Oscar **Poudel**

Ph.D. in Civil Engineering

Specialization in AI and Robotics for Construction Automation

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Newark, NJ, 07102

RESEARCH INTERESTS

- > Human-Robot Interaction for Construction Robotics : Designing and implementing hardware-software systems to facilitate multimodal interactions between humans and robots, with applications in construction site automation and assistive robotics
- > Structural Health Monitoring and Inspection: Development of computer vision-based systems for automated detection, quantification, and analysis of structural conditions, utilizing camera sensors, edge computing, and embedded AI for realtime infrastructure assessment.
- > Artificial Intelligence for Civil and Construction Engineering: Application of large language models (LLMs), deep learning (DL), and reinforcement learning (RL) for construction automation, predictive modeling, and intelligent decision-making, including the design of agentic systems and autonomous workflows.
- > Intelligent Infrastructure and Ubiquitous Monitoring Systems: Integration of ubiquitous sensing technologies, wireless sensor networks, and data fusion techniques to enable scalable, adaptive monitoring and predictive maintenance for civil infrastructure.

TECHNICAL SKILLS

ETABS, SAP2000, SAFE, PERFORM3D, Robot Structural Analysis, RCDC, IDEA StatiCa, OPEN-Structural Engineering

SEES, Grasshopper

Drafting & BIM Tools Revit, AutoCAD, SketchUp, Lumion

GIS & Remote Sensing **QGIS**, SNAP (ESA)

Project Management Tools Primavera P6, MS Project

Programming Languages Python, C/C++, MATLAB, JavaScript

AI & Machine Learning Frameworks PyTorch, TensorFlow, LangChain, PydanticAI, scikit-learn, OpenCV

Simulation & Robotics Platforms ROS2, Isaac Sim, Webots, Unity, Gazebo, Movelt

Embedded Systems & Hardware Arduino, Microcontrollers, Sensor Integration, SPI/I2C Protocols

Technical Software & Analysis Tools Simulink, Excel (Advanced), JupyterLab, Ansys (basic)

> Scientific Reporting, Grant Writing, Technical Presentation, Teaching and Mentoring **Professional Skills**

Operating Systems Linux, Windows, macOS



PROFESSIONAL EXPERIENCE

Present

Research Assistant | Al and Automation Engineer, NEW JERSEY INSTITUTE OF TECHNOLOGY (NJIT), Newark, NJ, USA

September 2023

- > Developed human-robot interaction systems for autonomous construction tasks using ROS2, Isaac Sim, and embedded systems
- > Integrated large language models (LLMs), computer vision, and reinforcement learning for construction site automation
- > Led the development of an agent-based simulation platform for infrastructure maintenance planning using Mesa and PyTorch
- > Contributed to grant writing and conference papers in robotics, AI, and civil engineering domains Python PyTorch ROS2 | Isaac Sim Gazebo | LangChain PydanticAl | Git Arduinos | Microcontroller Programming

September 2025 September 2023

Teaching Assistant | Civil Engineering Department, NJIT, Newark, NJ, USA

- > Assisted in teaching undergraduate courses including Strength of Materials, Statistics, and Engineering Dynamics
- > Conducted recitation sessions, developed grading rubrics, and supported student engagement and mentoring
- > Coordinated lab assignments and provided technical support during simulation-based instruction SolidWorks Excel LaTeX

August 2023 November 2022

Structural Engineer, HATEMALO ENGINEERING & CONSTRUCTION PVT. LTD., Kathmandu, Nepal

- > Performed structural analysis and design of RCC and steel buildings including seismic detailing per NBC/IS codes
- > Conducted site inspections and verification of construction practices aligned with design documents
- > Collaborated with architectural and MEP teams for coordinated BIM workflows ETABS | SAP2000 | AutoCAD | Revit | Excel | SketchUp |

November 2022 August 2022

Junior Structural Engineer, MRB & Associates, Kathmandu, Nepal

- > Supported senior engineers in analysis and detailing of multi-storey commercial and residential struc-
- > Participated in retrofitting design and strengthening evaluation of vulnerable RC buildings
- > Prepared structural drawings, BOQs, and engineering documentation

STAAD.Pro ETABS SAFE AutoCAD Excel

EDUCATION

2023-Present Ph.D. in Civil Engineering (Specialization: Construction Management), New Jersey Institute of Technology, Newark, NJ GPA: 4.0/4.0

2017-2022 Bachelor's in Civil Engineering, Institute of Engineering, Pulchowk Campus, Lalitpur, Nepal Percentage: 82%



Research Publications

Journal Papers (J)

- J03. Poudel, O., & Assaad, R. H. (2025). A Real-Time Intelligent Acoustic IoT-Enabled Embedded Construction Site Monitoring and Alert System: Integrating Deep Learning-Based Machine-Listening Algorithms, Edge Computing, and Cloud Computing. Journal of Construction Engineering and Management, 151(7), 04025075.
- J02. Assaad, R. H., Mohammadi, M., & Poudel, O. (2025). Developing an intelligent IoT-enabled wearable multimodal biosensing device and cloud-based digital dashboard for real-time and comprehensive health, physiological, emotional, and cognitive monitoring using multi-sensor fusion technologies. Sensors and Actuators A: Physical, 381, 116074.
- J01. Poudel, O., & Shrestha, K. C. (2024). Enhancing earthquake resilience with strategically arranged inclined columns in multistoried RCC structures. Innovative Infrastructure Solutions, 9(6), 223.

66 REFERENCES

Dr. Rayan H. Assaad

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Prof. Assaad is my Ph.D. dissertation supervisor.

Dr. Mohsen Mohammadi

Senior Structural and GeoStructural Engineer, Schnabel Engineering, Jersey City, NJ, USA

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Dr. Mohammadi is my collegue

Nima Sthapit

Earthquake/Structure Engineer, MRB & Associates, Kathmandu, Nepal

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Industrial Reference, I collaborated with Mrs. Sthapit in multiple projects and also she mentored me during my internship