Marius **Wiggert**

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In my research I develop machine learning, robotics, and control techniques to tackle impactful problems, mostly in climate change mitigation. In my PhD I developed methods to enable ocean vessels to navigate by hitchhiking on ocean currents, thereby requiring 1000x less power. My algorithms are now used by the Start-Up Phykos to operate floating seaweed farms for gigaton-scale carbon removal.

Education

M.Sc. & Ph.D in Electrical Engineering and Computer Science – *GPA: 4.0* – UC BERKELEY   *Berkeley, USA*
Research on Machine Learning and Robotics advised by Prof. Claire Tomlin   *Aug 2018 - May 2023*
Dissertation: Towards Operating Underactuated Robotic Systems by Going With the Flow

Honors Degree in Technology Management – *GPA: 4.0* – CDTM   *Munich, Germany*
Hands-on projects on: Entrepreneurship, Trend Research, Product Development, Rapid Prototyping   *Feb 2016 - Aug 2017*

B.A. Philosophy – *GPA: 3.9* – LUDWIG-MAXIMILIANS UNIVERSITY   *Munich, Germany*
Thesis: An Ethical Assessment of Artificial Intelligence   *Oct 2014 - Mar 2018*
Courses in Epistemology, Logic, Ethics, Theory of Reasoning, Political Theory, Human Rights etc.

B.Sc. Engineering Science – *GPA: 3.9 (Top 1%)* – TECHNICAL UNIVERSITY OF MUNICH   *Munich, Germany*
Thesis: Encoding Behavioral Decisions into spatio-temporal Action Spaces for Autonomous Driving   *Oct 2013 - Aug 2017*
Interdisciplinary program covering Computer Science, Mathematics, Electrical & Mechanical Engineering.

Work Experience

Robotics Start-Up Advisor & Research Project Lead – PHYKOS PBC & UC BERKELEY   *San Francisco, USA*
- Initiated collaboration with early-stage Start-Up Phykos and Oceanographers at MIT.   *May 2021 - present*
- Developed research roadmap inspired by real-world roadblockers and raised $350k from multiple grants
- Build and managed a team of up to 8 Researchers and Engineers publishing at top conferences
- Software, Data Pipeline, Control Algorithms to simulate autonomous operation of marine robots in real ocean conditions and testing it on hardware prototypes in the Pacific Ocean.

Climate Tech Venture Capital Fellow – WORLDFUND [$350M FUND]   *Amsterdam, NL*
Analyzed 100+ Start-Ups, Develop Investment Thesis, and lead DD for $128M Series A of IQM (Quantum Computing)   *May - August 2022*

Associate Intern – MCKINSEY & COMPANY [STRATEGY CONSULTING]   *Munich, Germany*
Developed the strategy for an IT-Hardware company to expand into digital offerings, unlocking $100+M in revenues.   *Feb - May 2021*

PhD Artificial Intelligence Residency – X THE MOONSHOT FACTORY   *Mountain View, USA*
Developed a Deep Reinforcement Learning algorithm for precision weeding in agricultural robotics at Mineral.   *May - Aug 2019*
It outperformed both classic control and learning-based baselines.

Start-Up Tech Lead & Strategy – ELENAS AT POLYMATH VENTURES   *Bogota, Colombia*
Developed tech roadmap and strategy. Build first data-analytics back- and frontend that led to first revenue.   *April - Jun 2018*

Robotics Product Development Consultancy Project – MAGAZINO GMBH   *Munich, Germany*
Advised the CEO on the highest-value robotics use-cases in material-handling, including requ. and features.   *Apr - Jul 2017*
This led to a new robot launched in 2019 (in 2023 >150 robots deployed).

Vehicle Intelligence Research – MERCEDES-BENZ R&D NORTH AMERICA   *Sunnyvale, USA*
Developed a behavioral architecture and algorithms to naturally embed traffic rules into robotic decision.   *Oct 2016 - Feb 2017*
Implemented first version in C++ and tested it on the road.

