Michael C. Welle

114 17 Stockholm, Sweden

mwelle@kth.se | people.kth.se/ mwelle/

Personal data

Date of birth: 10/12/1988
Sex: male
Nationality: German
Country of residence: Sweden

Passionate and team-oriented robotics/machine learning researcher Ph.D. looking to leverage academic research in the real world to create a better future.

Skills

Programming	*level*
Python, PyTorch, ROS	*advanced*
C++, Matlab / simulink, PLC - Schneider/Siemens	*intermediate*
C#, Visual Basic, Unity	*basic*

Language	*level*
German	*native*
English	*C2*
Swedish	*A1*

Code repositories

Project name: link	*Status*
Latent Space Roademap V1: https://github.com/visual-action-planning/lsr-code	*Released*
Latent Space Roademap V2: https://github.com/visual-action-planning/lsr-v2	*Released*
Loss comparison representation learning: https://github.com/State-Representation/code	*Released*
Custom Franka Panda controller: https://github.com/MWelle77/franka_ros	*Devel*

Employment

Royal Institute of Technology (KTH) — *Stockholm, Sweden*

Postdoctoral researcher - Robotics, Perception and Learning EECS — *01/2022 - present*

- Representation Learning
- Deformable object manipulation
- Research validation on real robots

Royal Institute of Technology (KTH) — *Stockholm, Sweden*

Ph.D. student - Robotics, Perception and Learning EECS — *01/2018 - 12/2021*

- Topic: Learning Structured Representations for Rigid and Deformable Object Manipulation

Royal Institute of Technology (KTH) — *Stockholm, Sweden*

Research Engineer - School of Computer Science and Communication — *02/2017 - 05/2017*

- STRANDS project, indoor drone applications

Romaco Pharmatechnik GmbH — *Karlsruhe, Germany*

Automation engineering and visualization - engineering department — *01/2015 - 08/2015*

- PCL programming, visualization with Zenon 6 & 7

German Aerospace Center (DLR) *Stuttgart, Germany*

Student - Bachelor thesis - Institute of Vehicle Concepts *03/2014 - 08/2014*

- analysis of multiphase windings , Visualization with Visual Basic

Mercedes Benz Malaysia *Kuntan, Malaysia*

Internship - Laison Office *09/2012 - 02/2013*

- Quality management

Progress-Werk Oberkirch AG *Zusenhofen, Germany*

Industrial electrician - Welding and assembly line maintenance *02/2009 - 07/2010*

- Troubleshooting of manufacturing machines, production and assembly of spare parts

Progress-Werk Oberkirch AG *Zusenhofen, Germany*

Apprenticeship mechatronics *09/2005 - 02/2009*

- Dual Apprenticeship process

Education

KTH | Royal Institute of Technology *Stockholm, Sweden*

Ph.D. in Computer Science *01/2018 - 12/2021*

- Thesis: Learning Structured Representations for Rigid and Deformable Object Manipulation
- Supervisor: Danica Kragic
- Co-supervisors: Anastasia Varava, Hang Yin

KTH | Royal Institute of Technology *Stockholm, Sweden*

M.S. in Systems, Control and Robotics *08/2015 - 01/2018*

- Thesis: View planning for objects modeling with drones
- Supervisor: Patric Jensfelt
- Specialization: Robotics track

HSKA | University of Applied Sciences Karlsruhe *Karlsruhe, Germany*

B.Eng. in Mechatronics *10/2010 - 09/2014*

Visiting Internship

HKUST | Hong Kong University of Science and Technology *Hongkong*

PG Visiting Internship - MAE (Full-Time) *17/07/2017 - 29/09/2017*

- Project: Baxter play's Tic-Tac-Toe demonstration
- Supervisors: Michael Wang, Hang Kaiyu

Organizing

Transferability in Robotics *London, England*

ICRA 2023 Workshop *02/06/2023*

- `https://transferabilityinrobotics.github.io/icra2023/`

Third workshop on Representing and Manipulating Deformable Objects *London, England*

