

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

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| 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

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| Present | Research Assistant AI and Automation Engineer, NEW JERSEY INSTITUTE OF TECHNOLOGY (NJIT), Newark, NJ, USA |
| September 2023 | <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 <div style="display: flex; justify-content: space-around; gap: 10px;">PythonPyTorchROS2Isaac SimGazeboLangChainPydanticAIGitArduinosMicrocontroller Programming</div> |
| September 2025 | Teaching Assistant Civil Engineering Department, NJIT, Newark, NJ, USA |
| September 2023 | <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 <div style="display: flex; justify-content: space-around; gap: 10px;">SolidWorksExcelLaTeX</div> |

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| 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; gap: 10px;"> 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; gap: 10px;"> ETABS SAP SAFE AutoCAD Excel </div> |

EDUCATION

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| 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% |

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.

REFERENCES

Dr. Rayan H. Assaad

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

Dr. Mohsen Mohammadi

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Dr. Mohammadi is my colleague

Nima Sthapit

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