ANTO OVID G S

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Education

North Carolina State University, *PhD and MS in Civil Engineering* | Raleigh, NC, USA | GPA: 3.9/4.0 Expected May'26

- **Dissertation:** Generative AI for Proactive Construction Safety: From Data-Driven Hazard Understanding to Multi-Agent Prevention-through-Design and Learning Systems.
- **Advisor:** Prof. Alex Albert, Construction Safety Laboratory.
- **Coursework:** Building Information Modeling (BIM); Project, Safety, Risk & Financial Management; Facilities.

North Carolina State University, *MS in Electrical Engineering* | Raleigh, NC, USA | GPA: 3.9/4.0

- **Coursework:** Computer Vision, Neural Networks, Robotics, GenAI, Metaheuristic Algorithms, Wearable Sensors. May'19

Anna University, *B.Tech in Civil Engineering* | GCT - Coimbatore, TN, India | CGPA: 3.46/4.0

- Structural and Geotechnical Engineering, Transportation, Hydraulics, Structural Analysis and Design, and C/C++.

Publications

Peer-Reviewed Journal Articles

[J3] Chen, G., Alsharef, A., **Ovid, A.**, Albert, A., & Jaselskis, E. (2025). Meet2Mitigate: An LLM-Powered Framework for Real-Time Issue Identification and Mitigation from Construction Meeting Discourse. *Advanced Engineering Informatics, 64*, 103068.

[J2] Uddin, S. M. J., Albert, A., Tamanna, M., **Ovid, A.**, & Alsharef, A. (2024). ChatGPT as an Educational Resource for Civil Engineering Students. *Computer Applications in Engineering Education, 32*(4), e22747.

[J1] Uddin, S. M. J., Albert, A., **Ovid, A.**, & Alsharef, A. (2023). Leveraging ChatGPT to Aid Construction Hazard Recognition and Support Safety Education and Training. *Sustainability, 15*(9), 7121.

Manuscripts Under Review

[UR8] Ovid, A., Albert, A., Alsharef, A., & Uddin, S. M. J. (2025). Severe Injuries Impacting Specialty Trade Contractors. *Journal of Construction Engineering and Management. (Under review).*

[UR7] Ovid, A., Albert, A., Uddin, S. M. J., & Alsharef, A. (2025). Severe Hand Injuries in the Construction Industry: Patterns and Practical Implications. *Journal of Safety Research. (Under review).*

[UR6] Ovid, A., Albert, A., Uddin, S. M. J., & Alsharef, A. (2025). Mapping Severe Head Injury Pathways in Construction: Insights for Targeted Prevention. *Journal of Construction Engineering and Management. (Under review).*

[UR5] Ovid, A., Albert, A., Alsharef, A., & Uddin, S. M. J. (2025). Severe Injuries in the Manufacturing Industry: Insights from OSHA's Severe Injury Reporting Program. *Safety Science. (Under review).*

[UR4] Ovid, A., Albert, A., Chen, G., & Alsharef, A. (2025). Statistical Insights into Severe Injuries from Heavy Equipment and Material Handling in Construction. *Journal of Construction Engineering and Management. (Under review).*

[UR3] Ovid, A., Albert, A., & Alsharef, A. (2025). Off-Road and Highway Vehicle Injuries in Construction: Statistical Associations and Haddon Matrix Narrative Insights. *Accident Analysis & Prevention. (Under review).*

[UR2] Ovid, A., Albert, A., Uddin, S. M. J., & Alsharef, A. (2025). Severe Injuries in the U.S. Natural Resources and Mining Super-sector: A Hybrid Analysis of Statistical Associations and Socio-Technical Risk Themes Using BERTopic and LLMs. *The Extractive Industries and Society. (Under review).*

[UR1] Chaudhary, N., Uddin, S. M. J., Chandra, S., **Ovid, A.**, & Albert, A. (2025). Prompt to Protection: A Comparative Study of Multimodal LLMs in Construction Hazard Recognition. *(Under review).*

Manuscripts in Preparation for Journal

[IP2] Ovid, A., Albert, A. ConSAFE-GPT: A domain-specific multi-task dataset and instruction-tuning LLM for construction safety applications. Target: *Automation in Construction*. (Manuscript in preparation).

