

Tomáš Svoboda¹

Work experience

- since 2023 Vicedean for development, Faculty of Electrical Engineering, Czech Technical University in Prague.
- since 2016 Head of the Vision for Robotics and Autonomous Systems group. (VRAS)
- 2017-2023 Chair of the Department of Cybernetics, Czech Technical University in Prague, Full Professor since 2020.
- 2011-2017 Deputy head of the department for teaching at the Czech Technical University in Prague. Since 2013 Associate Professor.
- 2003-2011 Research Fellow and Assistant Professor at the Czech Technical University, Faculty of Electrical Engineering, Department of Cybernetics.
- 2000–2003 Post-doc (Oberassistent) at the Swiss Federal Institute of Technology (ETHZ), Computer Vision.

Scientific projects

- 2023-2028 **Roboprox** - Robotics and Advanced Industrial Production, leading RA9 - Resilient machines through continuous learning and sensing.
- 2018- Contractual Research with Valeo and Valeo.ai on Self-supervised learning for automotive.
- 2018-2023 Research Center Informatics (RCI), PI of Robotics research program.
- 2018-2021 DARPA SubTerraanean Challenge. Leader of CTU-CRAS-NORLAB team. Twice 1st among self-funded teams (3rd overall), special DARPA-Final funding, 2nd overall in SubT Final round.
- 2016-2019 **Principal investigator at CTU:** EU H2020 Project Enable-S3, *European Initiative to Enable Validation for Highly Automated Safe and Secure Systems.*
- 2014-2017 EU FP7 ICT project **TRADR**, *Long-Term Human-Robot Teaming for Robot Assisted Disaster Response.*
- 2010-2013 EU FP7 ICT project **NIFTi**, *Natural Human-Robot Cooperation in Dynamic Environments.*
- 2010-2013 **Principal investigator:** The Czech Science Foundation, *Advanced predictors for object detection and tracking in video*
- 2004-2008 **Principal investigator:** The Czech Academy of Sciences, *MultiCam - Cognitive Multicamera System*
- since 2003 multiple smaller CTU projects in computer vision and robotics

Education

- 1995–2000 PhD in Artificial Intelligence and Biocybernetics, at Czech Technical University, with thesis *Central Panoramic Cameras Design, Geometry, Egomotion.*
- 1990–1995 Master (Engineer) in control engineering study branch Technical Cybernetics at Czech Technical University, with honors, with thesis *Camera Self-Calibration and Motion Analysis*

Scientific results

Working in computer vision since 1993 and in mobile robotics since 2010. In computer vision published on 3D vision [11], omnidirectional vision [12], learnable visual tracking [15, 17], object recognition [14]. In robotics focused on fusing modalities for machine perception [3, 7, 4], learning for active perception [16], reinforcement learning [5, 6], robot control and exploration [7, 8, 9]. Currently researches and supervises PhD students on self-supervised learning [18, 2, 1], deep learning [10] and multi-modal recognition [13].

T. Svoboda's publications have more than 1500 citations in Science Citation Index Expanded (4400 in Google Scholar), his SCI-expanded based h-index is 19 (31 in Google Scholar², 13 in WoS³, 21 in Scopus⁴).

