Sajan Bhujel

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EDUCATION

University of North Dakota — Grand Forks, USA
MS in Mechanical Engineering • **CGPA: 4.0/4.0** — Aug. 2025 – Present
Courses: Introduction to Autonomous Robotics, Reinforcement Learning, Advanced System Modeling, Dynamics, and Control

Institute of Engineering, Pashchimanchal Campus — Pokhara, Nepal
B.E. in Mechanical Engineering • **84.7% (Dept. Topper)** — May 2024

PUBLICATIONS

Deep Q-Network with Lagrangian Relaxation for Autonomous Aircraft Landing [Link]
- Proposed a constrained DQN framework enforcing angle-of-attack safety via Lagrangian relaxation, achieving fewer safety violations than standard DQN.

Analysis and Comparison of UAV Propellers for High-Altitude Search and Rescue Missions [Link]
- Designed and experimentally validated Clark-Y and S1223 propellers using CFD and high-altitude field tests (3610 m) for UAV SAR missions.

Development and Testing of a Non-Contact Wireless Tachometer [Link]
- Developed an IR-based wireless tachometer with Bluetooth communication, achieving $< 0.3\%$ error up to 6995 RPM.

Aerodynamic Effects of Fuselage–Package Separation Distance on UAV Performance [Under review]
- Conducted RANS-based CFD analysis in ANSYS Fluent to quantify payload-induced aerodynamic interference and identify optimal separation distances.

WORK EXPERIENCE

Research Assistant — Aug. 2025 – Present
University of North Dakota — Grand Forks, USA

- Conducted machine-learning–based UAV navigation research focused on GPS spoofing detection and robust 3D drone path planning.
- Developed federated learning, domain adaptation, and physics-informed neural network (PINN) methods to enable decentralized, physically consistent UAV navigation under trajectory-induced distribution shifts.

Teaching Assistant — Aug. 2025 – Present
University of North Dakota — Grand Forks, USA

- Instructed and supported a class of 41 undergraduate students in ANSYS-based simulation and numerical analysis.
- Graded assignments, evaluated projects, and provided detailed technical feedback to enhance student learning outcomes.

Faculty Lecturer — Nov. 2024 – July. 2025
Tribhuvan University, IOE, Pashchimanchal Campus — Pokhara, Nepal

- Taught Heat Transfer, Turbomachinery, Engineering Drawing, CAD, and Engineering Professional Practice courses to undergraduate engineering students.
- Supervised laboratory sessions and guided students in practical engineering applications.

Intern — Sept. 2023 – Nov. 2023
Kali Gandaki A Hydropower Station — Syangja, Nepal

- Assisted in maintenance and inspection of Francis turbines to support efficient operation of a 144 MW hydropower plant.
- Performed modeling and simulation tasks using SolidWorks and ANSYS for hydropower system analysis.

Intern — Oct. 2022 – Dec. 2022
Parbhu Helicopter — Pokhara, Nepal

- Conducted pre-flight and post-flight inspections of Robinson R66 helicopters equipped with Rolls-Royce RR300 engines.
- Performed maintenance, inspections, and testing on Robinson R44 II helicopters fitted with Lycoming IO-540-AE1A5 engines.

LEADERSHIP & VOLUNTEERING

President
SEDS-WRC (May 2023 – May 2024)

- Led astronomy outreach initiatives by organizing telescope training sessions, facilitating a virtual tour of the International Space University, and conducting solar and lunar observation programs across multiple schools, including the first-ever lunar observation at Pashchimanchal Campus.

Executive Member
Robotics Club, Pashchimanchal Campus (May 2022 – May 2023)

- Designed and built line-following, robosoccer, and robowar robots; developed two electric go-karts (750W and 2kW), and organized SolidWorks training and 3D printing workshops.

Volunteer
Mission Oxygen Team (Jun. 2021 – Apr. 2022)

- Maintained real-time COVID-19 resource data, including hospital bed availability and oxygen cylinder information, ensuring accurate updates on the public helpline platform.

Volunteer
SIMES (Nov. 2020 – Oct. 2021)

- Contributed to publishing the annual research magazine "MECHAZINE" and organized technical training programs in SolidWorks, ANSYS, and scientific paper writing.

SKILLS

- **Machine Learning:** PyTorch, NumPy, Pandas, scikit-learn, linear regression, classification, reinforcement learning (RL), federated learning (FL)
- **Software Packages:** Python, SOLIDWORKS, ANSYS, MATLAB, Autodesk
- **Other Skills:** Sketching, communication, leadership, teamwork, video editing

HONORS & ACHIEVEMENTS

- Silver Tier at the National Mathematics Competition
- District Topper, Student of the Year (2016 – 2017)
- Winner of the Line follower Robot and Robo-soccer Competition
- Paper Presenter at 15th IOE Graduate Conference (May 2024)