Michael C. Welle

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Personal data

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

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

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 and Apps

Project name: link	*Status*
Puppeteer Franka - Robot teleoperation: https://ar-puppeteer.github.io/	*Alpha*
Quest2ROS - Robot teleoperation: https://quest2ros.github.io/	*Alpha*
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

INCAR Robotics AB

Stockholm, Sweden

Founder & CEO — *12/2024 - present*

- Founded INCAR Robotics AB
- Developing advanced robotics solutions
- Empowering human-robot collaboration

Royal Institute of Technology (KTH)

Stockholm, Sweden

Postdoctoral researcher - Robotics, Perception and Learning EECS — *01/2022 - 12/2024*

- 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

4th workshop on Representing and Manipulating Deformable Objects *Yokohama, Japan*

ICRA 2024 Workshop *17/05/2024*

- `https://deformable-workshop.github.io/icra2024/`

Associate Editor

RA-L 2024 *2024*

- keywords: Bimanual Manipulation; Contact Modeling; Dexterous Manipulation; Dual Arm Manipulation; Grasping; Grippers and Other End-Effectors; In-Hand Manipulation; Manipulation Planning; Multifingered Hands

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 (4) @ KTH | Royal Institute of Technology *Stockholm, Sweden*

Mohammed Al-Jaff; Co-supervisor - Preliminary: Multi-Model Machine Learning *12/2023-present*

Alberta Longhini; Co-supervisor - Adapting to Variations in Textile Properties for Robotic Manipulation *02/2022-01/2025*

Marco Moletta; Co-supervisor - Graph Representations for Deformable Object Manipulation *03/2022-present*

Peiyang "Yonk" Shi; Co-supervisor - Representation Learning for Generative Models *04/2022-12/2023*

Research Engineer (6) @ KTH | Royal Institute of Technology *Stockholm, Sweden*

Piotr Koczy; Teleoperation of Dexterous Hands *09/2024-present*

Loizos Hadjiloizou; Enhancing Provably Safe Reinforcement Learning *12/2023-09/2024*

Jonne van Haastregt ; VR/AR for Robotic simulations + Visumotor diffusion policies *12/2023-06/2024*

Jesper Munkeby; Foundational Models in Robotics *12/2023-10/2024*

Nils Ingelhag; Visumotor diffusion policies for Manipulation *10/2023-10/2024*

Oscar Gustavsson; Cloth manipulation based on category classification and landmark detection *03/2021-06/2021*

Master Thesis (14) @ KTH | Royal Institute of Technology *Stockholm, Sweden*

Ludwig Kristoffersson; Evaluating Techniques for Building AI Assistants in a Specialised Domain — *Spring 2024*

Nils Ingelhag; Mimicking the human grasp with robotic grippers — *Spring 2023*

Mohammed Al-Jaff; Messing With The Gap: On The Modality Gap Phenomenon In Multimodal Contrastive Representation Learning — *Spring 2023*

Ioannis Iakovidis; Using Satellite Images And Self-supervised Deep Learning To Detect Water Hidden Under Vegetation — *Spring 2023*

Erik Zetterström; Unsupervised Domain Adaptation for Regressive Annotation: Using Domain-Adversarial Training on Eye Image Data for Pupil Detection — *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*

Foundational Models In Robotics, Perception, and Decision Making - Teacher — *spring 2024*

Introduction to Robotics - TA — *Fall 2021*

Introduction to Robotics - TA — *Fall 2020*

Project Course in Data Science - Teacher — *Fall 2020*

Introduction to Robotics - TA — *Fall 2019*

Project Course in Data Science - Teacher — *Fall 2019*

Introduction to Robotics - TA — *Fall 2018*

Artificial Intelligence - TA — *Fall 2018*

Project Course in Data Science- TA — *Fall 2018*

Artificial Intelligence - TA — *Fall 2017*

Artificial Intelligence - TA — *Fall 2016*

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

Automation Course- TA — *WS 2012*

Journal Publications

1. Noémie Jaquier*, **Michael C Welle***, Andrej Gams, Kunpeng Yao, Bernardo Fichera, Aude Billard, Aleš Ude, Tamim Asfour, and Danica Kragic. Transfer learning in robotics: An upcoming breakthrough? a review of promises and challenges. *The International Journal of Robotics Research*, 0(0):02783649241273565, 0
2. Alberta Longhini, **Michael C Welle**, Zackory Erickson, and Danica Kragic. Adafold: Adapting folding trajectories of cloths via feedback-loop manipulation. *Accepted to RA-L 2024*, 2024

3. 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

4. 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

5. **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

6. 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

7. 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. Jonne van Haastregt*, **Michael C Welle***, Yuchong Zhang, and Danica Kragic. Puppeteer your robot: Augmented reality leader-follower teleoperation. *Accepted to HUMANOIDS 2024*, 2024

2. Nils Ingelhag*, Jesper Munkeby*, Jonne van Haastregt*, Anastasia Varava, **Michael C Welle**, and Danica Kragic. A robotic skill learning system built upon diffusion policies and foundation models. *Accepted to RO-MAN 2024*, 2024

3. Martina Lippi*, **Michael C Welle***, Marco Moletta, Alessandro Marino, Andrea Gasparri, and Danica Kragic. Visual action planning with multiple heterogeneous agents. *Accepted to RO-MAN 2024*, 2024

4. Martina Lippi*, **Michael C Welle***, Maciej K Wozniak, Andrea Gasparri, and Danica Kragic. Low-cost teleoperation with haptic feedback through vision-based tactile sensors for rigid and soft object manipulation. *Accepted to RO-MAN 2024*, 2024

5. Martina Lippi*, **Michael C Welle***, Andrea Gasparri, and Danica Kragic. Ensemble latent space roadmap for improved robustness in visual action planning. In *2024 IEEE International Conference on Robotics and Automation (ICRA)*, pages 2638–2644. IEEE, 2024

6. Irene Garcia-Camacho, Alberta Longhini, Michael **Welle**, Guillem Alenyà, Danica Kragic, and Júlia Borràs. Standardization of cloth objects and its relevance in robotic manipulation. *Accepted to ICRA 2024*, 2024

7. Marco Moletta, Maciej K Wozniak, **Michael C Welle**, and Danica Kragic. A virtual reality framework for human-robot collaboration in cloth folding. In *2023 IEEE-RAS 22nd International Conference on Humanoid Robots (Humanoids)*, pages 1–7. IEEE, 2023

8. **Michael C Welle***, Martina Lippi*, Haofei Lu, Jens Lundell, Andrea Gasparri, and Danica Kragic. Enabling robot manipulation of soft and rigid objects with vision-based tactile sensors. In *2023 IEEE 19th International Conference on Automation Science and Engineering (CASE)*, pages 1–7. IEEE, 2023

9. 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. In *2023 IEEE International Conference on Robotics and Automation (ICRA)*, pages 3875–3881. IEEE, 2023

10. 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 elastic context: Encoding elasticity for data-driven models of textiles. In *2023 IEEE International Conference on Robotics and Automation (ICRA)*, pages 1764–1770. IEEE, 2023

11. 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

12. 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

13. 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

14. 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

15. 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

16. 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

17. 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

18. 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

19. 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

20. **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.