

CV of Prof. Dr. Robert Katzschmann

Personal information

Name: Prof. Dr. Robert K. Katzschmann, DoB: 4. Sept. 1986	Tannenstrasse 3, CLA F1.2
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OrcID: 0000-0001-7143-7259	Department of Mechanical and Process Engineering (D-MAVT)
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SRL publications: https://srl.ethz.ch/publications.html	

Education

- 09/13 – 05/18 **PhD** in Mechanical Engineering, Massachusetts Institute of Technology (MIT), MA, USA, *Thesis:* “Building and Controlling Fluidically Actuated Soft Robots: From Open Loop to Model-based Control”, PhD defense date: 18/5/18, *Thesis Committee:* [D. Rus](#), R. Tedrake, J. Leonard, P. Hosoi
- 10/07 – 01/13 **Diplom-Ingenieur** (equiv. Bachelor & Master) in Mechanical Engineering, KIT, Germany

Employment history

- 07/20 – pres. **Assistant Professor (Tenure-Track) of Robotics**, D-MAVT, ETH Zurich, CH
- 07/19 – 06/20 **Chief Technology Officer (CTO)**, Dexai Robotics, Somerville, MA, USA
- 11/18 – 06/19 **Senior Applied Scientist**, Amazon Robotics LLC., North Reading, MA, USA
- 06/18 – 11/18 **Postdoctoral Associate**, Distributed Robotics Laboratory, Computer Science and Artificial Intelligence Laboratory, MIT, MA, USA, Advisor: *Prof. Daniela Rus*
- 09/13 – 05/18 **Graduate Research Assistant**, Distributed Robotics Laboratory, Computer Science and Artificial Intelligence Laboratory, MIT, MA, USA, Advisor: *Prof. Daniela Rus*
- 01/16 – 12/17 **Robotics Consultant**, Seadrone Inc., Palo Alto, CA, USA
- 12/12 – 08/13 **Robotics Systems Engineer**, Auris Health, Inc., Redwood City, CA, USA
- 04/12 – 11/12 **Graduate Research Assistant** (Master’s Thesis), Artificial Intelligence Laboratory, Stanford University, CA, USA, Advisors: *Dr. Torsten Kröger*, *Prof. Oussama Khatib*
- 08/11 – 02/12 **Robotics Research Internship**, ABB (China) Ltd., Advisors: *Dr. Jens Hofschulte*

Institutional responsibilities

- 03/23 – pres. **Search Committee Member of Selection Committee on Power Electronics**, D-ITET, ETH Zurich
- 04/22 – 10/22 **Search Committee Member of Selection Committee on Robotic Materials**, D-MATL, ETH Zurich
- 01/21 **Admissions Committee Member**, M.Sc. in Robotics, Systems + Control, ETH, CH
- 07/20 – pres. **Head of the Soft Robotics Laboratory**, D-MAVT, ETH Zurich, CH
- 01/21 **Admissions Committee Member**, M.Sc. in Robotics, Systems + Control, ETH, CH
- 07/19 – 06/20 **Chief Technology Officer**, Dexai Robotics LTD, Somerville, MA, USA