ICRA 2023 Workshop *29/05/2023*

- `https://deformable-workshop.github.io/icra2023/`

Associate Editor *Kyoto, Japan*

IROS 2022 *10/2022*

- keywords: Visual Learning; Object Detection, Segmentation and Categorization; Visual Servoing

Second workshop on Representing and Manipulating Deformable Objects *Philadelphia, USA*

ICRA 2022 Workshop *23/05/2022*

- `https://deformable-workshop.github.io/icra2022/`

Representing and Manipulating Deformable Objects *Virtual/ Xi'an, China*

ICRA 2021 Workshop *30/05/2021*

- `https://deformable-workshop.github.io/icra2021/`

Supervision

Ph.D. students @ KTH | Royal Institute of Technology *Stockholm, Sweden*

Alberta Longhini; Co-supervisor - Identification and Modeling of Deformable Objects Properties *Spring 2022*

Marco Moletta; Co-supervisor - Graph Representations for Deformable Object Manipulation *Spring 2022*

Peiyang "Yonk" Shi; Co-supervisor - Representation Learning for Generative Models *Spring 2022*

Master Thesis @ KTH | Royal Institute of Technology *Stockholm, Sweden*

Nils Ingelhag; Ongoing *Spring 2023*

Mohammed Al-Jaff; Ongoing *Spring 2023*

Ioannis Iakovidis; Ongoing *Spring 2023*

Erik Zetterström; Ongoing *Fall 2022*

Tommy Wallin; Structural Comparison of Data Representations Obtained from Deep Learning Models *Fall 2021*

David Norrman; Impact of Semantic Segmentation on OOD Detection Performance for VAEs and Normalizing Flow Models *Fall 2021*

Samuel Norling; Probabilistic Forecasting through Reformer Conditioned Normalizing Flows *Spring 2021*

Simon Westberg; Investigating the Learning Behavior of Generative Adversarial Networks *Spring 2021*

Joakim Dahl; Analysis of the effect of latent dimensions on disentanglement in Variational Autoencoders *Spring 2021*

Alberta Longhini; Fabric Material Classification by Combining Force Sensing and Vision *Fall 2020*

Nik Vaessen; Training Multi-Task Deep Neural Networks with Disjoint Datasets *Spring 2020*

Georgios Deligiorgis; Context-Aware Graph Convolutional Network with Multi-Clusters Mini-Batch for Link Prediction *Spring 2020*

Ching-An Wu; Investigation of Different Observation and Action Spaces for Reinforcement Learning on Reaching Tasks *Fall 2019*

Teaching

KTH | Royal Institute of Technology *Stockholm, Sweden*

Introduction to Robotics *Fall 2021*

Introduction to Robotics *Fall 2020*

Project Course in Data Science *Fall 2020*

Introduction to Robotics *Fall 2019*

Project Course in Data Science *Fall 2019*

Introduction to Robotics *Fall 2018*

Artificial Intelligence *Fall 2018*

Project Course in Data Science *Fall 2018*

Artificial Intelligence *Fall 2017*

Artificial Intelligence *Fall 2016*

HSKA | University of Applied Sciences Karlsruhe *Karlsruhe, Germany*

Automation Course *WS 2012*

Journal Publications

1. Martina Lippi*, Petra Poklukar*, **Michael C Welle***, Anastasiia Varava, Hang Yin, Alessandro Marino, and Danica Kragic. Enabling visual action planning for object manipulation through latent space roadmap. *IEEE Transactions on Robotics*, 39(1):57–75, 2023
2. Oscar Gustavsson, Thomas Ziegler, **Michael C Welle**, Judith Bütepage, Anastasiia Varava, and Danica Kragic. Cloth manipulation based on category classification and landmark detection. *International Journal of Advanced Robotic Systems*, 19(4), 2022
3. **Michael C Welle**, Anastasiia Varava, Jeffrey Mahler, Ken Goldberg, Danica Kragic, and Florian T Pokorny. Partial caging: a clearance-based definition, datasets, and deep learning. *Autonomous Robots*, pages 1–18, 2021
4. Irene Garcia-Camacho*, Martina Lippi*, **Michael C Welle**, Hang Yin, Rika Antonova, Anastasiia Varava, Julia Borras, Carme Torras, Alessandro Marino, Guillem Alenya, et al. Benchmarking bimanual cloth manipulation. *IEEE Robotics and Automation Letters*, 5(2):1111–1118, 2020
5. Judith Bütepage, Silvia Cruciani, Mia Kokic, **Michael C Welle**, and Danica Kragic. From visual understanding to complex object manipulation. *Annual Review of Control, Robotics, and Autonomous Systems*, 2:161–179, 2019

