

Oscar POUDEL

Ph.D. in Civil Engineering

Specialization in AI and Robotics for Construction Automation

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💻 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 real-time 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

Structural Engineering	ETABS, SAP2000, SAFE, PERFORM3D, Robot Structural Analysis, RCDC, IDEA StatiCa, OPEN-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 AR/VR, Gazebo, MoveIt, Docker, AWS
Embedded Systems & Hardware	Arduino, PCB design, IOTs(NodeRed,C++), Microcontrollers, Sensor Integration
Technical Software & Analysis Tools	Simulink, Excel (Advanced), JupyterLab, Ansys (basic)
Professional Skills	Scientific Reporting, Grant Writing, Technical Presentation, Teaching and Mentoring
Operating Systems	Linux, Windows, macOS

💼 PROFESSIONAL EXPERIENCE

Present	Research Assistant AI and Automation Engineer, NEW JERSEY INSTITUTE OF TECHNOLOGY (NJIT), Newark, NJ, USA <ul style="list-style-type: none">➤ 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
September 2023	Teaching Assistant Civil Engineering Department, NJIT, Newark, NJ, USA <ul style="list-style-type: none">➤ 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
September 2025 September 2023	SolidWorks Excel LaTeX

August 2023 November 2022	Structural Engineer, HATEMALO ENGINEERING & CONSTRUCTION PVT. LTD., Kathmandu, Nepal <ul style="list-style-type: none"> ➢ 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 <div style="display: flex; justify-content: space-around; font-size: small; margin-top: 5px;"> ETABS SAP2000 Rhino AutoCAD Revit Excel SketchUp </div>
November 2022 August 2022	Junior Structural Engineer, MRB & ASSOCIATES, Kathmandu, Nepal <ul style="list-style-type: none"> ➢ Supported senior engineers in analysis and detailing of multi-storey commercial and residential structures ➢ Participated in retrofitting design and strengthening evaluation of vulnerable RC buildings ➢ Prepared structural drawings, BOQs, and engineering documentation <div style="display: flex; justify-content: space-around; font-size: small; margin-top: 5px;"> ETABS SAP SAFE AutoCAD Excel </div>

EDUCATION

2023-Present	Ph.D. in Civil Engineering (Construction Automation/ Construction Management), New Jersey Institute of Technology, Newark, NJ GPA : 4.0/4.0
2023-Present	Masters in Artificial Intelligence (MSAI), New Jersey Institute of Technology, Newark, NJ
2017-2022	Bachelor's in Civil Engineering, Institute of Engineering, Pulchowk Campus, Lalitpur, Nepal Percentage : 82%

CERTIFICATION AND LICENSURE

2025	NCEES FE Civil (2571691-1865513-e1a7b26)
2023	Nepal Engineering Council (Category "A" 32803)
2022	ASCE member (000012454689)

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.

Representative Conference papers (C)

- C03. Poudel, O., Assaad, R. H., & Awada, M. (2025, Accepted/In-press). SLAM assisted Transformers-Based TD3 Deep Reinforcement Learning for Adaptive Navigation and Mapping and Dynamic Obstacle Avoidance in Autonomous Construction Robotics. In *Computing in Civil Engineering 2025*
- C02. Poudel, O., Assaad, R. H., & Awada, M. (2025, Accepted/In-press). Integrating Large Language Models (LLMs) with Autonomous Aerial Drone Robotics and Computer Vision for Contextual Adaptive Construction Site Safety Management and Risk Assessment. In *Computing in Civil Engineering 2025*.
- C01. Poudel, O., Assaad, R. H., & Awada, M. (2025, Accepted/In-press). Visio-GEN : A Wireless Gaze-Assisted and Voice-Controlled Generative AI System Leveraging Stable Diffusion for Real-Time Image Generation for Civil Engineering Design and Visualization. In *Computing in Civil Engineering 2025*

“ REFERENCES

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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 colleague

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