Approved research projects as principal investigator

- 07/24 - pres. **Armasuisse** Soft Robotic based Telemanipulation, PI, CHF 25k
- 07/24 - pres. **Armasuisse** Noctua – The silent eye for search and rescue, PI, CHF 40k
- 03/24 - pres. **FESTO** Electrohydraulic low-voltage actuators for industrial app., PI, CHF 492k
- 03/24 - 02/25 **SNSF Spark Gant** Identify Drug-Induced Cardiac Side Effects, PI, CHF 100k
- 01/24 - 12/25 **ALIVE Engineering with Living Materials**, *Co-culturing Neuromuscular Robots*, PI, CHF 100k
- 10/23 - 03/24 **USZ Innovations**, *Tissue Patches for Ventricular Septal Rupture Repair*, PI, CHF 80k
- 10/23 - 09/24 **USZ Innovations**, *Dexterous anthropomorphic manipulators for cardiac surgeries*, PI, CHF 155k
- 09/23 - 08/27 **SNSF Sinergia Grant**, *Bioxology of Skeletal Muscle Tissues*, Lead PI, CHF 2’960k
- 07/23 - 12/24 **RobotX Research Program**, *Versatile Robotic Hands for Autonomous Dexterity*, PI, CHF 103k
- 07/23 - 06/24 **Hasler Foundation**, *Dexterous Grasp Planning Framework*, PI, CHF 50k
- 06/23 - 01/24 **Innovedum Funding Advancing Education**, *Soft Robotics in the real world*, PI, CHF 49k
- 05/23 - 04/24 **USZ PhD Funding**, *Tissue Patches for Ventricular Septal Rupture Repair*, PI, CHF 29k
- 04/23 - 03/27 **SNSF Project Grant**, *Electrostatic Muscles for Musculoskeletal Robots*, PI, CHF 999k
- 02/23 - 12/24 **Swiss Data Science Center (SDSC) Research Grant**, *FastPoints2Mesh*, PI, CHF 473k
- 12/22 - pres. **HOLCIM** Research Scholarship for Dr. Oncay Yasa, CHF 100k
- 10/22 - pres. **FESTO** Research Project on Soft Robotic Hands, PI, CHF 41k
- 06/22 - pres. **Armasuisse** ARAMO/MetaSuit/SURF-eDNA, PI, CHF 100k
- 05/22 - pres. **NCCR Spin-off Funding Robotic Grippers**, CHF 50k
- 05/22 - pres. **Amazon Robotics Research Award (ARA)** Manipulation Design Optimization, USD 100k
- 05/22 - pres. **RobotX Research Program** Representations for Robotic Manipulation, PI, CHF 172k
- 03/22 - pres. **ALIVE Engineering with Living Materials** Biohybrid Robots, PI, CHF 100k
- 03/22 - pres. **Armasuisse** Flying Gripping, PI, CHF 20k
- 03/22 - 02/25. **ETH Grant** Optimizing Fluidic Soft Robots with Multiphysics-Informed NN, PI, CHF 227k
- 01/22 - 12/22. **Olga Mayenfisch Stiftung** on Tissue-engineered Biohybrid Artificial Heart, PI, CHF 50k
- 12/21 - pres. **Zurich Heart** Project on Electrostatically actuated Muscles, PI, CHF 100k
- 09/21 - 5/22. **FESTO** Research Project on Robotic Fingers, PI, CHF 50k

Supervision of junior researchers at graduate and postgraduate level

Postgraduate: Dr. M. Filippi, Dr. R. Hinchet, Dr. A. Wu

Doctoral students: T. Buchner, B.G. Cangan, E. Nava, H. Zheng, L. Jones, A. Balciunaite, M. Michelis, A. Kazemipour, Y. Toshimitsu, A. Badolato, M. Mekattu, C. Yang, D. Liconti, D. Albayrak

Graduated Doctoral Students: D. Wälchli

Teaching activities

- 09/23 - pres. **Real-World Robotics**, yearly, ETH Zurich, CH
- 09/21 - pres. **6 Focus Projects**, {[raptor](#), [surf](#), [metasuit](#), [sara](#), [noctua](#), reeFranger}.ethz.ch, yearly, ETH Zurich, CH
- 06/21 - pres. **Robotics Summer School**, teaching lab for visiting researchers, ETH Zurich, CH
- 02/21 - pres. **Soft and Biohybrid Robotics Class**, yearly, ETH Zurich, CH
- 02/21 - pres. **MaP Distinguished Lecture Series on Soft Robotics**, yearly, ETH Zurich, CH
- 09/20 - pres. **Distinguished Seminar in Robotics, Systems and Control**, yearly, ETH Zurich, CH

Membership in panels, boards, and individual scientific reviewing activities

- 08/23 – pres. **Associate Editor** Robosoft, ICRA
- 01/23 – pres. **Editor** International Journal of Robotics Research (IJRR)
- 01/22 – pres. **Associate Editor** IROS, RA-L
- 04/21 **Panel Member & Reviewer** The Academy of Finland Research Grants
- 02/21 – pres. **Area Chair/Associate Editor** RSS (Robotics: Science and Systems) 2021 + 2022
- 10/20 **Reviewer** ETH Bridging Grants [1x]
- 04/20 **Panel Member & Reviewer** US National Science Foundation (NSF) Grants
- 02/19 – 03/21 **Guest Editor of Special Issue** IJRR on topic “Soft Robotic Modeling and Control: Bringing Together Articulated Soft Robots and Soft-Bodied Robots”
- 10/15 – pres. **Reviewer Journals and Conferences:** e.g. Nature, Nature Scientific Reports, Science Robotics, Science Advances, Advanced Materials IEEE ICRA/IROS/RoboSoft, etc.