Predictive Maintenance Prototype Development – KONUX INC.   *Munich, Germany*
Developed a predictive maintenance prototype (hardware, machine learning, dashboard) for industrial pumps   *Apr - Jul 2016*

Trend Research Project – WORLD FOOD PROGRAM INNOVATION ACCELERATOR   *Munich, Germany*
Researched and published a study on fighting hunger by leveraging emerging digital technologies.   *Feb - Apr 2016*

Research Assistant – TUM CHAIR FOR AUTOMOTIVE ENGINEERING   *Munich, Germany*
Optimization of own consumption of electricity in the context of an electric mobility fleet management system   *May 2015 – Aug 2015*

Technical Co-Founder – ZEITBOTE (POSTAL SERVICE START-UP)   *Munich, Germany*
Developed concept of IT and RFID-Database System, Risk Analysis, Process Optimization, Direct Sales etc.   *Feb 2015 – Feb 2016*

Honors & Awards

2023	**Leon O. Chua Award for outstanding achievement in nonlinear science,** EECS UC Berkeley
2023	**2nd Place Energy Summit Innovation Expo,** Berkeley Energy and Resource Collaborative (BERC)
2022	**San Francisco Bay Area Winner,** Falling Walls Science Summit 2022 (SF and Berlin)
2021	**Best Paper Award Finalist,** ACM/IEEE Human Robot Interaction Conference (HRI)
2018	**Gateway Award,** International House at UC Berkeley
2017	**MINT Studies Excellence Award,** German Ministry of Education

Fellowships & Grants

2023	**Finalist for Climate Change AI Innovation Grant ($100k),** Climate Change AI
2023	**Finalist for Carbon Removal Research Grant ($1M),** Google Research
2021-23	**AI for Climate Security Grant ($250k),** C3 Digital Transformation Institute
2021	**Graduate Research Grant,** H2H8 Foundation
2018-20	**Graduate Fellowship,** German Academic Exchange Service (DAAD)
2016-18	**2-year Ethical Leadership Program,** Bavarian Elite Academy
2014-2016	**University Fellowship,** Hans Rudolf Foundation
2013-2019	**Klaus Murmann Fellowship,** Foundation of German Business (SDW)
2013	**University Fellowship,** Friedrich Naumann Foundation for Freedom

Publications

Operating Autonomous Seaweed Farms by Going With The Flow of Ocean Currents
Marius Wiggert, Manan Doshi, Pierre FJ. Lermusiaux, Claire J. Tomlin
In preparation for Science Robotics or Nature

Hedging against Uncertainty with Data-Assimilative Path Planning and POMPDs
Marius Wiggert[*], Manan Doshi[*], Pierre FJ. Lermusiaux, Claire J. Tomlin
In preparation for IEEE Robotics and Automation Letters (RA-L)

Safe Connectivity Maintenance in Underactuated Multi-Agent Networks for Dynamic Oceanic Environments
Nicolas Hoischen[*], **Marius Wiggert**[*], Claire J. Tomlin
Submitted to IEEE Journal Transactions on Control Systems Technology; arXiv 2307.01927

Maximizing Seaweed Growth on Autonomous Farms:
A Dynamic Programming Approach for Underactuated Systems Operating in Uncertain Ocean Currents
Matthias Killer[*], **Marius Wiggert**[*], Hanna Krasowski, Manan Doshi, Pierre FJ. Lermusiaux, Claire J. Tomlin
Submitted to IEEE/RAS International Conference on Robotics and Automation (ICRA), 2024; arXiv 2307.01916

Stranding Risk for Underactuated Vessels in Complex Ocean Currents: Analysis and Controllers
Andreas Doering[*], **Marius Wiggert**[*], Hanna Krasowski, Manan Doshi, Pierre FJ. Lermusiaux, Claire J. Tomlin
IEEE International Conference on Decision and Control (CDC), 2023

Navigating Underactuated Agents by Hitchhiking Forecast Flows
Marius Wiggert, Manan Doshi, Pierre FJ. Lermusiaux, Claire J. Tomlin
IEEE International Conference on Decision and Control (CDC), 2022

Hamilton-Jacobi Multi-Time Reachability
Manan Doshi, Manmeet Bhabra, **Marius Wiggert**, Pierre FJ. Lermusiaux, Claire J. Tomlin
IEEE International Conference on Decision and Control (CDC), 2022

Inducing Structure in Reward Learning via Feature Learning
Andreea Bobu[*], **Marius Wiggert**[*], Claire Tomlin, Anca D. Dragan
The International Journal of Robotics Research (IJRR), 2022

