Abhinav **Valada**

Professor & Director of Robot Learning Lab

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Academic & Industry Experience

Full Professor (W3), Chair of Autonomous Intelligent Systems — *Freiburg, Germany*
University of Freiburg, Department of Computer Science, Robot Learning Lab — *Aug. 2023 - Present*

Assistant Professor (W1) of Robot Learning — *Freiburg, Germany*
University of Freiburg, Department of Computer Science, Robot Learning Lab — *Dec. 2019 - July 2023*

Postdoctoral Research Scientist — *Freiburg, Germany*
University of Freiburg, Department of Computer Science, Autonomous Intelligent Systems Lab — *Mar. 2019 - Nov, 2019*

Ph.D. Student and Research Associate — *Freiburg, Germany*
University of Freiburg, Department of Computer Science, Autonomous Intelligent Systems Lab — *Aug. 2014 - Feb. 2019*

Co-founder & Director of Operations — *Pittsburgh, USA*
Platypus LLC — *Aug. 2012 - Aug. 2015*

Systems Engineer — *Pittsburgh, USA*
National Robotics Engineering Center — *Jul. 2013 - Jul. 2014*

Systems/Software Engineer — *Pittsburgh, USA*
Carnegie Mellon University, The Robotics Institute, Field Robotics Center — *Nov. 2011 - Jun. 2013*

Research Scholar — *Pittsburgh, USA*
Carnegie Mellon University, The Robotics Institute, Field Robotics Center — *Jan. 2010 - Oct. 2011*

Research Assistant — *Vellore, India*
VIT University — *Aug. 2008 - Dec. 2009*

Research Associate — *Chennai, India*
Indian Institute of Technology Madras — *May. 2009 - Jul. 2009*

Research Intern — *Bangalore, India*
ABB Robotics — *Apr. 2008 - Jun. 2008*

Education

Ph.D. in Computer Science (Dr. rer. nat.) — *Freiburg, Germany*
University of Freiburg — **summa cum laude (with highest distinction)** — *Aug. 2014 - Feb. 2019*
Thesis: *Discovering and Leveraging Deep Multimodal Structure for Reliable Robot Perception and Localization*
Advisors: Prof. Dr. Wolfram Burgard, Prof. Dr. Dieter Fox

M.S. in Robotics — *Pittsburgh, USA*
Carnegie Mellon University — *Jan. 2012 - Dec. 2013*
Thesis: *An Autonomous Robot for Manipulation and Mapping of NFT Installations*
Advisors: Prof. Dr. George Kantor and Prof. Dr. Paul Scerri, Carnegie Mellon University, USA

B.Tech in Electronics and Instrumentation Engineering — *Vellore, India*
VIT University — *Jun. 2006 - Dec. 2010*
Thesis: *Design and Development of a Wireless Sensor Network System for Precision Agriculture*
Advisor: Prof. Dr. George Kantor, Carnegie Mellon University, USA

Honors & Awards

Honors

IROS Toshio Fukuda Young Professional Award for contributions to the advancement of robot learning — *2024*
IEEE Early Career Award in Robotics and Automation for contributions that have had a major impact in robotics — *2023*
DFG Emmy Noether AI Fellow of the German Research Foundation (DFG) for exceptionally qualified early career researchers — *2021*
ELLIS Scholar of the European Laboratory for Learning and Intelligent Systems (ELLIS) Society — *2020*

Robotics: Science and Systems (RSS) Pioneer for world's top early career researcher in robotics *2018*

Awards

Best Paper Award Finalist at IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) *2026*
Best Student Paper Award Finalist at IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) *2026*
Best Paper Award on Cognitive Robotics at IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) *2024*
Best Student Paper Award Finalist at IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) *2024*
Outstanding Workshop Presentation Award at IROS Workshop on Long-Term Perception for Autonomy *2024*
Third place at the Future Prize (Zukunftspreis) *2024*
Best Paper Award Honorable Mention IEEE Robotics and Automation Letters *2023*
Best Paper Award at IROS 2022 Workshop on Mobile Manipulation and Embodied Intelligence *2022*
NVIDIA Research Award for socially compliant autonomous robot navigation *2022*
AutoSens Most Novel Research Award for amodal panoptic segmentation *2022*
Second Place in the CVPR Embodied AI SoundSpaces Challenge *2022*
Winner of the NeurIPS AI Driving Olympics - Panoptic Tacking Challenge *2021*
Winner of the CVPR Embodied AI SoundSpaces Challenge *2021*
AutoSens Silver 2020 Vision Award for inspiring progress throughout the vehicle perception ecosystem *2020*
Young Engineer of the Year Award Finalist at AutoSens for demonstrating great achievement & leadership in ADAS *2020*
Winner of the ECCV Robust Vision Challenge - Panoptic Segmentation *2020*
Georges Giralt PhD Award Finalist for the Best Robotics PhD Thesis in Europe *2020*
Doctoral Consortium Award at The International Symposium on Robotics Research (ISRR) *2017*
Chancellor's Scholarship at VIT University *2009*

Funded Research Projects

Human-Aware Physical AI: Twinning for Next-Gen Robotics
Principal Investigator, funded by European Commission Horizon Europe *2027-2028*

Open Perception, Learning, and Decision-Making Toolbox for General Purpose Robot AI
Principal Investigator, funded by European Commission Horizon Europe *2026-2030*

AI-Supported Asset Digitization of Existing Buildings
Principal Investigator, funded by Ministry of Economic Affairs, Labor and Tourism Baden-Württemberg *2026-2028*

Hybrid Intelligence for Advanced Collective Awarness and Decision Making in Urban Environments
Principal Investigator, funded by European Commission Horizon Europe *2025-2028*

Deep Learning Cluster
Principal Investigator, funded by German Research Foundation (DFG) and the state of Baden-Württemberg *2024*

Robust Visual SLAM for Unstructured Environments
Principal Investigator, funded by Honda R&D Co., Ltd. *2024-2025*

Collaborative Research Centre 1597 Small Data - Essentials For Few-Shot Learning
Principal Investigator, funded by German Research Foundation (DFG) *2023-2027*

AI-based System Architectures for Automated Driving
Coordinator, funded by Robert Bosch GmbH, Lighthouse Collaboration *2023-2026*

Zuse School ELIZA
Principal Investigator, funded by Federal Ministry of Education and Research (BMBF) *2022-2032*

Autonomous Robust Outdoor Robots
Principal Investigator, funded by Baden-Württemberg Foundation *2023-2025*

Robot Learning for Long-Horizon Mobile Manipulation
Principal Investigator, funded by Toyota Motor Europe *2023-2025*

Learning BEV Maps for Automated Driving
Principal Investigator, funded by Qualcomm Technologies, Inc. *2022-2025*

Learning Multisensory Integration for Neural Circuits Modeling
Principal Investigator, funded by Cluster of Excellence BrainLinks-BrainTools *2022-2023*

Efficient Learning for Transferable Robot Autonomy in Human-Centered Environments
Principal Investigator, funded by German Research Foundation (DFG), Emmy Noether AI Program *2023-2028*

Responsible and Scalable Learning for Robots Assisting Humans
Principal Investigator, funded by Carl Zeiss Foundation *2022-2028*

Intelligent Scene Understanding of Operating Room Video Streams

Principal Investigator, funded by Stryker Corporation *2021-2025*

Embodied Cognitive Robotics

Principal Investigator, funded by Eva Mayr-Stihl Foundation *2020-2022*

Brain Controlled Service Robots

Principal Investigator, funded by Cluster of Excellence BrainLinks-BrainTools *2020-2023*

From Learning to Relearning Algorithmic Fairness in Socially-Aware Robot Navigation

Principal Investigator, funded by Cluster of Excellence BrainLinks-BrainTools *2020-2022*

Intelligent System for Autonomous Monitoring of Production Plants in Industry 4.0

Principal Investigator, funded by Federal Ministry of Education and Research (BMBF) *2020-2022*

Sensor Systems for Localization of Trapped Victims in Collapsed Infrastructure

Principal Investigator, funded by Federal Ministry of Education and Research (BMBF) *2020-2022*

Open Deep Learning Toolkit for Robotics

Principal Investigator, funded by European Commission H2020 *2020-2023*

Robust Localization Using Deep Landmark Features

Co-Principal Investigator, funded by Samsung GRO *2017-2018*

Invited Talks

Plenary and Keynote Talks

AI for Good – Discovery Series - United Nations (UN) ITU, Online *Sep. 2026*
IEEE/ITSS German Autonomy Summit - Keynote Talk, Munich, DE *Dec. 2025*
IEEE/RSJ International Conference on Intelligent Robots and Systems - Keynote Talk, Hangzhou, CN *Oct. 2025*
Brazilian Conference on Robotics - Plenary Talk, Belo Horizonte, BR *Apr. 2025*
IEEE IROS Workshop on Embodied Navigation to Movable Objects - Keynote Talk, Abu Dhabi, AE *Oct. 2024*
IEEE ITSC Workshop on Vision and Language Oriented Representation - Keynote Talk, Edmonton, CA *Sep. 2024*
11th International Conference on Signal Processing and Integrated Networks - Keynote Talk, New Delhi, IN *Mar. 2024*
14th International Conference on Cloud Computing, Data Science & Engineering - Keynote Talk, New Delhi, IN *Jan. 2024*
Bosch Distinguished Lecture on Machine Learning and Artificial Intelligence - Keynote Talk, Renningen, DE *Aug. 2023*
Edinburgh Center for Robotics and the Alan Turing Institute Symposium - Keynote Talk, Edinburgh, UK *Jun. 2023*
IEEE IV Workshop on Bridging the Gap between Map-based and Map-less Driving - Keynote Talk, Anchorage, US *Jun. 2023*
IEEE IV Workshop on Data Driven Intelligent Vehicle Applications - Keynote Talk, Anchorage, US *Jun. 2023*
Robotics & AI Research Conference - Keynote Talk, Rome, IT *Mar. 2023*
13th International Conference on Cloud Computing, Data Science & Engineering - Keynote Talk, New Delhi, IN *Jan. 2023*
ECCV Workshop on Map-Based Localization for Autonomous Driving - Keynote Talk, Tel Aviv, IL *Oct. 2022*
International Symposium on Robotics Research - Distinguished Speaker, Geneva, CH *Sep. 2022*
IEEE Intelligent Vehicles Symposium Workshop on Beyond Supervised Learning - Keynote Talk, Aachen, DE *Jun. 2022*
Robotics and Computer Science World Forum - Keynote Talk, Amsterdam, NL *Oct. 2021*
3rd International Workshop on Data Driven Intelligent Vehicle Applications - Keynote Talk, Nagoya, JP *Jul. 2021*
IEEE International Conference on Unmanned Systems - Plenary Talk, Harbin, CN *Nov. 2020*
AutoSens Conference - Keynote Talk, Brussels, BE *Jul. 2020*