Active memberships in scientific societies, fellowships in renowned academies

- 02/22 – pres. **TED Fellow**, TED Fellow Program, TED Conferences LLC
- 02/22 – pres. **Regular Member**, Tissue Engineering + Regenerative Medicine Int. Soc. (TERMIS)
- 10/21 – pres. **Executive Board Member**, ALIVE Engineering with Living Materials, ETH Zurich, CH
- 10/21 – pres. **Core Faculty Member** of the ETH AI Center, ETH Zurich, CH
- 12/21 – pres. **Associated Member** of NCCR Robotics, CH
- 12/20 – pres. **Associated Member** of Max Planck ETH Center for Learning Systems, GER - CH
- 07/20 – pres. **Core Faculty** of RobotX, ETH Zurich, CH
- 04/13 – pres. **Member** of the Institute of Electrical and Electronics Engineers (IEEE)

Organization of conferences

- 04/24 **Organizer**, RoboSoft 2024 workshop on “Bio-hybrids: When robots get alive”, San Diego, USA
- 04/24 **Organizer**, RoboSoft 2024 workshop on “Printing and Musculoskeletal Robotics”, San Diego, USA
- 10/22 – 04/23. **Workshop Co-Chair**, RoboSoft 2023 Singapore
- 04/22 **Organizer**, RoboSoft 2022 workshop on “Software for Soft Robotics”, Edinburgh, UK
- 10/18 **Organizer**, IROS 2018 workshop on “Soft Robotic Modeling and Control”, Spain

Prizes, awards, fellowships

- 02/22 **TED Fellowship Award**, TED Fellow Program, TED Conferences LLC
- 04/18 **Outstanding Paper Award** at IEEE RoboSoft 2019, Seoul, South Korea
- 09/14 **“Tony Stark Award for a Bad-Ass Live Demonstration”**, MIT Research Exhibition, USA
- 07/14 **Redtenbacher-Preis** for the outstanding result in Diplom-Ingenieur (equiv. Bachelor & Master) studies, awarded by the Faculty of Mechanical Engineering, KIT, Germany
- 09/13 – 03/14 **Graduate Exploration Fellowship**, MIT, MA, USA
- 03/12 – 11/12 **IGEL Fellowship** by the Faculty of Computer Science, KIT, Germany
- 03/12 – 11/12 **Fellowship** by the Kurt Fordan Foundation, Germany
- 03/12 – 11/12 **Fellowship** by the Dr.-Ing. Willy-Höfler Foundation, Germany
- 02/11 – 02/12 **Fellowship “Heinz Nixdorf Program for the Promotion of Asian-Pacific Experience for Young Professionals”** by the German Association for International Cooperation
- 02/10 **Grashof Award** for outstanding accomplishments and the best final result in the basic study of mechanical engineering in 2009, KIT, Germany
- 02/10 – 01/13 **Fellowship “Schaeffler Top Student”** by the Schaeffler Group, Germany
- 09/09 – 09/12 **Fellowship** by the Friedrich Naumann Foundation for Freedom, Germany

Key publications

Balciunaite, A., Yasa, O., Filippi, M., Michelis, M. Y., & Katzschmann, R. K. (2024, April). Bilayered Biofabrication Unlocks the Potential of Skeletal Muscle for Biohybrid Soft Robots. In 2024 IEEE 7th International Conference on Soft Robotics (RoboSoft) (pp. 525-530). IEEE.

Buchner, T. J., Fukushima, T., Kazemipour, A., Gravert, S. D., Prairie, M., Romanescu, P., ... & Katzschmann, R. K. (2024). Electrohydraulic musculoskeletal robotic leg for agile, adaptive, yet energy-efficient locomotion. *Nature Communications*, 15(1), 7634.

