Robotics and mechanisms research group

Our research group is actively engaged in advanced research and development across mechatronics, robotics, and agricultural engineering. A central focus of our work is the dynamic modeling of complex systems using modern frameworks such as Modelica and COLLADA languages, alongside the development of an innovative family of robots featuring modular topologies and control systems. We also explore cutting-edge integration technologies, leveraging augmented reality for the simulation and programming of industrial robots, as well as utilizing advanced 3D imaging for precise positioning, control, and tracking of manipulators and machine tool robots. Furthermore, our group contributes to the agricultural sector by studying and analyzing energy efficiency indicators and fuel consumption profiles of agricultural and horticultural machinery to optimize their operational performance.

Members

- dr. Forgó Zoltán
- dr. Tolvaly-Roşca Ferenc
- dr. Pásztor Judit

Partner institutions

- Universitatea „Babeş-Bolyai" Cluj-Napoca – Romania
- Universitatea Tehnică din Cluj-Napoca – Romania
- Ruhr University Bochum – Germany
- University of Tromsø – Norway

Research Grants

- Klebelsberg Kuno scholarship.
- MTA Domus Scholarship

Recent publications

1. **Forgó Zoltán**, Pásztor Judit, Tolvaly-Roşca Ferenc, Energy consumption evaluation of rotary tiller using dynamic modelling, INMATEH Agricultural Engineering, Vol. 68/3, 2022, DOI : https://doi.org/10.35633/inmateh-68-17, pp. 167-176
2. Wei Deng Solvang, Bjørn Solvang, **Zoltan Forgó,** Heidi Kaartinen, Hao Yu, Beibei Shu, Educational Support for SMEs Transitioning from Industry 4.0 to Industry 5.0-Insights and Lessons Learned from European Cooperation Projects, 2024 IEEE/SICE International Symposium on System Integration (SII), 1012-1017, DOI: 10.1109/SII58957.2024.10417242
3. Forgó, Zoltán, Ferenc Tolvaly-Roșca, and Attila Csobán. "Singular Configuration Analysis of Modular-Driven 4-and 6-DoF Parallel Topology Robots." *Robotics* 14, no. 5 (2025): 61.
4. Forgó, Zoltán, and Ferenc Tolvaly-Roșca. "Kinematic Characterization of a Novel 4-DoF Parallel Mechanism with Modular Actuation." *Robotics* 15, no. 1 (2026): 13.