Other Invited Talks

IROS Workshop on Physical World Models for Scaling Embodied AI, Pittsburgh, US *Sep. 2026*
IROS Workshop on Long-Term Perception for Human-Centric Autonomy, Pittsburgh, US *Sep. 2026*
ECCV Workshop on Safe World Models for Trustworthy Embodied AI, Malmö, SE *Sep. 2026*
RSS Workshop on Failure Is Not the End: Towards Open-World Failure Recovery for Robots, Sydney, AU *Jul. 2026*
TU Delft Distinguished Robotics Talk, Delft, NL *Jul. 2026*
IEEE IV Workshop on Safe and Trustworthy Motion Planning Subject to Sensor Network Uncertainties in ITS, Detroit, US *Jun. 2026*
IEEE ICRA Workshop on Uncertainty in Open-World Robotics, Vienna, AT *Jun. 2026*
IEEE ICRA Workshop on Leveraging Geometric and Semantic Priors for Real-World Robot Autonomy, Vienna, AT *Jun. 2026*
IEEE ICRA Workshop on Open Challenges for Rigorous Robot Perception, Vienna, AT *Jun. 2026*
UT Austin Guest Lecture, Online *Apr. 2026*
Technion AI & Robotics Seminar, Online *Jan. 2026*
KUIS AI Talks, Online *Dec. 2025*

ELLIIT Symposium on Robot Learning, Lund, SE *Nov. 2025*
Mila Robot Learning Seminar, Online *Nov. 2025*
IROS Workshop on Perception and Planning for Mobile Manipulation in Changing Environments, Hangzhou, CN *Oct. 2025*
CoRL Workshop on Safe and Robust Robot Learning for Operation in the Real World, Seoul, Korea *Sep. 2025*
Fraunhofer Technology Forum 2025: Automated Guided Vehicles and Mobile Robots, Stuttgart, DE *Sep. 2025*
Huawei Spatial Computing Workshop, Munich, DE *Jun. 2025*
IEEE IV Workshop on Workshop on Safe and Trustworthy Autonomous Driving, Cluj-Napoca, RO *Jun. 2025*
IEEE IV Workshop on Navigating Uncertainty: High-Integrity Localization, Mapping, and Perception, Cluj-Napoca, RO *Jun. 2025*
IEEE IV Workshop on Data-Driven Learning for Intelligent Vehicle Applications, Cluj-Napoca, RO *Jun. 2025*
INRIA Paris, Paris, FR *Jun. 2025*
MIT, Boston, US *Apr. 2025*
IEEE IROS Workshop on Interaction-aware Autonomous Systems, Abu Dhabi, AE *Oct. 2024*
Toyota TRACE Workshop, Leuven, BE *Sep. 2024*
Freiburg.ai, Freiburg, DE *Aug. 2024*
Halmstad University, Halmstad, SE *Jun. 2024*
Zebra Technologies AiLN Seminar, London, UK *Feb. 2024*
KION Group Research Series, Online *Feb. 2024*
Freiburg Robotics and Biology Conference, Freiburg, DE *Nov. 2023*
Freiburg-Oxford Workshop on Internal World Models in Animals, Humans, and AI, Freiburg, DE *Nov. 2023*
Summer School on Deep Learning for Autonomous Systems and Smart Cities, Aarhus, DK *May 2023*
KTH Royal Institute of Technology, Stockholm, SE *Nov. 2022*
TU Delft, Delft, NL *Nov. 2022*
Workshop on Embedded Optimization and Learning for Robotics and Mechatronics, Freiburg, DE *Oct. 2022*
Summer School on Continuous Engineering and Deep Learning for Trustworthy Autonomous Sys., Thessaloniki, GR *Oct. 2022*
Australian Centre for Field Robotics, Sydney, AU *Jun. 2022*
TU Nuremberg, Nuremberg, DE *Jun. 2022*
University of Bonn, Bonn, DE *May. 2022*
Sapienza University of Rome, Rome, IT *Apr. 2022*
Qualcomm Technologies, Online *Mar. 2022*
TU Graz, Graz, AT *Jan. 2022*
ICAR Workshop on Design, Learning, and Control for Safe Human-Robot Collaboration, Ljubljana, SL *Dec. 2021*
Universidad De Las Américas Puebla, Puebla, MX *Dec. 2021*
Bosch Corporate Research, Renningen, DE *Nov. 2021*
IROS Workshop on Open Deep Learning Toolkit for Robotics Prague, CZ *Sep. 2021*
Karlsruhe Institute of Technology, Karlsruhe, DE *Jun. 2022*
Robert Bosch, Heilbronn, DE *Mar. 2021*
Toyota Research Institute, Los Altos, US *Jul. 2020*
Wayve, London, UK *Jul. 2020*
Freiburg Center for Data Analysis and Modeling, University of Freiburg, Freiburg, DE *May 2020*
Sapienza University of Rome, Rome, IT *Mar. 2020*
Robert Bosch Center for Data Science and Artificial Intelligence, Chennai, IN *Sep. 2018*
Indo-German Workshop on Sensor Systems for Localization in Collapsed Infrastructure, New Delhi, IN *Sep. 2018*
Field Robotics Center Seminar, Carnegie Mellon University, Pittsburgh, US *Jul. 2018*
NVIDIA GPU Technology Conference Europe, Amsterdam, NL *Sep. 2016*
IEEE IROS Workshop on State Estimation and Terrain Perception, Daejeon, KR *Oct. 2016*
Field Robotics Center Seminar, Carnegie Mellon University, Pittsburgh, US *Jun. 2016*
Field Robotics Center Seminar, Carnegie Mellon University, Pittsburgh, US *Dec. 2013*
International Conference of Agricultural Engineering, Valencia, ES *Jul. 2012*
VIT Alumni Lecture, Vellore, IN *Jun. 2012*
The Indian Institute of Technology Madras, Chennai, IN *Jun. 2012*
Field Robotics Center Seminar, Carnegie Mellon University, Pittsburgh, US *Sep. 2010*
IEEE Resonance, VIT University, Vellore, IN *Jul. 2008*

Teaching Experience

Introduction to Robotics - University of Freiburg, MSc, lecture *2026-Present*
Advanced Deep Learning - University of Freiburg, MSc, lecture *2024-Present*

Artificial Intelligence - University of Freiburg, MSc, lecture *2024-Present*
Machine Learning - University of Freiburg, MSc, lecture *2023-Present*
Introduction to Mobile Robotics - University of Freiburg, MSc, lecture *2022-Present*
Foundations of Deep Learning - University of Freiburg, MSc, lecture *2019-Present*
Deep Learning Laboratory - University of Freiburg, MSc, laboratory *2018-Present*
FreiCAR: Practical Autonomous Driving - University of Freiburg, MSc, laboratory *2020-Present*
Learning from Limited Supervision - University of Freiburg, MSc, seminar *2022-Present*
Robot Learning - University of Freiburg, MSc, seminar *2021-Present*
Deep Learning for Autonomous Systems - University of Freiburg, MSc, seminar *2020*
Self-Supervised Learning - University of Freiburg, MSc, seminar *2020*
Deep Learning for Autonomous Driving - University of Freiburg, MSc, laboratory *2018*
Robot Navigation - University of Freiburg, MSc, seminar *2015-2017*
Robot Perception - University of Freiburg, MSc, seminar *2015*

Massive Open Online Courses (MOOCs)

Foundations of Deep Learning I: Basics *AI Campus Link*
Foundations of Deep Learning II: Architectures & Methodology *AI Campus Link*
Foundations of Deep Learning III: Advanced Topics *AI Campus Link*

Advising and Mentoring

PhD Students (32 PhD Students)

Ahana Datta	PhD	*11/2026-Present*
Julius Körner	ELLIS PhD	*08/2026-Present*
Bahey Tharwat	ELLIS PhD	*05/2026-Present*
Seunggyu Song	PhD	*05/2026-Present*
Mayank Mayank	PhD	*01/2026-Present*
Jonathan Kinzel	PhD	*07/2025-Present*
Chuang Yan	PhD	*07/2025-Present*
Roman Haas	PhD	*07/2025-Present*
Nicolas Schischka	ELLIS PhD	*07/2025-Present*
Akshay L Chandra	PhD	*06/2025-Present*
Imen Mahdi	ELLIS PhD	*11/2024-Present*
Jiarong Wei	PhD	*06/2024-Present*
Liudi Yang	PhD	*05/2024-Present*
Mohamed Abdelsamad	PhD	*02/2024-Present*
Markus Käppeler	ELLIS PhD	*01/2024-Present*
Sajad Marvi	PhD	*10/2023-Present*
Fabian Schmidt	PhD	*09/2023-Present*
Maximilian Luz	ELLIS PhD	*07/2023-Present*
Sharang Kaul	PhD	*02/2023-Present*
Jan Ole von Hartz	PhD	*12/2022-Present*
Julia Hindel	ELLIS PhD	*09/2022-Present*
Nick Heppert	ELLIS PhD	*09/2022-Present*
Kürsat Petek	PhD (Co-advised)	*06/2022-12/2024*
Martin Büchner	PhD	*10/2021-05/2026*
Adrian Röfer	ELLIS PhD	*06/2021-Present*
Niclas Vödisch	ELLIS PhD (Co-advised)	*05/2021-06/2025*
Rohit Mohan	PhD	*05/2021-09/2026*
Christopher Lang	PhD	*11/2020-10/2026*
Eugenio Chisari	PhD	*09/2020-04/2025*
Nikhil Gosala	PhD	*07/2020-10/2025*
Daniel Honerkamp	PhD	*05/2020-04/2025*
Juana Valeria Hurtado Rincon	PhD	*11/2019-10/2025*