- Gravert, S. D., Varini, E., Kazemipour, A., Michelis, M. Y., Buchner, T., Hinchet, R., & Katzschmann, R. K. (2024). Low-voltage electrohydraulic actuators for untethered robotics. *Science Advances*, 10(1), eadi9319.
- Zheng, H., Pinzello, S., Cangan, B. G., Buchner, T. J., & Katzschmann, R. K. (2024). Vision-Based Online Key Point Estimation of Deformable Robots. *Advanced Intelligent Systems*, 2400105.
- Buchner, T. J., Rogler, S., Weirich, S., Armati, Y., Cangan, B. G., Ramos, J., ... & Katzschmann, R. K. (2023). Vision-controlled jetting for composite systems and robots. *Nature*, 623(7987), 522-530.
- Toshimitsu, Y., Forrai, B., Cangan, B. G., Steger, U., Knecht, M., Weirich, S., & Katzschmann, R. K. (2023, December). Getting the ball rolling: Learning a dexterous policy for a biomimetic tendon-driven hand with rolling contact joints. In *2023 IEEE-RAS 22nd International Conference on Humanoid Robots (Humanoids)* (pp. 1-7). IEEE.
- Yasa, O., Toshimitsu, Y., Michelis, M. Y., Jones, L. S., Filippi, M., Buchner, T., & Katzschmann, R. K. (2023). An overview of soft robotics. *Annual Review of Control, Robotics, and Autonomous Systems*, 6(1), 1-29.
- Fischer, O., Toshimitsu, Y., Kazemipour, A., & Katzschmann, R. K. (2023). Dynamic Task Space Control Enables Soft Manipulators to Perform Real-World Tasks. *Advanced Intelligent Systems*, 5(1), 2200024.
- Appius, A. X., Bauer, E., Blöchlinger, M., Kalra, A., Oberson, R., Raayatsanati, A., ... & Katzschmann, R. K. (2022, October). Raptor: Rapid aerial pickup and transport of objects by robots. In *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)* (pp. 349-355). IEEE.
- Filippi, M., Buchner, T., Yasa, O., Weirich, S., & Katzschmann, R. K. (2022). Microfluidic tissue engineering and bio-actuation. *Advanced Materials*, 34(23), 2108427.
- Dubied, M., Michelis, M. Y., Spielberg, A., & Katzschmann, R. K. (2022). Sim-to-real for soft robots using differentiable fem: Recipes for meshing, damping, and actuation. *IEEE Robotics and Automation Letters*, 7(2), 5015-5022.
- Han, M., Euler-Rolle, J., & Katzschmann, R. K. (2021). DeSKO: Stability-assured robust control with a deep stochastic Koopman operator. In *International Conference on Learning Representations*.
- Ma, P., Du, T., Zhang, J. Z., Wu, K., Spielberg, A., Katzschmann, R. K., & Matusik, W. (2021). Diffaqua: A differentiable computational design pipeline for soft underwater swimmers with shape interpolation. *ACM Transactions on Graphics (TOG)*, 40(4), 1-14.
- Della Santina, C., Katzschmann, R. K., Bicchi, A., & Rus, D. (2020). Model-based dynamic feedback control of a planar soft robot: trajectory tracking and interaction with the environment. *The International Journal of Robotics Research*, 39(4), 490-513.
- Katzschmann, R. K., Della Santina, C., Toshimitsu, Y., Bicchi, A., & Rus, D. (2019, April). Dynamic motion control of multi-segment soft robots using piecewise constant curvature matched with an augmented rigid body model. In *2019 2nd IEEE International Conference on Soft Robotics (RoboSoft)* (pp. 454-461). IEEE.
- Truby, R. L., Katzschmann, R. K., Lewis, J. A., & Rus, D. (2019, April). Soft robotic fingers with embedded ionogel sensors and discrete actuation modes for somatosensitive manipulation. In *2019 2nd IEEE international conference on soft robotics (RoboSoft)* (pp. 322-329). IEEE.
- Katzschmann, R. K., DelPreto, J., MacCurdy, R., & Rus, D. (2018). Exploration of underwater life with an acoustically controlled soft robotic fish. *Science Robotics*, 3(16), eaar3449.
- Katzschmann, R. K., Marchese, A. D., & Rus, D. (2015). Autonomous object manipulation using a soft planar grasping manipulator. *Soft robotics*, 2(4), 155-164.
- Katzschmann, R. K., Marchese, A. D., & Rus, D. (2015, November). Hydraulic autonomous soft robotic fish for 3D swimming. In *Experimental Robotics: The 14th International Symposium on Experimental Robotics* (pp. 405-420). Cham: Springer International Publishing.
- Homberg, B. S., Katzschmann, R. K., Dogar, M. R., & Rus, D. (2015, September). Haptic identification of objects using a modular soft robotic gripper. In *2015 IEEE/RSJ international conference on intelligent robots and systems (IROS)* (pp. 1698-1705). IEEE.
- Marchese, A. D., Katzschmann, R. K., & Rus, D. (2015). A recipe for soft fluidic elastomer robots. *Soft robotics*, 2(1), 7-25.