Dr. rer. nat. Mahathi **ANAND**

CONTACT DETAILS

@ mahathi.anand@gmail.com
+49 1512 438 2725
LinkedIn: Mahathi Anand
Google Scholar: Mahathi Anand
Github: Mahathi Anand

PROFILE

Applied scientist and roboticist with deep expertise in control, motion planning, and learning-based algorithms for robotics. Proven record of designing and deploying safe, robust, and scalable algorithms for autonomous systems, including hands-on work with real robot arms (e.g., Franka Emika). Experienced in cross-functional collaboration bridging software, ML, and control. Passionate about bringing cutting-edge research in intelligent learning and control into real-world production systems.

PERSONAL INFORMATION

Residency: **Germany**

Languages: **English** (professional/C2), **German** (intermediate/B1), **Tamil** (native), **Hindi** (professional), **Telugu** (professional),

SKILLS

- **Programming:** Python, MATLAB, C++
- **Robotics, ML, Optimization:** PyTorch, sklearn, pandas, Gymnasium, Stable Baselines3, YALMIP, SeDUMi
- **Systems & Version Control:** Linux, Windows, Git, Jupyter
- **Soft Skills:** Analytical thinking, Collaboration, Communication, Teamwork, Leadership, Time management

EXPERIENCE

POSTDOCTORAL RESEARCHER, *Technical University of Munich* **01.2025–**
◇ Certified robot motion planning via imitation learning
◇ Exploratory data analysis for motion planning algorithms
◇ Active learning for robot control
◇ Real-world deployment with implementation on Franka Panda robot
◇ Project management in CeTI project

POSTDOCTORAL RESEARCHER, *University of Stuttgart* **08.2023–12.2024**
◇ Developing safe control for switched and real-time control systems
◇ Training neural network controllers for motion planning specifications
◇ Lecturer: Formal Methods in Control, Teaching Assistant: Optimal Control

VISITING RESEARCHER, *University of Pennsylvania* **02.2023–04.2023**
◇ Learning safe neural-network based controllers for large-scale and multi-agent systems

RESEARCHER, *Ludwig Maximilian University of Munich* **07.2019-07.2023**
◇ Learning provably safe controllers using neural networks
◇ Formal verification and control of systems against motion planning objectives
◇ Automata-theoretic approaches to verification and controller synthesis
◇ Certificates for system safety, reachability, and stability
◇ Researcher in DFG Research Training Group ConVeY, targeting continuous verification and synthesis of autonomous systems

EXCHANGE STUDENT, *Technical University of Munich* **09.2018–03.2019**
◇ Safety verification of switched stochastic systems via barrier certificates
◇ Computation of control barrier certificates via counterexample guided inductive synthesis

EDUCATION

DOCTOR OF SCIENCE, Computer Science, *Ludwig Maximilian University of Munich* **2019–2023**
◇ Thesis title: *Formal Analysis of Control Systems via Inductive Approaches*
◇ grade: 1.00, magna cum laude

MASTER OF TECHNOLOGY, System and Control, *Indian Institute of Technology Roorkee* **2017–2019**
◇ Thesis title: *Barrier Certificates for Verification of Stochastic Systems*
◇ grade: 9.63/10

BACHELOR OF TECHNOLOGY, Electrical and Electronics Engineering, *SRM Institute of Science and Technology* **2012–2016**
◇ Thesis title: *EEG and Gesture Control for Human Computer Interface*
◇ grade: 9.763/10

ADDITIONAL TRAINING

SUMMER TRAINING SCHOOL, Safety and Security of Software Systems: Logics, Proofs, Applications, Marktoberdorf **08.2019**

EXPERTISE

ROBOTICS & CONTROL: Cyber-physical and intelligent systems, multi-agent systems, robot kinematics, dynamics and control, motion planning, mathematical optimization, optimal control and model predictive control

MACHINE LEARNING: Deep & graph neural networks, deep learning, explainability and robustness in learning approaches, learning-based control, imitation learning, reinforcement learning

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Publications and Research Impact

Applied Research

◇ Strong theoretical foundations in control systems, machine learning as well as robotics
◇ Focus on applied research with practical implementations beyond theoretical results
◇ Proven ability to collaborate with interdisciplinary and cross-functional teams
◇ Experience with publishing and presenting complex research to a diverse audience through conferences and teaching
◇ Passion for contributing to prototype implementations of learning algorithms to robotic applications in real-world conditions

Research Impact

◇ High quality publications in several top quality peer-reviewed conferences and journals such as Conference and Decision Control, Transactions on Automatic Control, etc.
◇ Expertise in communicating complex ideas to diverse stakeholders

Selected and Relevant Publications

◇ Allen Emmanuel Binny, *Mahathi Anand*, Hugo Kussaba, Lingyun Chen, Abdalla Swikir, "Learning Safe Neural Network Dynamical Systems for Robot Motion Planning", *submission in review, RA-L, 2025*
◇ *Mahathi Anand* and Majid Zamani, "Distributed Safety Controller Synthesis for Unknown Interconnected Systems via Graph Neural Networks", IFAC Conference on Analysis and Design of Hybrid Systems, 2024
◇ *Mahathi Anand* and Majid Zamani, "Formally verified neural network control barrier certificates for unknown systems", 22^{nd} IFAC World Congress, 2023
◇ *Mahathi Anand*, Abolfazl Lavaei and Majid Zamani, "From small-gain theory to compositional construction of barrier certificates for large-scale stochastic systems", Transactions on Automatic Control, 2022.

Project Management and Leadership

◇ Project lead and manager for CeTI- Center for Tactile Internet with Human in the Loop, TU Munich and MIRMI Chapter.
◇ Budget planning, project planning and development tracking
◇ Lead of several research projects, mentored junior researchers and supervised students