Senior Scientists and PostDocs (8 PostDoctoral Researchers)

Rohit Mohan	PostDoc	*10/2026-Present*
Iman Nematollahi	PostDoc	*04/2025-Present*
Simon Bultmann	PostDoc	*10/2024-Present*
Lukas Luft	PostDoc	*08/2023-12/2024*
Daniel Büscher	PostDoc	*08/2023-12/2024*
Daniele Cattaneo	PostDoc	*01/2020-10/2025*
Paulo Drews-Jr	PostDoc (Capes-Humboldt Fellowship)	*08/2021-07/2024*
Tim Welschehold	PostDoc	*03/2020-Present*

Master Theses (59 Master Students)

Shreya Ravindra Deshmukh	Master Thesis	*2026*
Shradha Devadas Prabhu	Master Thesis	*2026*
Rounack Kundu	Master Thesis	*2026*
Gabriele Somaschini	Master Thesis	*2026*
Sejal Mutakekar	Master Thesis	*2026*
Swarnava Chowdhury	Master Thesis	*2026*
Santosh Suresh Parit	Master Thesis	*2026*
Henry Borya Frey	Master Thesis	*2026*
Sidharth Suresh	Master Thesis	*2025*
Peter Würth	Master Thesis	*2025*
Bastian Steffen Schnitzer	Master Thesis	*2025*
Jens Tobias Müller	Master Thesis	*2025*
Batin Muslu	Master Thesis	*2025*
Riya Mohan	Master Thesis	*2025*
Martin Peters	Master Thesis	*2025*
Alen Nasic	Master Thesis	*2025*
Noah Lenagan	Master Thesis	*2025*
Pranav Kolar Bhaskarpantula	Master Thesis	*2025*
Erich Choudhury	Master Thesis	*2025*
Melika Shekarriz	Master Thesis	*2025*
Abdelrhman Werby	Master Thesis	*2025*
Tim Steinke	Master Thesis	*2025*
Minh Quang Nguyen	Master Thesis	*2025*
Rishab Verma	Master Thesis	*2025*
Raphel Schneider	Master Thesis	*2025*
Mohammad Shannak	Master Thesis	*2024*
Tobias Heimbach	Master Thesis	*2024*
Sven Pfitzer	Master Thesis	*2024*
Amrutha Venkatesan	Master Thesis	*2024*
Aron Distelzweig	Master Thesis	*2024*
Simon Andreas Dorer	Master Thesis	*2024*
Ahmet Selim Canakci	Master Thesis	*2024*
Jonas Schramm	Master Thesis	*2023*
Sassan Mokhtar	Master Thesis	*2023*
Kiran Kumaraswamy	Master Thesis	*2023*
Elias Greve	Master Thesis	*2023*
Akshay Mirylkar	Master Thesis	*2023*
Abdallah Ayad	Master Thesis	*2023*
Nayana Koneru	Master Thesis	*2023*
Amith Boggram	Master Thesis	*2023*
Abhijeet Nayak	Master Thesis	*2023*
Markus Käppeler	Master Thesis	*2023*
Asmaa Khalid	Master Thesis	*2023*
Monish Reddy Nallapareddy	Master Thesis	*2023*

Fabian Schmalstieg	Master Thesis	*2023*
Venkat Subramanyam	Master Thesis	*2023*
Jan Ole von Hartz	Master Thesis	*2022*
Francesco Peracchia	Master Thesis	*2022*
Lorenzo Mur Labadia	Master Thesis	*2022*
Suresh Guttikonda	Master Thesis	*2022*
José Arce y de la Borbolla	Master Thesis	*2022*
Jing Lu	Master Thesis	*2022*
Abdelrahman Younes	Master Thesis	*2021*
Sai Sourabh Tiruvaipati	Master Thesis	*2021*
Rohit Mohan	Master Thesis	*2021*
Borna Bešić	Master Thesis	*2021*
Manav Madan	Master Thesis	*2019*
Eduardo Alvarado	Master Thesis	*2019*
Johan Vertens	Master Thesis	*2016*

Visitors

Eduardo Lawson da Silva	Visiting PhD student	*2026*
Prof. Giovanni Beltrame	Visiting Professor	*2025*
Niyati Rawal	PhD Exchange Student	*2024*
Bhavesh Garg	Internship	*2024*
Mohammad Mohammadi	PhD Exchange Student	*2024*
Jiaye Yang	MSc Exchange Student	*2023*
Alvari Seppänen	PhD Exchange Student	*2023*
Harsh Mahesheka	DAAD-WISE Internship	*2023*
Abhinav Gupta	Internship	*2022*
Jasmeet Kaur	Internship	*2021*
Matteo Vaghi	Internship	*2020*
Jay Patravali	Internship	*2017*
Mayank Mittal	DAAD-WISE Internship	*2017*
Rohit Suri	DAAD-WISE Internship	*2017*
Himanshu Maurya	DAAD-WISE Internship	*2018*
Ankit Dhall	DAAD-WISE Internship	*2016*

Academic Activities

Editorial Services

Management Committee, IEEE Transactions on Robot Learning (T-RL) *2026-2027*
General Chair, German Conference on Pattern Recognition (GCPR) *2025*
Chair, IEEE Robotics and Automation Society (RAS) Technical Committee on Robot Learning *2021-Present*
Senior Editor, IEEE Robotics and Automation Letters (RA-L) *2024-Present*
Senior Area Chair, Conference on Robot Learning (CoRL) *2026*
Area Chair, Robotics: Science and Systems Conference (RSS) *2025-2026*
Area Chair, Conference on Robot Learning (CoRL) *2020-2025*
Guest Editor, IEEE Transactions on Robotics (T-RO) *2024-2025*
Guest Editor, Sensors Journal, Special Issue on Sensing and Semantic Perception in Autonomous Driving *2021*
Associate Editor, International Journal of Robotics Research (IJRR) *2023-Present*
Associate Editor, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) *2020-Present*
Associate Editor, IEEE International Conference on Robotics and Automation (ICRA) *2020-Present*
Associate Editor, International Symposium on Robotics Research (ISRR) *2022-Present*
Associate Editor, IEEE International Conference on Advanced Robotics (ICAR) *2021*
Associate Editor, IEEE Robotics and Automation Letters (RA-L) *2019-2023*
Senior Program Committee Member, International Joint Conference on Artificial Intelligence (IJCAI) *2021-Present*
Program Committee Member, AAAI Conference on Artificial Intelligence, Student Abstract and Poster Program *2020-2023*
Program Committee Member, Conference on Robot Learning (CoRL) *2019-2020*
Program Committee Member, Robotics: Science and Systems (RSS) *2020-2021*

Program Committee Member, 24th European Conference on Artificial Intelligence (ECAI) *2020*
General Co-chair, RSS Pioneers, Robotics: Science and Systems Conference (RSS) *2019*

Workshop & Tutorial Organization

Force-Grounded, Cross-View Articulated Manipulation, European Conference on Computer Vision (ECCV) *2026*
Robot World Models, Robotics: Science and Systems Conference (RSS) *2026*
Resilient Off-road Autonomous Robotics, Robotics: Science and Systems Conference (RSS) *2025*
Label Efficient Learning Paradigms for Autonomy at Scale, IEEE/RSJ Int. Conference on Intelligent Robots and Systems *2024*
Interaction-Aware Autonomous Systems, IEEE/RSJ Int. Conference on Intelligent Robots and Systems (IROS) *2024*
RoboNerF: Neural Fields in Robotics, IEEE International Conference on Robotics and Automation (ICRA) *2024*
Mobile Manipulation and Embodied Intelligence, IEEE International Conference on Robotics and Automation (ICRA) *2024*
3D-Deep Learning for Automated Driving, IEEE Intelligent Vehicles Symposium (IV) *2020-2023*
Open and Trustworthy Deep Learning for Robotics, IEEE/RSJ Int. Conference on Intelligent Robots and Systems (IROS) *2022*
Perception and Navigation for Autonomous Robotics in Unstructured and Dynamic Environments, IEEE/RSJ IROS *2022*
AI Driving Olympics, Conference on Neural Information Processing Systems (NeurIPS) *2021*
Scene Understanding for Unstructured Environments, DAGM German Conference on Pattern Recognition (GCPR) *2021*
Self-Supervised Robot Learning, Robotics: Science and Systems Conference (RSS) *2020*

Reviewing

Project Proposals

European Commission, German Research Foundation (DFG), Swiss National Science Foundation (SNSF), German Academic Exchange Service (DAAD), Luxembourg National Research Fund (FNR), Belgian Science Policy Office (Belspo)

Journals

International Journal of Robotics Research (IJRR), International Journal of Computer Vision (IJCV), IEEE Transactions on Robotics (T-RO), IEEE Transactions on Neural Networks and Learning Systems (TNNLS), Robotics and Autonomous Systems (RAS), IEEE Robotics and Automation Letters (RA-L), IEEE Robotics & Automation Magazine, Journal of Field Robotics (JFR), International Journal of Pattern Recognition and Artificial Intelligence (IJPRAI), IEEE Transactions on Industrial Electronics (T-IE), IEEE Transactions on Multimedia (T-MM), Sensors

Conferences

Conference on Robot Learning (CoRL), IEEE Conference on Computer Vision and Pattern Recognition (CVPR), IEEE International Conference on Computer Vision (ICCV), Robotics: Science and Systems (RSS), IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), International Conference on Field and Service Robotics (FSR), International Symposium on Robotics Research (ISRR), European Conference on Mobile Robotics (ECMR), International Conference on Advanced Robotics (ICAR), German Conference on Pattern Recognition (GCPR), International Conference on Intelligent Robotics and Applications (ICIRA)

External Ph.D. Committee Memberships

Chalmers University of Technology, Sweden *2026*
Tampere University, Finland *2026*
Vrije Universiteit Amsterdam, Netherlands *2026*
KTH Royal Institute of Technology, Sweden *2026*
University of Galway, Ireland *2026*
Czech Technical University in Prague, Czech Republic *2026*
Karlsruhe Institute of Technology, Germany *2025, 26*
RMIT University, Australia *2025*
University of Modena and Reggio Emilia, Italy *2025*
Inria Paris, France *2025*
Technical University Eindhoven, Netherlands *2024*
Halmstad University, Sweden *2024*
Technical University of Munich, Germany *23, 24, 25, 26*
The University of Sydney, Australia *2023*
German Research Centre for Artificial Intelligence, Germany *2023*
TU Delft, Netherlands *2022, 25, 26*
University of Bonn, Germany *2021, 25, 26*