Identification of Cancer Cell Population Dynamics Leveraging the Effect of Pre-Treatment for Drug Schedule Design
Marius Wiggert, Megan Turnidge, Zoe Cohen, Ellen M. Langer, Rosalie C. Sears, Margaret P. Chapman, Claire J. Tomlin
American Control Conference (ACC), 2021

Feature Expansive Reward Learning: Rethinking Human Input
Andreea Bobu[*], **Marius Wiggert**[*], Claire Tomlin, Anca D. Dragan
ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2021

RAPID-MOLT: A Meso-scale, Open-source, Low-cost Testbed for Robot Assisted Precision Irrigation and Delivery
Marius Wiggert, Leela Amladi, Ron Berenstein, Stefano Carpin, Joshua Viers, Stavros Vougioukas, Ken Goldberg
IEEE International Conference on Automation Science and Engineering (CASE), 2021

Teaching

UC Berkeley - EECS206A Introduction to Robotics – Graduate Student Instructor
Berkeley, USA
Fall 2022
Taught topics of computer vision, kinematics, motion planning, and control.
Designed and ran labs with robot manipulators and mobile platforms operating on ROS.

UC Berkeley - ASTRON W12 The Planets – Graduate Student Instructor
Berkeley, USA
Summer 2022
Wrote homework and exam questions, held office hours, and graded work on the basics of Astronomy.

Technical University of Munich (TUM) - Higher Mathematics – Teaching Assistant
Munich, Germany
Fall & Spring 2014/15
Prepared and taught weekly tutorials on linear algebra to 45 students

Research Mentorship

Nicolas Hoischen – M.Sc. Student at ETH Zurich (now PhD Student at TUM)
Berkeley, USA
Spring 2023
Thesis on *Safe Connectivity Maintenance for a Fleet of Underactuated Seaweed Farms
in Dynamic Oceanic Environments* paper submitted to IEEE Transactions on Control Systems Technology

Andreas Doering – M.Sc. Student at TUM (now ML Engineer)
Berkeley, USA
Spring 2023
Thesis on *Safe Motion Planning for Underactuated Autonomous Vessels* paper published at CDC 2023

Matthias Killer – M.Sc. Student at TUM (now SWE at Climate-Tech Start-Up)
Berkeley, USA
Spring 2023
Thesis on *Long-term Horizon Planning for Underactuated Autonomous Vessels* paper submitted to ICRA 2024

Jérôme M. Jeannin – M.Sc. Student at ETH Zurich (now ML Engineer at Med-Tech Start-Up)
Berkeley, USA
Fall 2022
Thesis on *Deep Reinforcement Learning for Under-Actuated Current-Based Navigation*

Jonas Dieker – M.Sc. Student at TUM (now Data Scientist at Robotics Start-Up)
Berkeley, USA
Fall 2022
Thesis on *Deep Generative Models for Simulation of Realistic Ocean Currents*

Killian Kempf – M.Sc. Student at ETH Zurich (now ML Engineer at Construction Start-Up)
Berkeley, USA
Fall 2022
Thesis on *Improving Local Ocean Currents Forecasts with Data Assimilation and Deep Learning Techniques*

Conor Martin – B.Sc. Student at UC Berkeley (now Data Scientist at Deloitte)
Berkeley, USA
Spring 2022
Research on Deep Reinforcement Learning for underactuated systems

Nisha Prabhakar – B.Sc. Student at UC Berkeley (now SWE at Start-Up)
Berkeley, USA
Spring 2022
Research on modelling seaweed growth on floating open-ocean farms

Derek Liu – B.Sc. Student at UC Berkeley
Berkeley, USA
Fall & Spring 2021/22

Sunay Dagli – B.Sc. Student at UC Berkeley
Berkeley, USA
Fall 2021

Helen Peng – B.Sc. Student at UC Berkeley
Berkeley, USA
Fall 2021

Sohum Hulyalkar – B.Sc. Student at UC Berkeley (now SWE at Scale.AI)
Berkeley, USA
Fall & Spring 2020/21

Leela Amladi – B.Sc. Student at UC Berkeley (now at Apple)
Berkeley, USA
Fall & Spring 2019/20

