# Jagannath Prasad Sahoo

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## Professional Summary

AI and Robotics Engineer specializing in bipedal robot design, reinforcement learning, and autonomous multi-agent systems. Full-stack experience from mechanical design and FEA through dynamic modeling, learning-based control, and real-time ROS deployment, with prior product development at Dover India and spacecraft research at ISRO.

## Core Technical Skills

- **Robotics and Control:** ROS, ROS2, Bipedal Robotics, Control Systems, Motion and Path Planning, Kinematics and Dynamics
- **AI and Machine Learning:** Reinforcement Learning, Deep Learning, Computer Vision, Vision Language Models, Agentic AI
- **Simulation and Programming:** Gazebo, PyBullet, Isaac Gym, MuJoCo, MATLAB, Python, C, C++, Git, Linux
- **CAD and Analysis:** SolidWorks, UG NX, ANSYS (FEA), NASTRAN, DFMEA, DFM, Product Development (NPD, R&D, VAVE)

## Education

**Master of Technology (Research) in AI and Robotics** Mar 2024 to Sep 2026
*Indian Institute of Technology Mandi, India*, Supervisor: Dr. Amit Shukla

- Degree awarded on 02 September 2026 with a Cumulative Grade Point Average of 8.57 out of 10.0
- **Thesis:** "Design, Development and Experimental Validation of a Bipedal Robot for Adaptive Locomotion and Navigation"
- **Coursework:** Robot Kinematics, Dynamics and Control, Mechatronics, Robot Programming, Modeling and Simulation, Principles of Robot Autonomy, Deep Learning and Applications, Introduction to Blockchain, Introduction to Cyber Security

**Bachelor of Engineering in Mechanical Engineering** Aug 2019 to Jun 2023
*Ramaiah Institute of Technology, Bengaluru, India*

- Cumulative Grade Point Average of 8.90 out of 10.0
- **Award:** Best Outgoing Student Award for Academics and Co-curricular Activities
- **Relevant Coursework:** Robotics, Nanotechnology, Machine Design, Kinematics and Dynamics of Machines, Manufacturing Processes, CAD and CAM

## Professional Experience

**Project Associate I**, Indian Institute of Technology Mandi, India Jan 2025 to Jul 2026

- Led development of an autonomous pipe inspection system based on computer vision and robotics
- Built an end-to-end pipeline of hardware integration, sensor fusion, path planning, and deployment with real-time navigation, obstacle avoidance, and defect detection

**Teaching Assistant**, Indian Institute of Technology Mandi, India Jan 2026 to Jul 2026

- **AR-525 Reinforcement Learning for Robotics:** policy gradient and actor-critic methods, simulation-based assignments, and project mentoring
- **IC-140 Foundation for Design Practicum:** hands-on mechatronic design, prototyping, and project evaluation

**Design Engineer**, Dover India Private Limited, India Jul 2023 to Mar 2024

- Led new product development, R&D, and automation projects for double diaphragm pump systems
- Conducted FEA and stress testing and reduced cost by 15 percent through VAVE, design optimization, and DFM

**Project Trainee**, Indian Space Research Organisation (ISRO), India Dec 2021 to Dec 2022

- Designed and analyzed a six degree of freedom Vibration Isolation System for spacecraft
- Validated natural frequencies against analytical models and performed vibration testing across 20 to 2000 Hz

## Publications

- Sharma, V., ***Sahoo, J. P.***, Shukla, A., Ameta, D., Shorey, J., Reddy, S., Shewale, P. P., and Sharma, S. (2026). TongueSight: AI-powered tongue analysis for digitizing traditional medicine diagnostics. *16th Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP)*, Article 22, pp. 1 to 7.
- Prajapati, D., Kumar, P., Surya Prakash S. K., Mehra, A., Rana, A., ***Sahoo, J. P.***, Reddy, T. J., and Shukla, A. (2026). Reference-coupled heterogeneous multi-agent coordination with real-time adaptive perimeter field navigation. *12th IEEE ICARA 2026*, pp. 307 to 312.