Other Activities

European Lighthouse of AI for Sustainability (ELIAS) Virtual Center of Excellence Freiburg, Site Representative *since 2026*
IEEE European Public Policy Committee (EPPC) Working Group on ICT, Member *since 2026*

European Lighthouse on Secure and Safe AI (ELSA) Freiburg, Site Representative *since 2024*
IEEE Autonomous Agent Alignment Working Group (VT/AVSC/AAA-WG), Founding Member *since 2024*
ELIZA Unit Freiburg, Site Representative, Admissions Committee *since 2025*
Konrad Zuse School of Excellence in Learning and Intelligent Systems (ELIZA), School Board, Academic Fellow *since 2023*
European Laboratory for Learning and Intelligent Systems (ELLIS) Unit Freiburg, Founding Faculty *since 2020*
BrainLinks-BrainTools Center, Member and Principal Investigator *since 2019*

University Departmental Services

- **Admissions Committee Member**, MSc. Computer Science Program, University of Freiburg
- **Organizing Committee Member**, Robotics: Science and Systems (RSS) 2019
- **Organizing Committee Member**, International Conference on Sensors and Related Networks 2007
- **Public Spaces Committee Member**, Field Robotics Center, Carnegie Mellon University

Consultancy Activities

Advisory Board Member, EU Horizon Europe EVENTS project *2023-Present*
Industry Advisory Activities, NDA *since 2022*

Publications

Peer-Reviewed Journal and Conference Articles

[1] F. Schmidt, K. Fedurko, M. Enzweiler, and A. Valada, "Expand-and-prune: Test-time candidate-space adaptation for end-to-end autonomous driving," *Winter Conference on Applications of Computer Vision (WACV)*, 2026.

[2] F. Schmidt, M. Enzweiler, and A. Valada, "Graphpilot: Grounded scene graph conditioning for language-based autonomous driving," *Winter Conference on Applications of Computer Vision (WACV)*, 2026.

[3] M. Büchner, A. Röfer, T. Engelbracht, T. Welschehold, Z. Bauer, H. Blum, M. Pollefeys, and A. Valada, "Articulated 3d scene graphs for open-world mobile manipulation," *10th Annual Conference on Robot Learning (CoRL)*, 2026.

[4] J. Wei, Y. Chen, S. Song, Y. Wu, A. Rehr, and A. Valada, "Copark: Learning reactive parking via self-play," *10th Annual Conference on Robot Learning (CoRL)*, 2026.

[5] Z. Zhuang, R. Wang, N. Heppert, J. Fabian Hahn, A. Valada, F. T. Pokorny, and D. Kragic, "Attention from action, for action: Emergent visual bottlenecks for policy learning," *10th Annual Conference on Robot Learning (CoRL)*, 2026.

[6] D. Rotondi, F. Argenziano, S. Koch, N. Hughes, M. Buechner, J. Wald, L. Rosenberger Schmid, D. Nardi, A. Valada, L. Paull, F. Tombari, L. Carlone, and K. O. Arras, "3d scene graphs: Open challenges and future directions," *Annual Review of Control, Robotics, and Autonomous Systems (ARCRAS)*, vol. 10, 2027.

[7] M. Z. Irshad, M. Comi, Y.-C. Lin, N. Heppert, A. Valada, R. Ambrus, Z. Kira, and J. Tremblay, "Neural fields in robotics: A survey," *IEEE Transactions on Robotics (T-RO)*, 2026.

[8] C. Lang, A. Braun, and A. Valada, "Mask what matters: Saliency-guided video self-supervised learning for autonomous driving," 2026.

[9] R. Corlito, F. Schmidt, N. Seibert, M. Enzweiler, A. Valada, and A. Roennau, "Sensor configuration matters: A systematic evaluation of multimodal slam on quadruped robots," *IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI)*, 2026.

[10] M. Abdelsamad, B. Yang, M. Ulrich, M. Zhang, Y. Miron, A. P. Condurache, and A. Valada, "Ghostpoint: Self-supervised representation learning by hallucinating occluded lidar structure," *European Conference on Computer Vision (ECCV)*, 2026.

[11] L. Yang, G. Eskandar, F. Shen, M. Altillawi, Y. Bai, C. Zhang, Z. Liu, and A. Valada, "Confctrl: Enabling precise camera control in video diffusion via confidence-aware interpolation," *European Conference on Computer Vision (ECCV)*, 2026.

[12] F. Schmidt, K. Fedurko, M. Enzweiler, and A. Valada, "Lad-drive: Bridging language and trajectory with action-aware diffusion transformers," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2026.

[13] M. Käppeler, Ö. Çiçek, Y. Miron, and A. Valada, "Leveraging previous-traversal point cloud map priors for camera-based 3d object detection and tracking," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2026.

[14] M. Luz, T. Nürnberg, Y. Miron, and A. Valada, "Streaming gaussian encoding for 4d panoptic occupancy tracking," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2026.

[15] S. Dorer, M. Büchner, N. Heppert, and A. Valada, "Anchord: Metric grounding of monocular depth using factor graphs," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2026.

[16] S. Kaul, S. Bultmann, M. Berk, and A. Valada, "Effort-based criticality metrics for evaluating 3d perception errors in autonomous driving," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2026.

[17] S. Kaul, S. Bultmann, M. Berk, and A. Valada, "Contour errors: An ego-centric metric for reliable 3d multi-object tracking," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2026.

[18] M. Luz, R. Mohan, T. Nürnberg, Y. Miron, D. Cattaneo, and A. Valada, "Latent gaussian splatting for 4d panoptic occupancy tracking," *IEEE Robotics and Automation Letters (RA-L)*, 2026.

[19] J. O. von Hartz, A. Röfer, J. Boedecker, and A. Valada, "The unreasonable effectiveness of discrete-time gaussian process mixtures for robot policy learning," *IEEE Transactions on Robotics (T-RO)*, 2026.

[20] R. Mohan, F. Drews, Y. Miron, D. Cattaneo, and A. Valada, "Up-fuse: Uncertainty-guided lidar-camera fusion for 3d panoptic segmentation," *Robotics: Science and Systems (RSS)*, 2026.

[21] J. O. von Hartz, L. Schweizer, J. Boedecker, and A. Valada, "Msg: Multi-stream generative policies for sample-efficient robotic manipulation," *IEEE Robotics and Automation Letters (RA-L)*, 2026.

[22] T. Engelbracht, R. Zurbrügg, M. Wohlrapp, M. Büchner, A. Valada, M. Pollefeys, H. Blum, and Z. Bauer, "Hoi! - a multimodal dataset for force-grounded, cross-view articulated manipulation," *IEEE/CVF International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2026.

[23] J. Wei, A. Rehr, C. Feist, and A. Valada, "Parkdiffusion++: Ego intention conditioned joint multi-agent trajectory prediction for automated parking using diffusion models," *IEEE International Conference on Robotics and Automation (ICRA)*, 2026.

[24] N. Heppert, M. Quang Nguyen, and A. Valada, "Scaling single human demonstrations for imitation learning using generative foundational models," *IEEE International Conference on Robotics and Automation (ICRA)*, 2026.

[25] R. Mohan, J. V. Hurtado, R. Mohan, and A. Valada, "Forecastocc: Vision-based semantic occupancy forecasting," *IEEE International Conference on Robotics and Automation (ICRA)*, 2026.

[26] L. Yang, Y. Bai, G. Eskandar, F. Shen, M. Altillawi, D. Chen, Z. Liu, and A. Valada, "Covar: Co-generation of video and action for robotic manipulation via multi-modal diffusion," *IEEE International Conference on Robotics and Automation (ICRA)*, 2026.

[27] M. Abdelsamad, M. Ulrich, B. Yang, M. Zhang, Y. Miron, and A. Valada, "Dos: Distilling observable softmaps of zipfian prototypes for self-supervised point representation learning," *AAAI Conference on Artificial Intelligence (AAAI)*, 2026.

[28] J. V. Hurtado, R. Mohan, and A. Valada, "Hyperspectral adapter for semantic segmentation with vision foundation models," *IEEE Robotics and Automation Letters (RA-L)*, 2026.

[29] F. Schmidt, N. M. K. Abdul Nazar, M. Enzweiler, and A. Valada, "Enhancing llm-based autonomous driving with modular traffic light and sign recognition," *IEEE Intelligent Vehicles Symposium (IV)*, 2026.

[30] R. Buchanan, A. Röfer, J. Moura, A. Valada, and S. Vijayakumar, "Online estimation and manipulation of articulated objects," *Autonomous Robots*, 2026.

[31] A. Röfer, R. Buchanan, M. Argus, S. Vijayakumar, and A. Valada, "Efficient learning of object placement with intra-category transfer," *IEEE Robotics and Automation Letters (RA-L)*, vol. 11, no. 1, pp. 442–449, 2026.

[32] J. K. Rai, A. Valada, A. K. Dubey, and A. Abdelgawad, Eds., *Emerging Trends in Artificial Intelligence and Machine Learning*. Springer Singapore, 2026.

[33] L. Paull, S. Morin, D. Maggio, M. Büchner, C. Cadena, A. Valada, and L. Carlone, "Towards open-world spatial AI," in *SLAM Handbook. From Localization and Mapping to Spatial Intelligence*, L. Carlone, A. Kim, T. Barfoot, D. Cremers, and F. Dellaert, Eds., Cambridge University Press, 2026.

[34] C. Kassab, S. Morin, M. Büchner, M. Mattamala, K. Gupta, A. Valada, L. Paull, and M. Fallon, "Openlex3d: A new evaluation benchmark for open-vocabulary 3d scene representations," *Thirty-ninth Annual Conference on Neural Information Processing Systems Datasets and Benchmarks Track*, 2025.

[35] A. Werby, M. Büchner, A. Röfer, C. Huang, W. Burgard, and A. Valada, "Articulated object estimation in the wild," in *Proceedings of The 9th Conference on Robot Learning*, vol. 305, 2025, pp. 3828–3849.

