Aditya Bhatt

HUMANOID ROBOTICS & REINFORCEMENT LEARNING RESEARCHER

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I study weird, underexplored phenomena in robot manipulation that unlock entirely new capabilities.
My research combines deep RL, interactive perception and mechanical intelligence—from blind in-hand manipulation to proprioception-only whole-body humanoid skills. My work encompasses the full robotics stack: hardware design, low-level control, simulation, learning and real-world deployment.

CURRENT RESEARCH



Blind Dexterity: Whole-Body Humanoid Manipulation via Pure Proprioception ↗

Aditya Bhatt · Oleg Kaidanov · Puze Liu · Jan Peters

- **Main-conference paper:** Accepted · IEEE-RAS International Conference on Humanoid Robots (Humanoids 2026)
- **Double-blind CoRL 2026 workshop paper:** Best Paper Award & Oral Spotlight · Workshop on Everything Beneath the Policy ↗

Showed how robots can overcome severe sensory deprivation through learned interactive perception—actively probing and interpreting the physical world. Findings: humanoids walk and survive pushes without an IMU; joint angles reveal 3D object pose, unlocking dexterous manipulation; and robots trap footballs, find and lift suitcase handles, and mount skateboards—all from proprioception, without cameras or tactile sensing.



The Blind Skateboarder ↗

Aditya Bhatt · Ansh Prakash · João Carvalho · Puze Liu · Jan Peters

- **Peer-reviewed, non-archival IROS 2026 workshop paper:** Best Poster Award & Lightning Talk · Perception and Decision Making for Athletic Humanoid Robotics ↗
- **CoRL 2026 workshop paper:** Accepted · Open Problems in Contact-Rich Loco-Manipulation ↗

The sequel to Blind Dexterity delivers the first robotic skateboarding tricks—ollie, pop-shuvit, manual and kickflip—outdoors, with safe recovery in real-world conditions—playable as a real-world video game. Proprioception alone lets Unitree G1 mount and control the board—without vision, external tracking or tactile sensing.

Poster-only acceptance · IROS 2026: **Blind Whole-Body Haptic Dexterity Without Tactile Sensors** ↗ — accepted poster, Workshop on Enhancing Dexterous Manipulation Through Haptic Feedback. Aditya Bhatt · Ansh Prakash · Oleg Kaidanov · João Carvalho · Puze Liu · Jan Peters.

SELECTED PUBLICATIONS

01 **Blind Dexterity: Whole-Body Humanoid Manipulation via Pure Proprioception** ↗
Aditya Bhatt · Oleg Kaidanov · Puze Liu · Jan Peters · **IEEE-RAS Humanoids 2026** · **Best Paper Award & Oral Spotlight, CoRL 2026 Workshop on Everything Beneath the Policy**

02 **CrossQ: Batch Normalization in Deep Reinforcement Learning for Greater Sample Efficiency and Simplicity** ↗
Aditya Bhatt* · Daniel Palenicek* · Boris Belousov · Max Argus · Artemij Amiranashvili · Thomas Brox · Jan Peters · **ICLR 2024 Spotlight (top 5%)** **200+ citations**

03 **Surprisingly Robust In-Hand Manipulation: An Empirical Study** ↗
Aditya Bhatt* · Adrian Sieler* · Steffen Puhlmann · Oliver Brock · **Robotics: Science and Systems 2021 Spotlight** **120+ citations**

04 **Discrete Variational Autoencoding via Policy Search** ↗
Michael Drolet · Firas Al-Hafez · **Aditya Bhatt** · Jan Peters · Oleg Arenz · **ICLR 2026**

05 **MuJoCo MPC for Humanoid Control: Evaluation on HumanoidBench** ↗
Moritz Meser · **Aditya Bhatt** · Boris Belousov · Jan Peters · **ICRA@40 Workshop, 2024 · arXiv:2408.00342**

TECHNICAL PROFILE

Learning & control	Deep RL, actor–critic methods, imitation learning, MPC, sim-to-real
Software	Python, C++, JavaScript, PyTorch, JAX, ROS, OpenCV, Qt
Robotics	Whole-body humanoid control, dexterous manipulation, teleoperation
Hardware	Unitree H1/G1, Booster T1, Franka Panda, compliant hands, low-cost teleoperation exosuit

RESEARCH EXPERIENCE

Doctoral Researcher · Intelligent Autonomous Systems, TU Darmstadt & DFKI
Nov 2022–Present

- Develop proprioception-only RL policies for dynamic whole-body humanoid manipulation and agile dexterity on Unitree G1/H1 and Booster T1.
- Own the full sim-to-real pipeline: task formulation, policy training, low-level integration, hardware debugging and real-robot evaluation.
- Designed and built a low-cost joint-level teleoperation exosuit for humanoid data collection and control.
- Co-supervise research on humanoid skill distillation and model-predictive humanoid control.

Research & Teaching Assistant · Robotics and Biology Lab, TU Berlin
Jul 2019–Jul 2022

- Built low-level arm controllers and pneumatic five-finger hands; designed the first open-loop cube-manipulation skills on the RBO Hand 3.
- Studied how compliance and action design produce robust sensorless manipulation; co-taught robotics and computer-science courses.
- Co-supervised MSc work on compliant-hand teleoperation and sequenceable manipulation synergies.

Student Research Assistant · Computer Vision Department, University of Freiburg
2017–2019

- Conducted original deep-RL research leading to work on stabilizing off-policy temporal-difference learning without target networks.

EDUCATION

PhD in Computer Science, candidate · TU Darmstadt & DFKI 2022–Present
Supervised by Prof. Jan Peters · Deep reinforcement learning for robust, compliant and humanoid manipulation.

MSc Computer Science · University of Freiburg
2016–2019 · Cognitive Technical Systems; Computational Neuroscience minor · Grade 1.6. Thesis: *Stabilizing Off-Policy TD with Feature Normalization.*

BTech Information & Communication Technology · DA-IICT
2008–2012 · Computer science and signal processing.

EARLIER ENGINEERING EXPERIENCE

Software Engineer · Kolab Systems AG
Berlin · 2015–2016

Prototyped open-source email software and collaborative rich-text editing.

Software Engineer · early employee · Contentful
Berlin · 2014–2015

Built frontend and backend API features for an early content-infrastructure platform serving major international clients.

Software Engineer · KO GmbH
Magdeburg · 2012–2014

Core author of WebODF and ViewerJS; built a browser document engine and collaborative editing with operational transformation.

Google Summer of Code · SETI Institute & KDE
2011 · 2010

Implemented signal processing in C for telescope data and automatic face detection and tagging for digiKam.

TEACHING & MENTORING

- Max Siebenborn — humanoid motor-skill distillation
- Friederike Thonagel — compliant-hand teleoperation
- Courses: Robotics, Robotics Project and Robotics Seminar
- Moritz Meser — model-predictive humanoid control
- Paul Dieterich — sequenceable manipulation synergies
- Algorithms & Data Structures

LANGUAGES

English, Hindi and Gujarati (native-level) · German (B1, conversational)

SELECTED TALKS

What the Body Sees When the Eyes Close — invited research talk on blind manipulation and humanoid skateboarding, Figure AI, October 2026.

Deep RL Made Easy Again — Meet a Fantastic Researcher, 2024.

How the Body Shapes the Way We Manipulate — Embodied Intelligence Workshop, 2021.

CrossQ — ICLR 2024 Spotlight, with Daniel Palenicek.

Hardware-Accelerated Dexterity — invited talk, NYU Machines in Motion Lab, 2023.