[IP1] Ovid, A., Albert, A., Alsharef, A., & Uddin, S. M. J. ConSevAI: Semantic retrieval of injury reports for task-level hazard anticipation in construction. Target: *Automation in Construction*. (Manuscript in preparation).

Peer-Reviewed Conference Proceedings

[C5] Ovid, A., Alsharef, A., Uddin, S. M. J., & Albert, A. (2024). Applied AI and Robotics for Construction Operations—A Smart Review of the State of the Science. *In Construction Research Congress 2024* (pp. 913–923).

[C4] Alsharef, A., **Ovid, A.**, Uddin, S. M. J., & Albert, A. (2024). Biggest Challenges Facing the Construction Industry. *In Construction Research Congress 2024* (pp. 652–660).

[C3] Uddin, S. M. J., Tabassum, N., **Ovid, A.**, Alsharef, A., & Albert, A. (2024). Measuring Mental Fatigue in Construction: State of the Science and Future Opportunities. *In Construction Research Congress 2024* (pp. 688–698).

[C2] Alsharef, A., Uddin, S. M. J., Banerjee, S., **Ovid, A.**, & Albert, A. (2024). Information Sources and Lessons Learned by Construction Organizations during the Early Months of the COVID-19 Pandemic in the U.S. *In Construction Research Congress 2024* (pp. 671–679).

[C1] Uddin, S. M. J., Tamanna, M., Alsharef, A., **Ovid, A.**, & Albert, A. (2024). Workforce Challenges Posed by the COVID-19 Pandemic: YouTube as a Data Source. *In Construction Research Congress 2024* (pp. 170–179).

Accepted Peer-reviewed Conference Submissions

[CS5] Ovid, A., Albert, A., Chen, G., Alsharef, A., & Uddin, S. M. J. (2026). Evaluating Closed-Set and Open-Vocabulary Object Detectors in Real-Time Construction Environment. *Construction Research Congress 2026*. (Accepted).

[CS4] Uddin, S. M. J., Albert, A., **Ovid, A.**, & Tamanna, M. (2026). YouTube vs. ChatGPT: Evaluating Digital Tools for Improving Construction Hazard Prevention-through-Design (CHPtD). *Construction Research Congress 2026*. (Accepted).

[CS3] Ovid, A., Albert, A., Choi, S. D., & Namian, M. (2026). Upgrading Head Protection: Supporting the Transition from Type I Hard Hats to Type II Safety Helmets. *Construction Research Congress 2026*. (Accepted).

[CS2] Ovid, A., Albert, A., Uddin, S. M. J., Alsharef, A., & Chen, G. (2026). Application of Neural Networks in BIM and 3D Reconstruction: A Systematic and Scientometric review. *Construction Research Congress 2026*. (Accepted).

[CS1] Ovid, A., Albert, A., Alsharef, A., Uddin, S. M. J., & Chen, G. (2026). Automated Classification of Construction Incident Reports: A Systematic Review and Evaluation of Models. *Construction Research Congress 2026*. (Accepted).

Peer-Reviewed Book Chapter

[BC1] Chen, G., Alsharef, A., **Ovid, A.**, Albert, A., & Jaselskis, E. (2026). *Wearable Edge AI Application for Real-Time Construction Safety Monitoring*. In H. Jebelli, Y. Liu, J. Du, Y. K. Cho, & T. Bock (Eds.), *AI, Robotics, and Automation in Construction: Emerging Technologies for Sustainability, Efficiency, and Safety*. Springer Nature. (Submitted).

Awards, Grants & Sponsored Projects

1st Place in Preconstruction Student Competition, *ASC Region 2 South East* Nov'22
Led NCSU's Tuffy construction team and won first place in the Preconstruction Bid Simulation competition at the 2022 ASC Region 2, sponsored by Brasfield & Gorrie.