[36] A. L. Chandra, I. Nematollahi, C. Huang, T. Welschehold, W. Burgard, and A. Valada, "Diwa: Diffusion policy adaptation with world models," in *Proceedings of The 9th Conference on Robot Learning*, vol. 305, 2025, pp. 3378–3400.

[37] E. Chisari, J. O. von Hartz, F. Despinoy, and A. Valada, "Robotic task ambiguity resolution via natural language interaction," 2025, pp. 14 821–14 827.

[38] M. Mohammadi, D. Honerkamp, M. Büchner, M. Cassinelli, T. Welschehold, F. Despinoy, I. Gilitschenski, and A. Valada, "More: Mobile manipulation rearrangement through grounded language reasoning," 2025, pp. 1805–1811.

[39] M. Büchner, L. Dahiya, S. Dorer, V. Ramtekkar, K. Nishimiya, D. Cattaneo, and A. Valada, "Visual loop closure detection through deep graph consensus," 2025, pp. 6164–6171.

[40] T. Steinke, M. Büchner, N. Vödisch, and A. Valada, "Collaborative dynamic 3d scene graphs for open-vocabulary urban scene understanding," 2025, pp. 6000–6007.

[41] L. Yang, Y. Bai, G. Eskandar, F. Shen, M. Altillawi, D. Chen, S. Majumder, Z. Liu, G. Kutyniok, and A. Valada, "Roboenvision: A long-horizon video generation model for multi-task robot manipulation," 2025, pp. 21 281–21 288.

[42] J. V. Hurtado, S. Marvi, R. Mohan, and A. Valada, "Learning appearance and motion cues for panoptic tracking," 2025, pp. 4315–4322.

[43] R. Mohan, J. Hindel, F. Drews, C. Glaser, D. Cattaneo, and A. Valada, "Open-set lidar panoptic segmentation guided by uncertainty-aware learning," 2025, pp. 2224–2231.

[44] J. Hindel, R. Mohan, J. Bratulic, D. Cattaneo, T. Brox, and A. Valada, "Label-efficient lidar semantic segmentation with 2d-3d vision transformer adapters," 2025, pp. 4115–4122.

[45] J. Wei, N. Vödisch, A. Rehr, C. Feist, and A. Valada, "Parkdiffusion: Heterogeneous multi-agent multi-modal trajectory prediction for automated parking using diffusion models," 2025, pp. 8297–8304.

[46] S. Marvi, C. Rist, J. Schmidt, J. Jordan, and A. Valada, "Evidential uncertainty estimation for multi-modal trajectory prediction," 2025, pp. 785–792.

[47] A. Distelzweig, A. Look, E. Kosman, F. Janjoš, J. Wagner, and A. Valada, "Stochasticity in motion: An information-theoretic approach to trajectory prediction," 2025, pp. 6211–6218.

[48] A. Selim Çanakçı, N. Vödisch, K. Petek, W. Burgard, and A. Valada, "Label-efficient lidar panoptic segmentation," 2025, pp. 4385–4392.

[49] F. Schmidt, J. Daubermann, M. Mitschke, C. Blessing, S. Meyer, M. Enzweiler, and A. Valada, "Rover: A multi-season dataset for visual slam," *IEEE Transactions on Robotics (T-RO)*, vol. 41, pp. 4005–4022, 2025.

[50] R. Schneider, D. Honerkamp, T. Welschehold, and A. Valada, "Task-driven co-design of mobile manipulators," *IEEE Automation and Robotics Letters (RA-L)*, vol. 10, no. 7, pp. 7158–7165, 2025.

[51] F. Schmidt, C. Blessing, M. Enzweiler, and A. Valada, "Visual-inertial slam for unstructured outdoor environments: Benchmarking the benefits and computational costs of loop closing," *Journal of Field Robotics*, vol. 42, no. 7, pp. 3726–3747, 2025.

[52] M. Abdelsamad, M. Ulrich, C. Glaser, and A. Valada, "Multi-scale neighborhood occupancy masked autoencoder for self-supervised learning in lidar point clouds," 2025, pp. 22 234–22 243.

[53] D. Cattaneo and A. Valada, "Cmrnext: Camera to lidar matching in the wild for localization and extrinsic calibration," *IEEE Transactions on Robotics (T-RO)*, vol. 41, pp. 1995–2013, 2025.

[54] J. V. Hurtado, R. Mohan, and A. Valada, "Panoptic-depth forecasting," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2025, pp. 01–07.

[55] A. Distelzweig, E. Kosman, A. Look, F. Janjoš, D. K. Manivannan, and A. Valada, "Motion forecasting via model-based risk minimization," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2025, pp. 7011–7018.

[56] A. Röfer, N. Heppert, A. Ayman, E. Chisari, and A. Valada, "Pseudotouch: Efficiently imaging the surface feel of objects for robotic manipulation," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2025, pp. 16 035–16 041.

[57] D. Honerkamp, H. Mahesheka, J. O. von Hartz, T. Welschehold, and A. Valada, "Whole-body teleoperation for mobile manipulation at zero added cost," *IEEE Robotics and Automation Letters (RA-L)*, vol. 10, no. 4, pp. 3198–3205, 2025.

[58] J. Hindel, D. Cattaneo, and A. Valada, "Taxonomy-aware continual semantic segmentation in hyperbolic spaces for open-world perception," *IEEE Robotics and Automation Letters (RA-L)*, vol. 10, no. 2, pp. 1904–1911, 2025.

[59] N. Vödisch, K. Petek, M. Käppeler, A. Valada, and W. Burgard, "A good foundation is worth many labels: Label-efficient panoptic segmentation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 10, no. 1, pp. 216–223, 2025.

[60] E. Chisari, N. Heppert, M. Argus, T. Welschehold, T. Brox, and A. Valada, "Learning robotic manipulation policies from point clouds with conditional flow matching," in *Proceedings of The 8th Conference on Robot Learning*, vol. 270, 2025, pp. 982–993.

[61] R. Mohan, D. Cattaneo, F. Drews, and A. Valada, "Progressive multi-modal fusion for robust 3d object detection," in *Proceedings of The 8th Conference on Robot Learning*, vol. 270, 2025, pp. 3285–3303.

[62] S. Prasanna, D. Honerkamp, K. Sirohi, T. Welschehold, W. Burgard, and A. Valada, "Perception matters: Enhancing embodied ai with uncertainty-aware semantic segmentation," in *Proc. of the International Symposium on Robotics Research (ISRR)*, 2024.

[63] J. von Hartz, T. Welschehold, A. Valada, and J. Boedecker, "The art of imitation: Learning long-horizon manipulation tasks from few demonstrations," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 2, pp. 11 369–11 376, 2024.

[64] K. Petek, N. Vödisch, J. Meyer, D. Cattaneo, A. Valada, and W. Burgard, "Automatic target-less camera-lidar calibration from motion and deep point correspondences," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 11, pp. 9978–9985, 2024.

[65] S. Lochner, D. Honerkamp, A. Valada, and A. D. Straw, "Recent trends in insect and robot navigation through the lens of reinforcement learning," *Frontiers in Computational Neuroscience*, vol. 18, 2024.

[66] A. R. Sekkat, R. Mohan, O. Sawade, E. Matthes, and A. Valada, "Amodalsynthdrive: A synthetic amodal perception dataset for autonomous driving," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 11, pp. 9597–9604, 2024.

[67] D. Honerkamp, M. Büchner, F. Despinoy, T. Welschehold, and A. Valada, "Language-grounded dynamic scene graphs for interactive object search with mobile manipulation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 10, pp. 8298–8305, 2024.

[68] A. Röfer, I. Nematollahi, T. Welschehold, W. Burgard, and A. Valada, "Bayesian optimization for sample-efficient policy improvement in robotic manipulation," in *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024, pp. 2801–2808.

[69] N. Heppert, M. Argus, T. Welschehold, T. Brox, and A. Valada, "Ditto: Demonstration imitation by trajectory transformation," in *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024, pp. 7565–7572.

[70] J. Schramm, N. Vödisch, K. Petek, R. B. Kiran, S. Yogamani, W. Burgard, and A. Valada, "Bevcar: Camera-radar fusion for bev map and object segmentation," in *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024, pp. 1435–1442.

[71] L. Christopher, A. Braun, L. Schillingmann, and A. Valada, "A point-based approach to efficient lidar multi-task perception," in *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024, pp. 13 261–13 268.

[72] N. Gosala, K. Petek, B. R. Kiran, S. Yogamani, P. L. J. Drews-Jr, W. Burgard, and A. Valada, "Letsmap: Unsupervised representation learning for semantic bev mapping," in *Proc. of the European Conference on Computer Vision (ECCV)*, 2024, pp. 110–126.

[73] R. Mohan, J. Arce, S. Mokhtar, D. Cattaneo, and A. Valada, "Syn-mediverse: A multimodal synthetic dataset for intelligent scene understanding of healthcare facilities," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 8, pp. 7094–7101, 2024.

[74] L. Londono, J. V. Hurtado, N. Hertz, P. Kellmeyer, S. Voeneky, and A. Valada, "Fairness and bias in robot learning," *Proceedings of the IEEE*, vol. 112, no. 4, pp. 305–330, 2024.

[75] I. Diester, M. Bartos, J. Bödecker, A. Kortylewski, C. Leibold, J. Letzkus, M. M. Nour, M. Schönauer, A. Straw, A. Valada, A. Vlachos, and T. Brox, "Internal world models in humans, animals, and ai," *Neuron*, vol. 112, no. 14, pp. 2265–2268, 2024, ISSN: 0896-6273.

[76] A. Werby, C. Huang, M. Büchner, A. Valada, and W. Burgard, "Hierarchical open-vocabulary 3d scene graphs for language-grounded robot navigation," *Proc. of the Robotics: Science and Systems (RSS)*, 2024.

[77] E. Chisari, N. Heppert, T. Welschehold, W. Burgard, and A. Valada, "Centergrasp: Object-aware implicit representation learning for simultaneous shape reconstruction and 6-dof grasp estimation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 6, pp. 5094–5101, 2023.

