

Wesley Roozing
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Personal profile

Dr. Wesley Roozing is an assistant professor at the Robotics and Mechatronics (RaM) group at the University of Twente, The Netherlands. He received his PhD degree from the Italian Institute of Technology (IIT) in 2018 and was a visiting student at the Australian Centre for Field Robotics (ACFR).

He is chair of the euRobotics Topic Group on Mechatronics, fostering interactions between academic, industrial, and other practitioners in the field of mechatronics. He has served on the programme committee of the European Robotics Forum since 2021, and as associate editor for IROS and BioRob since 2020 and 2023, respectively. He is currently serving as Exhibition & Local Chair for ICRA@40, the 40th Anniversary of the IEEE Conference on Robotics and Automation, to take place in Rotterdam in September 2024.

He is participating in national and international projects as local coordinator and teaching several graduate and undergraduate courses on energy-based modelling and control of mechatronic systems. He also actively contributes to development of the robotics programme, is a programme mentor for MSc students, and is on the examination board of the programme.

His main research interests include (compliant) actuation and their control, co-design for mechatronic systems, motors and gearing, mechanism design, bio-inspired and biarticulated actuation, and energy-based modelling and control methods for safety in robotics. He organised several highly attended workshops on these topics at international conferences. His research combines the latest developments in electric motors with innovative gearing concepts, compliance, co-design, and optimal control, with the aim of achieving high-performance robots capable of athletic feats such as running, jumping, and carrying. His work has been published in high-quality robotics publications including IJRR, T-MECH, RA-L, ICRA, IROS, and others, and received a honourable mention for the RA-L best paper award in 2021.

Research outputs

Experimental comparison of pinwheel and non-pinwheel designs of 3D-printed cycloidal gearing for robotics

Roozing, W. & Roozing, G., 8 Aug 2024, *2024 IEEE International Conference on Robotics and Automation, ICRA 2024*. IEEE, p. 7091-7098 8 p. (Proceedings - IEEE International Conference on Robotics and Automation).

An Underactuated Tendon-Driven Gripper with Variable Stiffness for Deformable Agri-Food Objects

Bluiminck, M. & Roozing, W., 28 Sept 2023, *2023 IEEE 19th International Conference on Automation Science and Engineering (CASE)*.

Progressive Series-Elastic Actuation with Magnet-based Non-linear Elastic Elements

Okken, B., Stramigioli, S. & Roozing, W., 24 Jan 2023, *2022 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*. IEEE, p. 166-173 8 p. 10018635

3D-printable low-reduction cycloidal gearing for robotics

Roozing, W. & Roozing, G., 26 Dec 2022, *IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2022*. Piscataway, NJ: IEEE, p. 1929-1935 7 p. (IEEE International Conference on Intelligent Robots and Systems; vol. 2022-October).

A task-based post-impact safety protocol based on energy tanks

Califano, F., Dijk, D. V. & Roozing, W., Oct 2022, In: *IEEE Robotics and automation letters*. 7, 4, p. 8791-8798 8 p., 9812506.

A New Methodological Approach to Analyze Human Roles in Human-Robot Interaction Scenarios

Puig-Pey, A., Sanfeliu, A., Leroux, C., Dario, P., Rasso, R., Arrue, B. C., Soueres, P., Dailami, F., Vasco, V., Munih, M., Ijspeert, A. & Roozing, W., 27 Jun 2022, *2022 IEEE International Conference on Advanced Robotics and Its Social Impacts, ARSO 2022*. IEEE, (Proceedings of IEEE Workshop on Advanced Robotics and its Social Impacts, ARSO; vol. 2022-May).

Energy-aware adaptive impedance control using offline task-based optimization

Gerlagh, B., Califano, F., Stramigioli, S. & Roosting, W., 5 Jan 2022, *2021 20th International Conference on Advanced Robotics, ICAR 2021*. IEEE, p. 187-194 8 p.

Blending of Series-Parallel Compliant Actuation With Field Weakening Control for Explosive Motion Generation

Amara, V. D., Malzahn, J., Roosting, W. & Tsagarakis, N., Apr 2021, In: *IEEE Robotics and automation letters*. 6, 2, p. 2076-2083 8 p., 9360453.

Energy-based Safety in Series Elastic Actuation

Roosting, W., Groothuis, S. S. & Stramigioli, S., 15 Sept 2020, *2020 IEEE International Conference on Robotics and Automation (ICRA)*. Piscataway, NJ: IEEE, p. 914-920 7 p. 9197448. (Proceedings - IEEE International Conference on Robotics and Automation (ICRA); vol. 2020).

On the efficient control of series-parallel compliant articulated robots

Amara, V. D., Malzahn, J., Ren, Z., Roosting, W. & Tsagarakis, N., 15 Sept 2020, *2020 IEEE International Conference on Robotics and Automation (ICRA)*. Piscataway, NJ: IEEE, p. 385-391 7 p. 9196786. (Proceedings - IEEE International Conference on Robotics and Automation (ICRA); vol. 2020).