Invited Talks

2023	**Keynote on Tackling Climate Change with AI,**	Verge - The Climate Tech Conference
2023	**Research talk at DataLearning Group Seminar,**	Imperial College London
2023	**Trend Seminar Talk on Innovations in the Ocean Economy,**	Center for Digital Technology and Management
2023	**Research Talk,**	Workshop on Robots and Sustainability at Bristol University
2023	**Research Talk,**	Berkeley AI Research Climate Initiative
2023	**Research Talk,**	WS Science of Design for Societal Scale Cyber-Physical Systems at Technical University of Munich
2023	**Innovations in Robotics Research,**	Bill Gates Delegation visiting UC Berkeley
2023	**Research Talk,**	CMU Seminar Sustainability Robotics
2023	**Research Talk,**	Berkeley Artificial Intelligence Research (BAIR) Seminar Series
2023	**Research Talk,**	5th NorCal Control Workshop
2022	**CCAI Webinar on Machine Learning in Robotics to Scale Climate Action,**	Climate Change AI
2022	**Research Talk at Semiautonomous Seminar,**	UC Berkeley
2022	**Smart Seaweed Farms: Breaking the Walls of Carbon Removal,**	Falling Walls Science Summit, Berlin
2022	**Guest Lecture,**	EE206A Introduction to Robotics at UC Berkeley
2022	**Research Talk,**	Stanford NASA ULI Safe Aviation Autonomy
2022	**Lecture SYSEN 5160 Managing and Modeling Complex Systems for Organizational Leaders,**	Cornell University
2022	**Research Talk and Poster,**	Bay Area Robotics Conference
2021	**Research Talk,**	Workshop on Aware Learning: How to benefit from Priors
2021	**Research Talk,**	BAIR Workshop on Robotics at UC Berkeley
2021	**Research Talk,**	Cancer Systems Biology Consortium (CSBC) Conference
2020	**Research Talk,**	EECS Department Seminar at UC Berkeley
2020	**Research Talk,**	Cancer Systems Biology Consortium (CSBC) West Coast Symposium
2019	**Talk on How to use AI to achieve the UN SGDs,**	AI for Social Good Workshop at UC Berkeley

Organized Workshops & Seminars

2023	**3-day Workshop on AI x Science x Climate at Bakar Institute Berkeley,**	Co-organizer
2023	**Workshop on Robotics and Sustainability: a Bidirectional Relationship,**	Speaker Coordination
2021-22	**SemiAutonomous weekly Seminar at UC Berkeley,**	Co-organizer
2020	**2nd Learning for Dynamics and Control (L4DC) Conference,**	IT and Website

Other Professional Service

2021-now	**Climate Change AI,**	Core Team Member organizing webinars and other community events
2020-now	**World Economic Forum Global Shapers Oakland Hub,**	Project Lead
2023	**Creative Destruction Lab,**	Scientist providing guidance and Tech Evaluation for Start-Ups in Paris AI Stream
2023	**Berkeley AI Research Climate Initiative,**	Co-organizer
2021-23	**Computer Science Graduate Entrepreneurs,**	Chair for seminars on spinning research into start-ups
2022	**UC Berkeley EECS admitted PhD Visit Day,**	Student Organizer of Entrepreneurship Panel

Reviewing

2022,23	**NeurIPS Workshop: Tackling Climate Change with Machine Learning,**
2023	**IEEE Transactions on Automatic Control (TAC),**
2021,23	**International Conference on Robotics and Automation (ICRA),**
2020-23	**IEEE Conference for Decision and Control (CDC),**
2021	**ICML Workshop: Tackling Climate Change with Machine Learning,**
2020,21	**Learning for Dynamics & Control Conference (L4DC),**
2021,22	**Conference on Neural Information Processing Systems (NeurIPS),**
2021,22	**Conference on Robot Learning (CoRL),**

Additional Information

Languages	German (native), English (fluent), Spanish (fluent), Latin
Programming	proficient in Python, ROS; knowledgeable in C++, Matlab, C, Java, SWL
Deep Learning	PyTorch (proficient), JAX, TensorFlow
Interests	Kitesurfing, Parkour, Yoga, Meditation, Traveling, Mountaineering, Skiing, Saxophon, Surfing
Erdös Number	4