

# Hardik Shah

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## EDUCATION

- **ETH Zurich, [5.70 / 6] (Transcript)** 2023 - Present  
MSc in Computer Science, w/ Major in Machine Intelligence & Minor in Data Management Systems
- **BITS Pilani, Goa [9.64 / 10] (Transcript)** 2019 - 2023  
B.E. in Computer Science, w/ Minor in Data Science
  - **Institute Rank 6** in a batch of 900 students. Recipient of BITS Goa **Merit Scholarship** for all 8 semesters awarded to **top 10** students across all departments – 100% tuition fee waiver.

## EXPERIENCE

- **Jet Propulsion Laboratory, NASA** Apr'25 - Present  
Visiting Student Researcher with [Dr. Shehryar Khattak](#), Supported by the [Zeno Karl Master Thesis Grant](#) Pasadena, United States
  - MSc Thesis at [347J - Perception Systems](#). Leveraging vision-based systems for traversability estimation of lunar terrains for legged robots.
- **Scandit AG** Jul'24 - Mar'25  
Computer Vision Student Researcher Zurich, Switzerland
  - Lightweight Interest Point Detection and Matching for SLAM-Based AR Visualization. Replaced traditional keypoint detectors with **learned detection and matching methods** in the tracking pipeline of Scandit's [MatrixScan](#)
- **Google Research [Accepted to CVPRW'24]** Aug'22 - Jun'23  
Student Researcher, Supervised by [Dr. Prateek Jain](#) (Undergraduate Thesis) Bangalore, India
  - Developed a versatile **neural network compression** toolbox that optimizes for the model's FLOPs via a novel  $\frac{l_1}{l_2}$  latency surrogate across a family of compression methods, including **pruning** and **low-rank factorization**. Optimized **on-device latency** of large vision models used for OCR tasks in **Google Lens**, and **GooglePay**.
- **Robot Vision Lab, Karlsruhe University of Applied Sciences [Code] [Website]** May'22 - Aug'22  
Summer Research Intern, funded by DAAD WISE Scholarship. Supervised by [Prof. Dr.-Ing. Niclas Zeller](#) Karlsruhe, Germany
  - Developed an end-to-end pipeline for 3D dense reconstruction using Intel RealSense, integrating multi-view stereo data with a self-supervised U-Net architecture ([MonoRec](#)) for stable point cloud output.

## PROJECTS

- **Vision-Language Grounded Semantic Exploration using CLIP Features [Accepted to CVPRW'25]** Feb'24 - Mar'25  
Graduate Student Researcher, [Robotics and Perception Group \(Prof. Dr. Davide Scaramuzza\)](#). *Grade: 6/6*
  - Developed a unified CLIP-based representation **combining geometry and semantics** for **Object Goal Navigation** in unseen environments.
- **POLD2: Unified Point and Line Feature Detection and Description** Mar'24 - Mar'25  
Graduate Student Researcher, [Computer Vision and Geometry Group \(Prof. Dr. Marc Pollefeys\)](#). *Grade: 6/6*
  - Developed POLD2, a deep learning-based pipeline that jointly detects and describes both **point and line features** in images, optimizing feature extraction (**9.5x speedup**) for 3D vision tasks like SLAM and pose estimation.
- **A Monocular Visual Odometry Pipeline [Code] [Report] [Demo]** Fall '23  
For [Vision Algorithms for Mobile Robotics](#), ETH Zurich
  - Implemented a continuous pipeline for camera pose estimation from 2D↔3D correspondences using **keypoint tracking, landmark triangulation and local bundle adjustment** for trajectory refinement.
- **Adding JAX Support to NPbench [Code] [Report]** Fall '24  
For [Design of Parallel and High Performance Computing](#), ETH Zurich
  - Integrated **JAX** into **NPbench**, a scientific computing benchmark suite. Achieved **3x runtime improvement** over NumPy on multi-core CPUs using JAX's JIT compilation, by porting all benchmarks to JAX as pure functions.
- **Project Kratos, A Mars Rover [Code] [Website] [Demo]** 2020 - 2022  
Rover Navigation and Autonomy Lead
  - Led the development of a Mars Rover for the University Rover Challenge ([URC](#)), actively driving the code design, implementation & deployment of mapping, planning, & control nodes for obstacle avoidance & object tracking.

## AWARDS AND ACHIEVEMENTS

- Recipient of the [Zeno Karl Schindler Foundation Master Thesis Grant](#) 2025
- [University Rover Challenge](#), Utah: Project Kratos secured **1st** position in India, **2nd** position in Asia 2022
- Recipient of **DAAD WISE** research scholarship (Germany) 2022
- Recipient of **MITACS Globalink** research scholarship (Canada) 2022

## SKILLS

- **Programming Languages:** Python, C++, C, JAVA, C#, MATLAB, Latex, HTML, CSS
- **Softwares and Packages:** Pytorch, Tensorflow, Keras, JAX, Numpy, OpenCV, Unity, Gazebo, Verilog, Robot Operating System (ROS), AutoCAD, Android Studio