An efficient leg with series-parallel and biarticular compliant actuation: design optimization, modeling, and control of the eLeg

Roosting, W. (Corresponding Author), Ren, Z. & Tsagarakis, N. G., 16 Dec 2019, In: *International journal of robotics research*. p. 1-17 17 p.

The Compliant Joint Toolbox for MATLAB: An Introduction with Examples

Malzahn, J., Roosting, W. & Tsagarakis, N., 1 Sept 2019, In: *IEEE Robotics and Automation Magazine*. 26, 3, p. 52-63 12 p., 8684261.

The eLeg: A Novel Efficient Leg Prototype Powered by Adjustable Parallel Compliant Actuation Principles

Ren, Z., Roosting, W. & Tsagarakis, N. G., 23 Jan 2019, *2018 IEEE-RAS 18th International Conference on Humanoid Robots, Humanoids 2018*. IEEE, Vol. 2018-November. p. 455-461 7 p. 8624960

Enhanced Explosive Motion for Torque Controlled Actuators Through Field Weakening Control

Roosting, W., Kashiri, N. & Tsagarakis, N. G., 27 Dec 2018, *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2018*. IEEE, p. 5972-5979 8 p. 8593608

An overview on principles for energy efficient robot locomotion

Kashiri, N. (Corresponding Author), Abate, A., Abram, S. J., Abu-Schaffer, A., Clary, P. J., Daley, M., Faraji, S., Furnemont, R., Garabini, M., Geyer, H., Grabowski, A. M., Hurst, J., Malzahn, J., Mathijssen, G., Remy, D., Roosting, W., Shahbazi, M., Simha, S. N., Song, J. B. & Smit-Anseeuw, N. & 4 others, Stramigioli, S., Vanderborgh, B., Yesilevskiy, Y. & Tsagarakis, N., 1 Dec 2018, In: *Frontiers Robotics AI*. 5, DEC, 129.

Explosive Motions with Compliant Actuation Arrangements in Articulated Robots

Djajadiningrat, R., Roosting, W. & Tsagarakis, N. G., 9 Oct 2018, *BIOROB 2018 - 7th IEEE International Conference on Biomedical Robotics and Biomechanics*. IEEE, Vol. 2018-August. p. 1309-1314 6 p. 8487207

Design of a Novel 3-DoF Leg with Series and Parallel Compliant Actuation for Energy Efficient Articulated Robots

Roosting, W., Ren, Z. & Tsagarakis, N. G., 10 Sept 2018, *2018 IEEE International Conference on Robotics and Automation, ICRA 2018*. IEEE, p. 6068-6075 8 p. 8460493

Modeling and control of adjustable articulated parallel compliant actuation arrangements in articulated robots

Roosting, W., 1 Jan 2018, In: *Frontiers in robotics and AI*. 5, FEB, 4.

What is the torque bandwidth of this actuator?

Malzahn, J., Kashiri, N., Roosting, W., Tsagarakis, N. & Caldwell, D., 13 Dec 2017, *IROS 2017 - IEEE/RSJ International Conference on Intelligent Robots and Systems*. IEEE, Vol. 2017-September. p. 4762-4768 7 p. 8206351

On the Stiffness Selection for Torque-Controlled Series-Elastic Actuators

Roozing, W., Malzahn, J., Kashiri, N., Caldwell, D. G. & Tsagarakis, N. G., 1 Oct 2017, In: IEEE Robotics and automation letters. 2, 4, p. 2255-2262 8 p., 7976385.

Comparison of open-loop and closed-loop disturbance observers for series elastic actuators

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Design Optimisation and Control of Compliant Actuation Arrangements in Articulated Robots for Improved Energy Efficiency

Roozing, W., Li, Z., Caldwell, D. G. & Tsagarakis, N. G., 1 Jul 2016, In: IEEE Robotics and automation letters. 1, 2, p. 1110-1117 8 p., 7393471.

Development and control of a compliant asymmetric antagonistic actuator for energy efficient mobility

Roozing, W., Li, Z., Medrano-Cerda, G. A., Caldwell, D. G. & Tsagarakis, N. G., 1 Apr 2016, In: IEEE/ASME transactions on mechatronics. 21, 2, p. 1080-1091 12 p., 7303955.

Compliant antagonistic joint tuning for gravitational load cancellation and improved efficient mobility

Tsagarakis, N. G., Dallali, H., Negrello, F., Roozing, W., Medrano-Cerda, G. A. & Caldwell, D. G., 1 Jan 2015, *2014 IEEE-RAS International Conference on Humanoid Robots, Humanoids 2014*. IEEE, Vol. 2015-February. p. 924-929 6 p. 7041474

Bipedal walking gait with variable stiffness knees

Roozing, W. & Carloni, R., Aug 2014, *5th IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechanics*. IEEE, p. 924-930 7 p.

Variable bipedal walking gait with variable leg stiffness

Roozing, W., Visser, L. C. & Carloni, R., Aug 2014, *Proceedings of the IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechanics*. USA: IEEE, p. 931-938 8 p.

Low-cost vision-based 6-DOF MAV localization using IR beacons

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