

Rama Krishna Kandukuri

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Education

Masters in Mechatronics Engineering [University of Siegen](#) Siegen, Germany 2017-2020
Robotics, Control, Optimization, Computer Vision and Machine Learning. (Master's thesis: 1.0)

Bachelors in Mechanical Engineering [National Institute of Technology Rourkela](#) Rourkela, India 2012-2016
Kinematics, Dynamics, Design, Thermodynamics, Mechatronics and Optimization.

Research and Work Experience

Robot Software Engineer, [Polybot](#) Tübingen, Germany 01/2024 - 04/2024
Training and deploying **diffusion-based generative policies** and real-time, **distributed multi-object tracking** algorithms for farming tasks, and benchmarks on the Spot mini robot.

Researcher, [Embodied Vision Group, MPI for Intelligent Systems](#) Tübingen, Germany 06/2020 - 12/2023
Developed and published novel computer vision methods for **3D rigid body tracking** from RGB-D video data, incorporating physically plausible modeling of rigid body dynamics with an accompanying video dataset with motion capture ground truth and physics annotations.
Research on deep learning techniques for **6D pose estimation** of rigid objects from RGB images, learning-based **planning and control** through contact/frictional constraints using **learned physics** models and **differentiable rendering** for unsupervised learning of scene physics from images.

Research Intern, [Embodied Vision Group, MPI for Intelligent Systems](#) Tübingen, Germany 07/2019 - 05/2020
Research on supervised, self-supervised learning methods for identifying physical parameters from videos in 2D using **differentiable physics** and spatial transformer networks. Developed controllers for the Franka arm, allowing it to seamlessly transition between trajectories when a new goal is set mid-execution to ensure real-time safety and adherence to joint state limits.

Student Researcher, [Computer Vision Group, University of Siegen](#) Siegen, Germany 11/2018 - 06/2019
Work on **object detection** and tracking with Siamese networks on a mobile robot. Worked on **adversarial robustness** in image classification.

Skills

- **6 years** of professional coding experience in **Python** and **4 years** of training deep neural networks (**object detection, segmentation, transformers, diffusion models**) in **PyTorch**.
- **5 years** of **research experience** and knowledge of state of the art literature in **learning physics from videos**, physics simulations, object detection and tracking, learning-based planning and control.
- Intermediate level coding experience in **C++(sensor fusion, manipulation)** and **CUDA** (custom kernels for **differentiable physics** operations) and scripting in **MATLAB** (control).
- Experienced in developing robotic software using **ROS/ROS2** for **manipulation, control, detection and motion generation**.

Publications

- Rama Kandukuri, Michael Strecke, Joerg Stueckler, [Physics-Based Rigid Object Tracking and Friction Filtering from RGB-D Videos](#), 3DV 2024.
- Rama Kandukuri, Jan Achterhold, Michael Moeller, Joerg Stueckler, [Learning to Identify Physical Parameters from video Using Differentiable Physics](#), GCPR, 2020 (**oral, honourable mention**), IJCV 2021.