Transitioning from Hard Hats to Safety Helmets for Small Construction Contractors: From Research to Practice 2024–2026
Sponsor: Jobsite Safety Institute - JSI. Role: Research Assistant; PI: Dr. Alex Albert. Amount: $25,000.

Science of Safety Training 2022–2024
Sponsor: Construction Safety Research Alliance . Role: Research Assistant; PI: Dr. Alex Albert. Amount: $50,000.

Developing a Fit-for-Purpose Handbook for Effective Implementation of CII Best Practices 2023–2025
Sponsor: Construction Industry Institute. Role: Research Assistant; Co-PI: Dr. Alex Albert. Amount: $163,180.

AI-Powered Accident Retrieval for Construction Safety (Proposal - In Preparation) Dec'25
Sponsor: Nesma & Partners Chair for Construction Research and Building Technologies. Role: Research Assistant; PI: Dr. Alex Albert. Budget: TBD. Call issued: 26 Jul 2025.

Travel Grants

ASC Region 5 Student Competition (Texas) Feb'23
Received travel support to compete at the ASC Region 5 event in Texas.

ASC Region 2 Student Competition (Atlanta, GA) Dec'22
Received travel support to compete at the ASC Region 2 event in Atlanta.

CRC & CI Joint Conference (2026) Mar'26
Awarded competitive travel funding to present research at the CRC & CI Joint Conference.

Research Experience

Graduate Research Assistant (GRA), Construction Safety Laboratory - NCSU Jan 2022 - Present
Advisor: Dr. Alex Albert.

OSHA Workplace Injury Analytics 2022 - Present
Led statistical analyses on OSHA Severe Injury Reports (construction, manufacturing, mining); Analyzed data using mixed-methods, Statistical Analysis, EFA, BERTopic models, k-Mean Clustering. Produced seven manuscripts under review in JCEM, Safety Science, JSR, AAP, and EIS.

Unreal Worksite Training: Mixed Reality with BIM and GPT for Real-Time HazRecon 2025 - Present
Designed an immersive training framework integrating BIM scenes with GPT-driven guidance for interactive safety training and assessment.

Domain-Specific Generative AI LLMs for Construction Safety 2024 - Present
Built a semantic-retrieval app and instruction-tuned model for hazard analysis and training; two phases of manuscripts in preparation for Automation in Construction.

Meet2Mitigate: LLM-Based RAG for Safety/Project Meeting Analysis 2023 - 2024
Co-developed retrieval-augmented generation workflows to mine action items and hazards from meeting records; published in Advanced Engineering Informatics (2025).

ChatGPT in Safety Training & Civil Engineering Education 2022 - 2023
Contributed to controlled studies on hazard recognition and pedagogy using ChatGPT; publications in Sustainability (2023) and CAEE (2024).

Teaching Experience

Instructor Fall'23,'25 and Spring'24

- CE 301 - Surveying Laboratory (Fall'23,'25 and Spring'24)

Teaching Assistant Fall'22 - Spring'25

- CE 365 - Construction Equipment Methods (Spring'25)
- CE 464/564 - Legal Aspects of Contracting (Spring'25)
- CE 466 - Building Construction Engineering (Fall'22, '23, '24, '25)
- CE 301 - Surveying Laboratory (Fall'22, Spring'23)

Mentoring Experience

Ph.D Students - 2 mentees 2024 - Present

- Vignesh V. P. (Ph.D., IIT Palakkad, India)
- Roya Albaloul (Ph.D., Civil Engineering, NCSU)

Masters Students - 3 mentees 2023 - Present

- Pavithran (M.S., McGill University, Canada)
- Sai Chand (M.S., NCSU)
- Myat Mon Aye (M.S., NCSU)

Undergraduate & Graduate Internship Mentoring - 4 mentees 2025 - Present

- Newsome Griffin - Industrial Engineering (Junior)
- Austin Booth - Civil Engineering (Senior)
- Ramchandra Shinde (M.S., NCSU)
- Swaraj Patil (M.S., NCSU)

DBIA Student Competition Team Mentor - NC State University - 4 mentees 2022 - 2023