[78] G. K.J. Fischer, M. Bergau, D. A. Gómez-Rosal, A. Wachaja, J. Gräter, M. Odenweller, U. Piechottka, F. Hoeflinger, N. Gosala, N. Wetzel, D. Büscher, A. Valada, and W. Burgard, "Evaluation of a smart mobile robotic system for industrial plant inspection and supervision," *IEEE Sensors Journal*, vol. 24, no. 12, pp. 19 684–19 697, 2024.

[79] R. Mohan, K. Kumaraswamy, J. V. Hurtado, K. Petek, and A. Valada, "Panoptic out-of-distribution segmentation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 5, pp. 4075–4082, 2024.

[80] M. Luz, R. Mohan, A. R. Sekkat, O. Sawade, E. Matthes, T. Brox, and A. Valada, "Amodal optical flow," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[81] M. Argus, A. Nayak, M. Büchner, S. Galesso, A. Valada, and T. Brox, "Compositional servoing by recombining demonstrations," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[82] R. Buchanan, A. Röfer, J. Moura, A. Valada, and S. Vijayakumar, "Online estimation of articulated objects with factor graphs using vision and proprioceptive sensing," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[83] M. Käppeler, K. Petek, N. Vödisch, W. Burgard, and A. Valada, "Few-shot panoptic segmentation with foundation models," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[84] A. Nayak, D. Cattaneo, and A. Valada, "Ralf: Flow-based global and metric radar localization in lidar maps," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[85] E. Greve, M. Büchner, N. Vödisch, W. Burgard, and A. Valada, "Collaborative dynamic 3d scene graphs for automated driving," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

[86] C. Lang, A. Braun, L. Schillingmann, K. Haug, and A. Valada, "Self-supervised representation learning from temporal ordering of automated driving sequences," *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 3, pp. 2582–2589, 2023.

[87] C. Lang, A. Braun, L. Schillingmann, and A. Valada, "Self-supervised multi-object tracking from consistency across timescales," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 11, pp. 7711–7718, 2023.

[88] D. Unger, N. Gosala, V. Ravi Kumar, S. Borse, A. Valada, and S. Yogamani, "Multi-camera bird's eye view perception for autonomous driving," *Computer Vision: Challenges, Trends, and Opportunities*, A. Rahman Ahad, U. Mahbub, M. Turk, and R. Hartley, Eds., 2023.

[89] D. A. Gómez-Rosal, M. Bergau, G. K.J. Fischer, A. Wachaja, J. Gräter, U. Piechottka, F. Hoeflinger, N. Gosala, N. Wetzel, D. Büscher, A. Valada, and W. Burgard, "A smart robotic system for industrial plant supervision," *IEEE SENSORS*, 2023.

[90] F. Schmalstieg, D. Honerkamp, T. Welschehold, and A. Valada, "Learning hierarchical interactive multi-object search for mobile manipulation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 12, pp. 8549–8556, 2023.

[91] J. O. von Hartz, E. Chisari, T. Welschehold, W. Burgard, J. Boedecker, and A. Valada, "The treachery of images: Bayesian scene keypoints for deep policy learning in robotic manipulation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 11, pp. 6931–6938, 2023.

[92] J. Hindel, N. Gosala, K. Bregler, and A. Valada, "Inod: Injected noise discriminator for self-supervised representation learning in agricultural fields," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 9, pp. 6013–6020, 2023.

[93] R. Trumpp, M. Büchner, A. Valada, and M. Caccamo, "Efficient learning of urban driving policies using bird's-eye-view state representations," in *Proc. of the IEEE International Conference on Intelligent Transportation Systems (ITSC)*, 2023.

[94] M. R. Nallapareddy, K. Sirohi, P. L. J. Drews-Jr, W. Burgard, C.-H. Cheng, and A. Valada, "Evcenternet: Uncertainty estimation for object detection using evidential learning," in *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.

[95] D. Honerkamp, T. Welschehold, and A. Valada, "N2m2:learning navigation for arbitrary mobile manipulation motions in unseen and dynamic environments," *IEEE Transactions on Robotics (T-RO)*, vol. 39, no. 5, pp. 3601–3619, 2023.

[96] N. Vödisch, K. Petek, W. Burgard, and A. Valada, "Codeps: Online continual learning for depth estimation and panoptic segmentation," in *Proc. of the Robotics: Science and Systems (RSS)*, 2023.

[97] N. Gosala, K. Petek, P. L. Drews-Jr, W. Burgard, and A. Valada, "Skyeye: Self-supervised bird's-eye-view semantic mapping using monocular frontal view images," in *Proc. of the IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.

[98] N. Heppert, M. Zubair Irshad, S. Zakharov, K. Liu, R. Andrei Ambrus, J. Bohg, A. Valada, and T. Kollar, "Carto: Category and joint agnostic reconstruction of articulated objects," in *Proc. of the IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.

[99] M. Büchner, J. Zürn, I.-G. Todoran, A. Valada, and W. Burgard, "Learning and aggregating lane graphs for urban automated driving," in *Proc. of the IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.

[100] T. Elsken, A. Zela, J. H. Metzen, B. Staffler, T. Brox, A. Valada, and F. Hutter, "Neural architecture search for dense prediction tasks in computer vision," *International Journal of Computer Vision (IJCV)*, vol. 131, no. 7, pp. 1784–1807, 2022.

[101] J. Arce, N. Vödisch, D. Cattaneo, W. Burgard, and A. Valada, "Padloc: Lidar-based deep loop closure detection and registration using panoptic attention," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 3, pp. 1319–1326, 2023.

[102] A. Younes, D. Honerkamp, T. Welschehold, and A. Valada, "Catch me if you hear me: Audio-visual navigation in complex unmapped environments with moving sounds," *IEEE Robotics and Automation Letters (RA-L)*, vol. 8, no. 2, pp. 928–935, 2023.

[103] C. Celemin, R. Pérez-Dattari, E. Chisari, G. Franzese, L. de Souza Rosa, R. Prakash, Z. Ajanović, M. Ferraz, A. Valada, and J. Kober, "Interactive imitation learning in robotics: A survey," *Foundations and Trends in Robotics*, vol. 10, no. 1-2, pp. 1–197, 2022.

[104] F. Schmalstieg, D. Honerkamp, T. Welschehold, and A. Valada, "Learning long-horizon robot exploration strategies for multi-object search in continuous action spaces," in *Proc. of the International Symposium on Robotics Research (ISRR)*, 2022.

[105] N. Vödisch, D. Cattaneo, W. Burgard, and A. Valada, "Continual slam: Beyond lifelong simultaneous localization and mapping through continual learning," in *Proc. of the International Symposium on Robotics Research (ISRR)*, 2022.

[106] C. Lang, A. Braun, and A. Valada, "On hyperbolic embeddings in 2d object detection," in *Proc. of the German Conference on Pattern Recognition (GCPR)*, 2022.

[107] C. Lang, A. Braun, and A. Valada, "Contrastive object detection using knowledge graph embeddings," in *Proc. of the German Conference on Pattern Recognition (GCPR)*, 2021.

[108] R. Mohan and A. Valada, "Perceiving the invisible: Proposal-free amodal panoptic segmentation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 4, pp. 9302–9309, 2022.

[109] M. Büchner and A. Valada, "3d multi-object tracking using graph neural networks with cross-edge modality attention," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 4, pp. 9707–9714, 2022.

[110] N. Passalis, S. Pedrazzi, R. Babuska, W. Burgard, D. Dias, F. Ferro, M. Gabbouj, O. Green, A. Iosifidis, E. Kayacan, J. Kober, O. Michel, N. Nikolaidis, P. Nousi, R. Pieters, M. Tzelepi, A. Valada, and A. Tefas, "Opendr: An open toolkit for enabling high performance, low footprint deep learning for robotics," in *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022.

[111] R. Mohan and A. Valada, "Amodal panoptic segmentation," in *Proc. of the IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.

[112] J. V. Hurtado and A. Valada, "Semantic scene segmentation for robotics," *Deep Learning for Robot Perception and Cognition*, vol. chapter 12, pp. 279–311, 2022.

[113] I. Nematollahi, E. Rosete-Beas, A. Röfer, T. Welschehold, A. Valada, and W. Burgard, "Robot skill adaptation via soft actor-critic gaussian mixture models," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2022.

[114] D. Cattaneo, M. Vaghi, and A. Valada, "Lcdnet: Deep loop closure detection and point cloud registration for lidar slam," *IEEE Transactions on Robotics (T-RO)*, vol. 38, no. 4, pp. 2074–2093, 2022.

[115] W. K. Fong, R. Mohan, J. V. Hurtado, L. Zhou, H. Caesar, O. Beijbom, and A. Valada, "Panoptic nuscenes: A large-scale benchmark for lidar panoptic segmentation and tracking," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 2, pp. 3795–3802, 2022.

[116] A. Röfer, G. Bartels, A. Valada, and M. Beetz, "Kineverse: A symbolic articulation model framework for model-agnostic mobile manipulation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 2, pp. 3372–3379, 2022.

[117] E. Chisari, T. Welschehold, J. Boedecker, W. Burgard, and A. Valada, "Correct me if i am wrong: Interactive learning for robotic manipulation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 2, pp. 3695–3702, 2022.

[118] B. Bešić, N. Gosala, D. Cattaneo, and A. Valada, "Unsupervised domain adaptation for lidar panoptic segmentation," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 2, pp. 3404–3411, 2022.

[119] B. Besic and A. Valada, "Dynamic object removal and spatio-temporal rgb-d inpainting via geometry-aware adversarial learning," *IEEE Transactions on Intelligent Vehicles (T-IV)*, vol. 7, no. 2, pp. 170–185, 2022.

[120] N. Gosala and A. Valada, "Bird's-eye-view panoptic segmentation using monocular frontal view images," *IEEE Robotics and Automation Letters (RA-L)*, vol. 7, no. 2, pp. 1968–1975, 2021.

[121] K. Sirohi, R. Mohan, D. Büscher, W. Burgard, and A. Valada, "Efficientlps: Efficient lidar panoptic segmentation," *IEEE Transactions on Robotics (T-RO)*, vol. 38, no. 3, pp. 1894–1914, 2021.

