

# Rishika Bera

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Portfolio: rishika2024.github.io | Citizenship: United States

## EDUCATION

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<b>Northwestern University</b> <i>MS in Robotics</i>	Evanston, IL Expected Aug 2026 - Dec 2026
<b>Indian Institute of Technology - Jodhpur</b> <i>B.Tech in Mechanical Engineering</i>	Rajasthan, India Dec 2021 – May 2025

## TECHNICAL SKILLS

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**Programming Languages:** C, C++ , Python, MATLAB, HTML, CNC G-Code  
**Robotics:** ROS 2, UAV, SLAM, Path Planning, Control Systems, Perception, Sensor Fusion, Motion Planning  
**Machine Learning & AI:** Machine Learning, MLP, CNNs, Autoencoders, Deep Learning, LLMs  
**Software & Libraries** PX4, MoveIt, OpenCV, Gazebo, RViz, CoppeliaSim, Unity3D, Simulink  
**Tools:** Linux, Git  
**Hardware:** Pixhawk, Franka Arm, Interbotix Arm, RealSense Camera, Arduino, Raspberry Pi  
**Design & Manufacturing:** SolidWorks, Onshape, Blender, 3D Printing, CNC Machine, Soldering

## PROJECTS

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**Morphing Aerial–Ground Transformer Robot** | (CAD, ROS 2, PX4, Raspberry Pi, UAVs) Jan 2026 - Present

- Designing and CAD-modeling a transformer robot capable of both aerial flight and ground locomotion
- Assembled and tested a quadrotor prototype under manual/teleoperated control.
- Developing a mode-switching system using Raspberry Pi, ROS 2, and PX4 to transition between aerial and ground operation

**Bug-Sorting - Franka Robot Arm** | (Python, ROS 2, OpenCV) Dec 2025

- Contributed to developing an autonomous system to catch and sort moving HexBugs with the Franka Arm
- Built a vision system using OpenCV and RealSense to detect, label, and track HexBugs in real-time
- Explored continuous tracking and pick-and-place motion planning using ROS 2 and MoveIt
- Collected trajectory data for ML-based motion prediction integration

**Simulating Dynamics of a Jack inside a moving Box** | (Dynamics, Python) Dec 2025

- Developed a Python simulation of a jack in a moving box by deriving Euler-Lagrange equations
- Implemented collision handling with time-varying forces to model realistic motion

**Grab the pen - PincherX Robot Arm** | (Python, OpenCV, ROS 2) Dec 2025

- Developed a vision and manipulation pipeline to identify objects and pick it up using Python and Realsense
- Used OpenCV to apply a color-based filter (HSV, depth) on live image and identify the contours
- Calibrated camera-robot transform for pick and place

**Underwater Manipulator** | (SolidWorks, 3D Printing, MATLAB, Simulink, Arduino) Oct 2024 - Dec 2024

- Designed a rack and pinion gripper mechanism in SolidWorks and fabricated it using 3D printing
- Developed pick-and-place algorithms in MATLAB and deployed to Arduino via Simulink
- Integrated encoders for position feedback and implemented PID tuning for precise actuation

## WORK EXPERIENCE

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**Purdue University** May 2024 - Jul 2024  
*Summer Undergraduate Research (SURF) Intern*

- Engineered PrimerCurator’s multimodal backend pipeline integrating text, image, and video using ChatGPT API
- Reduced manual tutorial creation time by 78% with >90% accuracy in automated extraction
- Collaborated with research team to ensure scalable performance and presented system design and results