementing slider-crank spring linkage, scotch-yoke spring linkage, noncircular cable-pulley spring mechanism, noncircular cable-frame pulley mechanism and inverted Cardano mechanism and continues with experimental study of the slider-crank spring mechanism used for balancing the backrest of a wheelchair, by adding a simple measurement setup based on sensors and a micro-controller. The setup makes the measurements evaluation more precise and can help when adjusting the design or choosing parameters for future improvements or measurements.

Prof Lovasz received the PhD degree both from Technische Universität Dresden and Politehnica University of Timișoara, in 1998 and the Habilitation degree from Politehnica University of Timișoara, in 2016. He works as Full Professor at the Department of Mechatronics of UPT and PhD advisor since 2016. He is also Head of Department of Mechatronics since 2008. He is involved in the IFToMM and ARoTMM (Romanian national IFToMM MO) activities and served as chair of TC Linkages and Mechanical Controls (2012-2017) and Secretary General of IFToMM (up 2020). His research areas involve mechanism science, robotics, medical engineering and mechatronics.



Development of mechanisms, machine elements and controls for service and industrial robotics

Prof. Yukio Takeda, Visiting professor, Department of Mechanical Engineering, Institute Science Tokyo, Japan

Abstract: The laboratory conducts research on mechanism and machine theory, novel mechanisms, actuators, soft robotics, and assistive and rehabilitation robots, and this seminar introduces three representative topics. The first concerns a planar parallel mechanism driven along a curved guide, designed for robotic tasks on complex curved surfaces that require a thin curve-shaped workspace and a narrow orientation range. A curved guide drive mechanism was designed, prototyped, and experimentally evaluated to demonstrate its feasibility. The second topic presents a chair-type sit-to-stand assistive device for elderly individuals and patients with reduced lower limb strength, employing a one-degree-of-freedom linkage and an elastic redundant hybrid actuator to provide assist-as-needed support. A control strategy that adjusts reference velocity based on user movement was developed and validated through experiments. The third topic introduces a parallel continuum robot with superior twisting performance, whose large orientation workspace was analyzed using a kineto-static model based on Kirchhoff rod theory. Experimental results confirmed its twisting capability and agreement with model predictions, and its application to wrist rehabilitation devices was also explored.

Prof Takeda is Vice President for Institute Admissions at Institute of Science Tokyo (Science Tokyo). He is also a professor in the Department of Mechanical Engineering. He received his bachelor's degree in mechanical engineering from Tokyo Institute of Technology (Tokyo Tech) in 1987, followed by a master's degree in 1989 and a doctoral degree in 1995, both from the same university. He served as a research associate at Tokyo Tech since 1989, became an associate professor in 1996, and was promoted to professor in 2012. He also served as a program officer of the Japanese Ministry of Education, Culture, Sports, Science & Technology, (FY2002-2003). His research interests lie in the field of robotics and mechanical design, especially, kinematics, dynamics and design of parallel robots and welfare devices. He has contributed to the activities of several academic societies such as Japan Society of Mechanical Engineers (JSME), Robotic Society of Japan (RSJ), Japan Society for Precision Engineering (JSPE), Japan Society for Design Engineering (JSDE), Japanese Society of Regenerative Medicine and Rehabilitation (JSRMR), International Federation for the Promotion of Mechanism and Machine Science (IFTToMM).



Laboratory webpage: <https://www.msd.mech.e.titech.ac.jp/en/>

All interested people are invited to attend.

Directors of LARM²: Prof. Marco Ceccarelli and Prof. Matteo Russo