- Datta, S., ***Sahoo, J. P.***, Surya Prakash S. K., and Shukla, A. (2026). Hardware model-mediated teleoperation for a force-blind low-cost manipulator with a single-scalar contact sensor. *IEEE ICARCV 2026*, Halong Bay, Vietnam. Accepted, contributed oral.
- ***Sahoo, J. P.***, et al. (2025). Learning multi-skill locomotion in underactuated biped: a waypoint-based reward shaping approach. *Indian Control Conference (ICC-11)*.
- ***Sahoo, J. P.***, et al. (2025). Design, kinematic modeling, and stability verification of a small-scale biped robot. *ICCAS 2025*, Korea.
- Surya Prakash S. K., Prajapati, D. K., Narula, B., ***Sahoo, J.***, and Shukla, A. (2025). Kinematics-based real-time distance monitoring for safe multi-arm robot operations. *ICCAS 2025*, Incheon, Korea, pp. 1491 to 1497.
- Madhu Kumar, T. M., Jyothi Kini, H., Praveen, M., Mohan Kumar, ***Sahoo, J. P.***, Deepayan, N. C., and Sindhushree, K. L. (2025). Polyethene composites for X-band electromagnetic interference shielding using conductive MWCNT and graphene nanoplatelets with soft magnetic MgFe2O4 nanoparticles. *Functional Composites and Structures, 7*(3), 035011.
- ***Sahoo, J. P.***, et al. (2025). From classical control to reinforcement learning: trends in bipedal robot locomotion. *IEEE ICCCNT 2025*.
- ***Sahoo, J. P.***, et al. (2022). A novel approach for payload design to streamline deep space missions: molecular nanoscience. *73rd IAC*, Paris, France.
- ***Sahoo, J. P.***, et al. (2022). Design of propulsion system for CubeSat: N2O and C2H4 as green bipropellant. *Journal of Aerospace Sciences and Technologies, 74*(2).
- ***Sahoo, J. P.***, et al. (2022). Analysis and design of a propulsion system for an interplanetary mission to Venus. *International Research Journal of Engineering and Technology, 9*(2).

## Conferences, Workshops, and Conclaves

- Paper presenter at **Indian Control Conference (ICC-11)** 2025, **ICCAS 2025** Korea, and **IEEE ICCCNT 2025**
- Participant at **ROSCon India 2025**

## Key Projects

**Multi-Skill Bipedal Robot with Learning-Based Control** Mar 2024 to Sep 2026

- Mechanical design, kinematic modeling, and stability analysis of a small-scale biped, with RL policies (PPO, TD3, SAC) achieving robust walking and running at over 90 percent success
- Simulation in Gazebo, PyBullet, and Isaac Gym with a ROS2 sim-to-real deployment pipeline

**Hierarchical Reinforcement Learning for Collision-Free Locomotion of an Underactuated Biped** Feb 2026 to Jul 2026

- High-level waypoint policy coupled with a low-level gait policy for obstacle-aware bipedal locomotion

**Autonomous Buried Power Cable Tracing Using Electromagnetic Locator Feedback** Jan 2025 to Jun 2026

- Goal-free obstacle avoidance and GPS mapping of buried cable routes from electromagnetic locator feedback

**Deep Reinforcement Learning for Vision-Based UAV Tracking by an Autonomous Ground Vehicle** Jan 2026 to Aug 2026

- Vision-driven UAV tracking policy for a heterogeneous UAV and UGV team

**MPPF, Mobile Probe Potential Field for Real-Time Multi-Agent Navigation** Sep 2025 to Feb 2026

- Probe-based potential field planner for real-time multi-agent navigation in industrial environments

**Smart Water Monitoring System, IISc Bangalore** May 2022 to Jul 2022

- IoT-based flow monitoring with anomaly detection deployed at 98 percent accuracy

**Predictive Maintenance for Aircraft Turbofan Engines** Mar 2022 to Jul 2022

- Ensemble machine learning models for remaining useful life prediction at 92 percent accuracy

## Volunteer Experience

- **Mentor, Drone and Robotics Bootcamp Group**, IIT Mandi (Jun 2025 to Aug 2026): hands-on sessions on drone assembly, ROS, and robot control for hundreds of students
- **Evaluator, ZenTej Season 3 Hackathon**, IIT Mandi (Oct 2025): assessed prototypes in a 24 hour sprint on soundness, innovation, and feasibility

## Leadership and Achievements

- **Best Teaching Assistant Award**, IIT Mandi
- **Best Outgoing Student Award**, Ramaiah Institute of Technology, 2023
- **Best Paper Award**, International Astronautical Congress, 2022
- **Student Coordinator**, Aerodynamics and Structures, STARDUST RIT Rocketry, 2020 to 2022
- **NSS Coordinator**, organized blood donation camps