¹<http://cmp.felk.cvut.cz/~svoboda>

²<http://scholar.google.com/citations?hl=en&user=ec4ZOF0AAAAJ>

³<http://www.researcherid.com/rid/H-1627-2012>

⁴<https://www.scopus.com/authid/detail.uri?authorId=35085537600>

Selected publications

- [1] Awet Hailelassie Gebrehiwot, David Hurych, Karel Zimmermann, Patrick Pérez, and Tomáš Svoboda. T-UDA: Temporal Unsupervised Domain Adaptation in Sequential Point Clouds. In *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 7643–7650, 2023.
- [2] Awet Hailelassie Gebrehiwot, Patrik Vacek, David Hurych, Karel Zimmermann, Patrick Pérez, and Tomáš Svoboda. Teachers in concordance for pseudo-labeling of 3D sequential data. *IEEE Robotics and Automation Letters*, 8(2):536–543, 2023.
- [3] Vladimír Kubelka, Lorenz Oswald, François Pomerleau, Francis Colas, Tomáš Svoboda, and Michal Reinstein. Robust data fusion of multi-modal sensory information for mobile robots. *Journal of Field Robotics*, 32(4):447–473, June 2015. .
- [4] Vladimír Kubelka, Michal Reinstein, and Tomáš Svoboda. Improving multimodal data fusion for mobile robots by trajectory smoothing. *Robotics and Autonomous Systems*, 84:88–96, October 2016. .
- [5] Martin Pecka and Tomáš Svoboda. Safe exploration techniques for reinforcement learning – an overview. In *Modelling and Simulation for Autonomous Systems*, number 8906 in Lecture Notes in Computer Science, pages 357–375. Springer, May 2014. .
- [6] Martin Pecka, Karel Zimmermann, Matěj Petrлік, and Tomáš Svoboda. Data-driven policy transfer with imprecise perception simulation. *IEEE Robotics and Automation Letters*, 3(4):3916–3921, 2018.
- [7] Martin Pecka, Karel Zimmermann, Michal Reinstein, and Tomáš Svoboda. Controlling robot morphology from incomplete measurements. *IEEE Transactions on Industrial Electronics*, 64(2):1773–1782, 2017. .
- [8] Martin Pecka, Karel Zimmermann, and Tomáš Svoboda. Fast simulation of vehicles with non-deformable tracks. In *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2017*, pages 6414–6419, 2017.
- [9] Tomáš Petříček, Vojtěch Šalanský, Karel Zimmermann, and Tomáš Svoboda. Simultaneous exploration and segmentation for search and rescue. *Journal of Field Robotics*, 36(4):696–709, 2019.
- [10] Zdenek Straka, Tomáš Svoboda, and Matej Hoffmann. PreCNet: Next-Frame Video Prediction Based on Predictive Coding. *IEEE Transactions on Neural Networks and Learning Systems*, pages 1–15, 2023.
- [11] Tomáš Svoboda, Daniel Martinec, and Tomáš Pajdla. A convenient multi-camera self-calibration for virtual environments. *PRESENCE: Teleoperators and Virtual Environments*, 14(4):407–422, August 2005. .
- [12] Tomáš Svoboda and Tomáš Pajdla. Epipolar geometry for central catadioptric cameras. *International Journal of Computer Vision*, 49(1):23–37, August 2002. .
- [13] Patrik Vacek, Otakar Jašek, Karel Zimmermann, and Tomáš Svoboda. Learning to predict lidar intensities. *IEEE Transactions on Intelligent Transportation Systems*, 23(4):3556–3564, 2022.
- [14] Karel Zimmermann, David Hurych, and Tomáš Svoboda. Non-rigid object detection with local interleaved sequential alignment (LISA). *Pattern Analysis and Machine Intelligence, IEEE Transactions on*, 36(4):731–743, April 2014. .
- [15] Karel Zimmermann, Jiří Matas, and Tomáš Svoboda. Tracking by an optimal sequence of linear predictors. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 31(4):677–692, April 2009. .
- [16] Karel Zimmermann, Tomáš Petříček, Vojtěch Šalanský, and Tomáš Svoboda. Learning for active 3d mapping. In *2017 IEEE International Conference on Computer Vision (ICCV)*, pages 1548–1556, Oct 2017. .
- [17] Karel Zimmermann, Tomáš Svoboda, and Jiří Matas. Anytime learning for the NoSLLiP tracker. *Image and Vision Computing, Special Issue: Perception Action Learning*, 27:1695–1701, October 2009. .
- [18] Vojtěch Šalanský, Karel Zimmermann, Tomáš Petříček, and Tomáš Svoboda. Pose Consistency KKT-Loss for Weakly Supervised Learning of Robot-Terrain Interaction Model. *IEEE Robotics and Automation Letters*, 6(3):5477–5484, 2021.