- Owen Martin - Civil Engineering (Senior)
- Seth Wilder - Civil Engineering (Senior)
- Caden Miller - Industrial Engineering (Senior)
- Sean MacKay - Architecture (Design School - Junior)

Professional Experience

Integrated Project Services - Cary, NC | *Project Engineer Intern* May'25 - Sep'25

- Coordinated construction operations for Controlled Environment Rooms (CERs): procurement tracking, MEP tie-ins, commissioning prerequisites, and QA/QC closure.
- Designed and deployed a Safety Onboarding app (Power Apps + Power Automate) to streamline subcontractor onboarding and compliance.
- Applied BIM and 4D scheduling to align pull-planning commitments with model-linked sequences, improving constructability reviews and inspection readiness.
- Delivered a Startup & Energization Plan for HVAC, building utilities, and process utilities; presented to leadership as capstone deliverable.
- Led a regional cross-project price benchmarking study; developed a forecasting model that informed preconstruction planning and competitive bidding.

DPR Construction - Raleigh–Durham, NC | *BIM/VDC Intern* Sep'22 - Dec'22

- Tracked pharmaceutical facility progress with DroneDeploy and StructionSite; integrated updates into BIM 360 and Autodesk Assemble.
- Built interactive dashboards in Power BI and Unity3D AR for real-time reporting and clash visualization.
- Supported BIM coordination with Navisworks clash detection and Synchro Pro 4D simulations.
- Prototyped immersive BIM meeting tools in Unreal Engine 5 (MRTK + HoloLens 2) to enhance client reviews.
- Led NCSU project team research assessing 4D BIM effectiveness in life sciences projects.

Fresco Structures - India | *Co-Founder & Project Engineer* Aug'18 - Dec'21

- Co-founded and managed a design–build firm delivering residential and commercial projects with integrated BIM workflows.
- Led multidisciplinary teams in structural design, planning, and execution of reinforced-concrete structures.
- Provided BIM services (Revit, Navisworks, Tekla) for cost estimation, scheduling, and visualization.
- Mentored junior engineers; delivered training on BIM, structural design, soil mechanics, vector calculus, Python for civil engineers, and AI/ML fundamentals.

Cubik CADD - India | *Part-Time Civil Software Trainer* Nov'19 - Apr'21

- Delivered professional training on AutoCAD, Revit, Navisworks, Synchro 4D, and STAAD.Pro to students and early-career engineers.

Swifterz Creative Services - India | *Structural Designer & BIM Modeler* Jan'19 - Jul'19

- Designed reinforced-concrete structures from architectural CAD drawings using STAAD.Pro and Excel.
- Built BIM models in Revit, performed clash detection, and conducted quantity takeoffs in Navisworks and Synchro.
- Executed structural designs for a medical college hospital, hostels, and apartment complexes.
- Collaborated with IT team to prototype Revit add-ins using Python and Dynamo.

Professional Service, Leadership & Memberships

Journal Reviewer 2024-Present

- ASCE - Journal of Construction Engineering and Management (2024 - Present)
- ASCE - Journal of Computing in Civil Engineering (2025 - Present)
- ASCE - Journal of Management in Engineering (2025 - Present)
- Elsevier - Automation in Construction (2025 - Present)
- Elsevier - Safety Science (2025 - Present)
- Elsevier - Journal of Safety Research (2025 - Present)
- Elsevier - Journal of Safety and Sustainability (2025 - Present)
- Elsevier - Journal of Building Engineering (2025 - Present)

Conference Reviewer 2024 - Present

- ASCE CI & CRC (2024, 2026)
- International Conference on Computing in Civil Engineering (i3CE 2025)

Leadership Roles 2019 - Present

- Founder, Fresco Structures (2019 - Present)
- President, CMAA Student Chapter, NC State University (2023 - 2025)
- Mentor, student competitions (DBIA, ASC-2) & career guidance (Sep'23, Nov'25)

Professional Memberships Current

- Student Member, American Society of Civil Engineers (ASCE)