[122] P. Jakob, M. Madan, T. Schmid-Schirling, and A. Valada, "Multi-perspective anomaly detection," *Sensors*, vol. 21, no. 16, 2021.

[123] D. Honerkamp, T. Welschehold, and A. Valada, "Learning kinematic feasibility for mobile manipulation through deep reinforcement learning," *IEEE Robotics and Automation Letters (RA-L)*, vol. 6, no. 4, pp. 6289–6296, 2021.

[124] F. Rivera Valverde, J. V. Hurtado, and A. Valada, "There is more than meets the eye: Self-supervised multi-object detection and tracking with sound by distilling multimodal knowledge," in *Proc. of the IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021, pp. 11 612–11 621.

[125] J. V. Hurtado, L. Londoño, and A. Valada, "From learning to relearning: A framework for diminishing bias in social robot navigation," *Frontiers in Robotics and AI*, vol. 8, p. 650 325, 2021.

[126] R. Mohan and A. Valada, "EfficientPS: Efficient Panoptic Segmentation," *International Journal of Computer Vision (IJCV)*, vol. 129, no. 5, pp. 1551–1579, 2021.

[127] J. Zürn, W. Burgard, and A. Valada, "Self-supervised visual terrain classification from unsupervised acoustic feature learning," *IEEE Transactions on Robotics (T-RO)*, vol. 37, no. 2, pp. 466–481, 2020.

[128] N. Radwan, W. Burgard, and A. Valada, "Multimodal Interaction-aware Motion Prediction for Autonomous Street Crossing," *International Journal of Robotics Research (IJRR)*, vol. 39, no. 13, pp. 1567–1598, 2020.

[129] M. Mittal, R. Mohan, W. Burgard, and A. Valada, "Vision-based autonomous uav navigation and landing for urban search and rescue," in *Proc. of the International Symposium on Robotics Research (ISRR)*, 2019.

[130] A. Valada, R. Mohan, and W. Burgard, "Self-supervised model adaptation for multimodal semantic segmentation," *International Journal of Computer Vision (IJCV)*, vol. 128, no. 5, pp. 1239–1285, 2019.

[131] F. Boniardi*, A. Valada*, R. Mohan, T. Caselitz, and W. Burgard, "Robot Localization in Floor Plans using a Room Layout Edge Extraction Network," in *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2019.

[132] N. Radwan, A. Valada, and W. Burgard, "Vlocnet++: Deep multitask learning for semantic visual localization and odometry," *IEEE Robotics and Automation Letters (RA-L)*, vol. 3, no. 4, pp. 4407–4414, 2018.

[133] A. Valada*, N. Radwan*, and W. Burgard, "Deep auxiliary learning for visual localization and odometry," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2018, pp. 6939–6946.

[134] W. Burgard, A. Valada, N. Radwan, T. Naseer, J. Zhang, J. Vertens, O. Mees, A. Eitel, and G. Oliveira, "Perspectives on Deep Multimodel Robot Learning," in *Proc. of the International Symposium on Robotics Research (ISRR)*, 2017.

[135] J. Vertens*, A. Valada*, and W. Burgard, "SMSnet: Semantic Motion Segmentation using Deep Convolutional Neural Networks," in *Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2017.

[136] A. Valada, J. Vertens, A. Dhall, and W. Burgard, "AdapNet: Adaptive Semantic Segmentation in Adverse Environmental Conditions," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2017.

[137] A. Valada and W. Burgard, "Deep spatiotemporal models for robust proprioceptive terrain classification," *The International Journal of Robotics Research (IJRR)*, vol. 36, no. 13-14, pp. 1521i–1539, 2017.

[138] A. Valada, G. L. Oliveira, T. Brox, and W. Burgard, "Deep Multispectral Semantic Scene Understanding of Forested Environments Using Multimodal Fusion," *Proc. of the International Symposium on Experimental Robotics (ISER)*, pp. 465–477, 2017.

[139] G. L. Olivera, A. Valada, W. Burgard, and T. Brox, "Deep Learning for Human Part Discovery in Images," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2016.

[140] F. Boniardi, A. Valada, W. Burgard, and G. D. Tipaldi, "Autonomous Indoor Robot Navigation Using a Sketch Interface for Drawning Maps and Routes," in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, 2016.

[141] A. Valada, L. Spinello, and W. Burgard, "Deep Feature Learning for Acoustics-based Terrain Classification," *Proc. of the International Symposium on Robotics Research (ISRR)*, vol. 2, pp. 21–37, 2015, (Selected in Top 10).

[142] C. Tomaszewski, A. Valada, and P. Scerri, "Planning Efficient Paths through Dynamic Flow Fields in Real World Domains," in *Proc. of the MTS/IEEE OCEANS*, 2013.

[143] A. Valada, C. Tomaszewski, B. Kannan, P. Velagapudi, G. A. Kantor, and P. Scerri, "An Intelligent Approach to Hysteresis Compensation while Sampling using a Fleet of Autonomous Watercraft," in *Proc. of the International Conference on Intelligent Robotics and Applications (ICIRA)*, 2012.

[144] N. Tanke, G. A. Long, D. Agrawal, A. Valada, and G. A. Kantor, "Automation of Hydroponic Installations using a Robot with Position Based Visual Feedback," in *Proc. of the International Conference of Agricultural Engineering (CIGR-Ageng)*, 2012.

[145] D. Kohanbash, A. Valada, and G. A. Kantor, "Base Station Design and Architecture for Wireless Sensor Networks," in *Proc. of the International Conference of Agricultural Engineering (CIGR-Ageng)*, 2012.

[146] A. Valada, P. Velagapudi, B. Kannan, C. Tomaszewski, G. A. Kantor, and P. Scerri, "Development of a low cost multi-robot autonomous marine surface platform," in *Proc. of the International Conference on Field and Service Robotics (FSR)*, 2012.

[147] P. Scerri, P. Velagapudi, B. Kannan, A. Valada, C. Tomaszewski, J. M. Dolan, A. Scerri, K. S. Shankar, L. L. Bill-Clark, and G. A. Kantor, "Real-World Testing of a Multi-Robot Team," in *Proc. of the International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2012.

[148] A. Valada, D. Kohanbash, and G. A. Kantor, "DSRP: Distributed SensorWeb Routing Protocol," in *Proc. of the International Conference on Electronics, Communications and Computers (CONIELECOMP)*, 2011.

[149] D. Kohanbash, A. Valada, and G. A. Kantor, "Development of a Distributed Wireless Sensing System for Agriculture," in *Proc. of the International Symposium on Wireless Sensor Network for Agriculture*, 2012.

Peer-Reviewed Workshop Papers

[1] J. Hindel, E. Mekic, E. Naga Karthik, R. Mohan, D. Cattaneo, and A. Valada, "Dynamic robot-assisted surgery with hierarchical class-incremental semantic segmentation," *MICCAI Workshop on Applications of Medical Artificial Intelligence*, 2025.

[2] M. Argus, J. Bratulić, H. Masnavi, M. Velikanov, N. Heppert, A. Valada, and T. Brox, "Cvla: Towards efficient camera-space vlas," *CoRL Workshop on Generalizable Priors for Robot Manipulation*, 2025.

[3] A. L. Chandra, I. Nematollahi, C. Huang, T. Welschehold, and A. Valada, "Diwa: Diffusion policy adaptation with world models," *RSS Workshop on Structured World Models for Robotic Manipulation*, 2025.

[4] A. Werby, M. Büchner, A. Röfer, C. Huang, W. Burgard, and A. Valada, "Articulated object estimation in the wild," *RSS Workshop on Egocentric Perception and Action for Robot Learning*, 2025.

[5] M. Mohammadi, D. Honerkamp, M. Büchner, M. Cassinelli, T. Welschehold, F. Despinoy, I. Gilitschenski, and A. Valada, "More: Mobile manipulation rearrangement through grounded language reasoning," *RSS Workshop on Mobile Manipulation: Emerging Opportunities Contemporary Challenges*, 2025.

[6] C. Kassab, S. Morin, M. Büchner, M. Mattamala, K. Gupta, A. Valada, L. Paull, and M. Fallon, "Openlex3d: A new evaluation benchmark for open-vocabulary 3d scene representations," *Thirty-ninth Annual Conference on Neural Information Processing Systems Datasets and Benchmarks Track*, 2025.

[7] D. Honerkamp, H. Mahesheka, J. O. von Hartz, T. Welschehold, and A. Valada, "Whole-body teleoperation for mobile manipulation at zero added cost," *ICRA Workshop on Human-Centric Multilateral Teleoperation*, 2024.

[8] N. Heppert, M. Quang Nguyen, and A. Valada, "Real2gen: Imitation learning from a single human demonstration with generative foundational models," *ICRA Workshop on Foundation Models and Neuro-Symbolic AI for Robotics*, 2025.

[9] J. Hindel, R. Mohan, J. Bratulic, D. Cattaneo, T. Brox, and A. Valada, "Label-efficient lidar semantic segmentation with 2d-3d vision transformer adapters," *ICRA Workshop on Foundation Models and Neuro-Symbolic AI for Robotics*, 2025.

[10] M. Kurenkov, S. Marvi, J. Schmidt, C. B. Rist, A. Canevaro, H. Yu, J. Jordan, G. Schildbach, and A. Valada, "Traffic and safety rule compliance of humans in diverse driving situations," in *CoRL Workshop on Safe and Robust Robot Learning for Operation in the Real World*, 2024.

[11] M. Büchner, S. Dorer, and A. Valada, "Learning lane graphs from aerial imagery using transformers," in *Robotics: Science and Systems Workshop on Autonomous Vehicles Across Scales*, 2024.

[12] A. Ayman, A. Röfer, N. Heppert, and A. Valada, "Imagine2touch: Predictive tactile sensing for robotic manipulation using efficient low-dimensional signals," in *IEEE International Conference on Robotics and Automation Workshop on Robot Embodiment through Visuo-Tactile Perception*, 2024.

[13] S. Mokhtar, E. Chisari, N. Heppert, and A. Valada, "Centerart: Joint shape reconstruction and 6-dof grasp estimation of articulated objects," in *IEEE International Conference on Robotics and Automation Workshop on 3D Visual Representations for Robot Manipulation*, 2024.