Conference Publications

1. Alberta Longhini*, Marco Moletta*, Alfredo Reichlin, **Michael C Welle**, David Held, Zackory Erickson, and Danica Kragic. Edo-net: Learning elastic properties of deformable objects from graph dynamics. *arXiv preprint arXiv:2209.08996 accepted to ICRA2023*, 2023
2. Alberta Longhini, Marco Moletta, Alfredo Reichlin, **Michael C Welle**, Alexander Kravberg, Yufei Wang, David Held, Zackory Erickson, and Danica Kragic. Elastic context: Encoding elasticity for data-driven models of textiles. *arXiv preprint arXiv:2209.05428 accepted to ICRA2023*, 2023
3. Thomas J Tewes, **Michael C Welle**, Bernd T Hetjens, Kevin Saruni Tipatet, Svyatoslav Pavlov, Frank Platte, and Dirk P Bockmühl. Understanding raman spectral based classifications with convolutional neural networks using practical examples of fungal spores and carotenoid-pigmented microorganisms. *AI*, 4(1):114–127, 2023
4. Martina Lippi*, **Michael C Welle***, Petra Poklukar, Alessandro Marino, and Danica Kragic. Augment-connect-explore: a paradigm for visual action planning with data scarcity. *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 754–761, 2022
5. Hang Yin, **Michael C Welle**, and Danica Kragic. Embedding koopman optimal control in robot policy learning. In *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 13392–13399. IEEE, 2022
6. Constantinos Chamzas*, Martina Lippi*, **Michael C Welle***, Anastasia Varava, Lydia E Kavraki, and Danica Kragic. Comparing reconstruction-and contrastive-based models for visual task planning. In *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 12550–12557. IEEE, 2022

7. Alberta Longhini, **Michael C Welle**, Ioanna Mitsioni, and Danica Kragic. Textile taxonomy and classification using pulling and twisting. *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021

8. Francesco Esposito, Christian Pek, **Michael C Welle**, and Danica Kragic. Learning task constraints in visual-action planning from demonstrations. In *2021 30th IEEE International Conference on Robot & Human Interactive Communication (RO-MAN)*, pages 131–138. IEEE, 2021

9. Martina Lippi*, Petra Poklukar*, **Michael C Welle***, Anastasiia Varava, Hang Yin, Alessandro Marino, and Danica Kragic. Latent space roadmap for visual action planning of deformable and rigid object manipulation. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2020

10. Thomas Ziegler, Judith Butepage, **Michael C Welle**, Anastasiia Varava, Tonci Novkovic, and Danica Kragic. Fashion landmark detection and category classification for robotics. In *2020 IEEE International Conference on Autonomous Robot Systems and Competitions (ICARSC)*, pages 81–88. IEEE, 2020

11. Anastasiia Varava*, **Michael C Welle***, Jeffrey Mahler, Ken Goldberg, Danica Kragic, and Florian T Pokomy. Partial caging: A clearance-based definition and deep learning. In *2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 1533–1540. IEEE, 2019

12. **Michael C Welle**, Ludvig Ericson, Rares Ambrus, and Patrie Jensfelt. On the use of unmanned aerial vehicles for autonomous object modeling. In *2017 European Conference on Mobile Robots (ECMR)*, pages 1–6. IEEE, 2017

* contributed equally, listed in alphabetical order.