[14] N. Vödisch, D. Cattaneo, W. Burgard, and A. Valada, "Covio: Online continual learning for visual-inertial odometry," in *Proc. of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, 2023.

[15] D. Honerkamp, S. Guttikonda, and A. Valada, "Active particle filter networks: Efficient active localization in continuous action spaces and large maps," *IEEE/RSJ International Conference on Intelligent Robots and Systems Workshop on Probabilistic Robotics in the Age of Deep Learning*, 2022.

[16] J. O. von Hartz, E. Chisari, T. Welschehold, and A. Valada, "Self-supervised learning of multi-object keypoints for robotic manipulation," *IEEE International Conference on Robotics and Automation Workshop on Reinforcement Learning for Contact-Rich Manipulation*, 2022.

[17] L. Londoño, A. Röfer, T. Welschehold, and A. Valada, "Doing right by not doing wrong in human-robot collaboration," *ACM/IEEE International Conference on Human-Robot Interaction Workshop on Fairness and Transparency in Human-Robot Interaction*, 2022.

[18] R. Mohan and A. Valada, "7th ai driving olympics: 1st place report for panoptic tracking," in *Conference on Neural Information Processing Systems (NeurIPS 2021) Workshop on AI Driving Olympics*, 2021.

[19] R. Mohan and A. Valada, "Robust vision challenge 2020 - 1st place report for panoptic segmentation," *European Conference on Computer Vision (ECCV) Workshop on Robust Vision Challenge*, 2020.

[20] D. Cattaneo, D. G. Sorrenti, and A. Valada, "Cmrnet++: Map and camera agnostic monocular visual localization in lidar maps," in *IEEE International Conference on Robotics and Automation (ICRA) Workshop on Emerging Learning and Algorithmic Methods for Data Association in Robotics*, 2020.

[21] J. V. Hurtado, R. Mohan, W. Burgard, and A. Valada, "Mopt: Multi-object panoptic tracking," in *The IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshop on Scalability in Autonomous Driving*, 2020.

[22] M. Mittal*, A. Valada*, and W. Burgard, "Vision-based Autonomous Landing in Catastrophe-Struck Environments," in *Workshop on Vision-based Drones: What's Next? at the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2018.

[23] A. Valada*, N. Radwan*, and W. Burgard, "Incorporating Semantic and Geometric Priors in Deep Pose Regression," in *Workshop on Learning and Inference in Robotics: Integrating Structure, Priors and Models at Robotics: Science and Systems (RSS)*, 2018.

[24] A. Valada and W. Burgard, "Learning Reliable and Scalable Representations Using Multimodal Multitask Deep Learning," in *RSS Pioneers at Robotics: Science and Systems (RSS)*, 2018.

[25] A. Valada, A. Dhall, and W. Burgard, "Convoluted Mixture of Deep Experts for Robust Semantic Segmentation," in *Workshop on State Estimation and Terrain Perception for All Terrain Mobile Robots at IEEE International Conference on Intelligent Robots and Systems (IROS)*, 2016.

[26] A. Valada, G. L. Olivera, T. Brox, and W. Burgard, "Towards Robust Semantic Segmentation using Deep Fusion," in *Workshop on Limits and Potentials of Deep Learning in Robotics at Robotics: Science and Systems (RSS)*, 2016.

[27] F. Boniardi, A. Valada, W. Burgard, and G. D. Tipaldi, "Autonomous Indoor Robot Navigation Using Sketched Maps and Routes," in *Workshop on Model Learning for Human-Robot Communication at Robotics: Science and Systems (RSS)*, 2015.

[28] T. El-Gaaly, C. Tomaszewski, A. Valada, P. Velagapudi, B. Kannan, and P. Scerri, "Visual Obstacle Avoidance for Autonomous Watercraft using Smartphones," in *Autonomous Robots and Multirobot Systems workshop (ARMS, at AAMAS)*, 2013.

[29] D. Kohanbash, A. Valada, and G. A. Kantor, "Irrigation Control Methods for Wireless Sensor Network," in *Proc. of the American Society of Agricultural and Biological Engineers (ASABE) Annual Meeting*, 2012.

[30] P. Scerri, P. Velagapudi, B. Kannan, A. Valada, C. Tomaszewski, J. M. Dolan, A. Scerri, K. S. Shankar, L. L. Bill-Clark, and G. A. Kantor, "Real-World Testing of a Multi-Robot Team," in *Autonomous Robots and Multi- Robot Systems Workshop at the 11th International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2012.

[31] D. Kohanbash, A. Valada, and G. A. Kantor, "Wireless Sensor Networks and Actionable Modeling for Intelligent Irrigation," in *Proc. of the American Society of Agricultural and Biological Engineers (ASABE) Annual Meeting*, 2011.

Theses

[1] A. Valada, "Discovering and leveraging deep multimodal structure for reliable robot perception and localization," in *PhD Thesis, University of Freiburg, Department of Computer Science, doi: 10.6094/UNIFR/17427*, 2019.

[2] A. Valada, "An Autonomous Robot for Manipulation and Mapping of Hydroponic NFT Installations," in *MS Thesis, Tech. rep. CMU-RI-TR-28-13, Carnegie Mellon University, Robotics Institute*, 2013.

[3] A. Valada, "Design and Development of a Wireless Sensor Network System for Precision Agriculture," in *BTech Thesis, Tech. rep. CMU-RI-TR-10-21, Carnegie Mellon University, Robotics Institute*, 2010.

Patents (11 Patents Pending)

[1] F. Despinoy, M. Van Loock, S. Meier, D. Honerkamp, T. Welschehold, and A. Valada, "Methods for robotic manipulation tasks," Jul. 2025, European Patent App. EP24305118.2A.

[2] N. Gosala, K. Petek, K. B. Ravi, S. K. Yogamani, and A. Valada, "Using neural radiance fields for label efficient image processing," May 2026, U.S. Patent No. 12,620,164.

[3] F. Despinoy, M. Cassinelli, D. Honerkamp, M. A. Buechner, T. Welschehold, A. Valada, M. Mohammadi, and I. Gilitschenski, "Computer-implemented method for controlling a robot," European Patent App. EP25305585.9.

[4] F. Despinoy, E. Chisari, J. Ole von Harz, and A. Valada, "A method for controlling a device for executing a kinematic task in a scene," European Patent App. EP25305568.5.

[5] F. Despinoy, M. Van Loock, S. Meier, D. Honerkamp, M. Buechner, T. Welschehold, and A. Valada, "A method for conducting a kinematic task within a given environment," European Patent App. EP25305372.5.

Selected Media Coverage

Robots need to understand the consequences of their actions in the physical world	*DAAD, 2026*
The ImageNet moment of robotics	*Industrial AI Podcast, 2023*
Towards Safer and More Robust Automated Driving Systems	*AZO Robotics, 2023*
Next generation of AI algorithms for automated driving	*Mirage News, 2023*
Künstliche Intelligenz zum Anfassen	*Baden TV Süd, 2023*
Diese Drohne soll Erdbeben-Opfer retten	*Bild, 2023*
Drohnen Übung für den Ernstfalls	*RTL News, 2023*
How AI can help autonomous vehicles perceive objects	*The Economic Times, 2023*
Autonome Autos können ihre Umgebung menschlicher wahrnehmen	*Motor Zeitung, 2023*
Mit KI die Umgebungserkennung autonomer Fahrzeuge verbessern	*AI Society, 2023*
Human-Like Perception for Self-Driving Cars	*elektroniknet, 2023*
Auf dem Weg zu menschenähnlicher Wahrnehmung für selbstfahrende Autos	*RegioTrends, 2022*
Autonomous Vehicles With Human-like Vision	*electronicsforum, 2022*
Human-Like Awareness Emerging in Self-Driving Vehicles	*AZO Robotics, 2022*
Advancing human-like perception in self-driving vehicles	*TechXplore, 2022*
Unlocking Human-Like Perception In Self-Driving Vehicles	*Autotech News, 2022*
University Of Freiburg: Step By Step Toward Safe Autonomous Driving	*India Education Diary, 2021*
Step by Step Toward Safe Autonomous Driving	*Uni Freiburg Magazine, 2021*
Advanced AI Model Enables Coherent Scene Recognition for Autonomous Vehicles	*selfdrivingcars360, 2020*
Deep Learning: Wie selbstfahrende Autos Szenen besser verstehen	*autocad-magazin, 2020*
New deep analysis breaks information in picture recognition capacity of self-driving automobiles	*news8plus, 2020*
AI Model Enhances Image Recognition Ability Of Self-Driving Cars	*pioneeringminds, 2020*
Advanced AI Model Enables Coherent Scene Recognition for Autonomous Vehicles	*azorobotics, 2020*
Neues KI-Modell verbessert die Umfelderkennung	*Springer Professional, 2020*
Deep learning method improves environment perception of self-driving cars	*eenewsautomotive, 2020*
Neue Methoden des Deep Learning	*intellicar, 2020*
EfficientPS: New State-of-the-art Model in Panoptic Segmentation	*Neurohive, 2020*
Faster and more effective scene understanding	*News Break, 2020*
Freiburger Forscherteam besser als Google	*elektroniknet, 2020*
New deep learning research breaks records in image recognition ability of self-driving cars	*innovations report, 2020*
Faster and more effective scene understanding	*Miragenews, 2020*
New deep learning research breaks records in image recognition ability of self-driving cars	*TechXplore, 2020*
FOUNT^2 – Einsatz fuïr die Wissenschaft	*Technisches Hilfswerk, 2019*
Robotic Crocodiles	*Discovery Channel, 2015*
Autonomous airboats monitor hippo dung in Kenya's Mara River basin	*ScienceDaily, 2014*
Crocodile Robot Dodges Hippo ... for Science!	*NBC News, 2014*
Robots: A Fun Context for Learning	*Grow a Generation, 2014*
For Surveying Dangerous Hippo Pools, Platypus Robots Go Where People Can't	*Environmental Monitor, 2014*
Dirty and Dangerous	*Cary Institute, 2014*
Platypus Floats Idea of Affordable Environmental Robotics	*Business Times, 2012*
Cooperative Robotic Watercraft	*Robots.net, 2012*
CMU's Team Develops Environmental Robotics	*Business Journal, 2012*
CMU Startup Adds Robotics to Water	*Pittsburgh Business Times, 2012*