Licenses & Certifications Current

- Advanced Teaching Certificate, NCSU - 2025
- Autodesk Certified Professional: AutoCAD, Revit, 3DS Max, Generative Design-Fusion 360
- OSHA 30-Hour Certified
- Procore Certified Project Manager

Projects (Selected Research/Applied)

Safety-Aware Autonomous Navigation for COBOTS Oct'25 - Present

- Developing a ROS 2 (Nav2) and Gazebo simulation for a mobile robot performing safe navigation in construction environments with dynamic obstacles and no-go zones.
- Integrating global planners and custom local controllers using TEB, MPPI-C, and Control Barrier Functions for collision-free trajectory generation.
- Exploring reinforcement learning for adaptive local control; compared RL and MPPI-C performance under varying worker motion and safety constraints.

Neural Insight: Automating Construction Accident Classification Using NLP & DL Apr'25

- Built a multi-output classifier that maps unstructured OSHA Severe Injury Reports (SIR) narratives to four labels: Event, Source, Body Part, and Nature.
- OSHA data engineered pipeline with cleaning, stratified splits, class weights, and focal loss for imbalance mitigation.
- Baseline models TF–IDF and MLP achieved Subset Accuracy 48.6%, Micro-F1 80%, Macro-F1 66%.
- Final fine-tuned BERT with four classifier heads reached Subset Accuracy 72.1%, Micro-F1 95%, Macro-F1 93%; large gains on "neck" and "surface wounds" classes.
- Implemented training and evaluation code, class-imbalance strategy, and error analyses; drafted integration concept for GPT-generated scenario inputs.

Wearable Bio-Sensor for Monitoring Construction Worker Safety Dec'23

- Developed a wearable hand-arm sleeve to monitor worker exposure to vibration and muscle fatigue.
- Incorporated a 3-axis MEMS accelerometer and EMG electrodes for real-time monitoring of Hand-Arm Vibration Syndrome (HAVS) and musculoskeletal disorders (MSDs).
- Designed the device to transmit data via Bluetooth to a companion app for trend analysis and immediate feedback.

Finite Element Analysis using MATLAB FEM Codes and ANSYS Scripts Apr'21

- Imported ANSYS models into MATLAB's Partial Differential Equation toolbox for structural analysis using FEM.
- Performed static structural analysis on 1D, 2D, and 3D solid elements using ANSYS scripts.
- Compared Finite Element Analysis (FEA) results of Trusses, 2D Plates, and 3D Solid elements between MATLAB FEM Code and ANSYS scripts.

Mathematical Programming using Python and MATLAB Apr'21

- Coded Genetic Algorithm, Particle Swarm Optimization, and Firefly Optimization algorithms.
- Programmed and solved Linear Programming transportation problems and Principal Component Analysis (PCA).
- Implemented the fourth-order Runge-Kutta method using a Prey-Predator system as an example.
- Programmed numerical root finding techniques such as Secant, Newton-Raphson, and Bisection methods.
- Solved numerical computations involving Eigenvectors, Eigenvalues, Numerical Integration, and Ordinary Differential Equations (ODEs).

Automation in Construction Design using PyAutoCAD and RevitPythonShell Feb'21

- Coded Python snippets for the design and visualization of concrete footings, beams, and columns.
- Automated beam design in AutoCAD using PyAutoCAD, streamlining the process for engineering teams.

Skills & Tools

Analysis & Design:	AutoCAD, Civil 3D, Robot; STAAD.pro; CSI-ETABS, SAP2000, SAFE; Tekla SD
FEA - Simulation:	Ansys, Abaqus; Plaxis 3D
Heavy Civil/Infrastructure:	Infraworks, Openroads; QGIS. Csi-Bridge, Leap Bridge (Concrete & Steel)
BIM/VDC & Management:	Revit, Navisworks, Synchro; MS Office, Primavera P6, Autodesk Assemble, BIM 360.
Data Visualization:	PowerBi, Tableau, Python - Matplotlib; Plotly, MS Excel.
Architectural Visualization [AR, VR]:	Unreal Engine, Unity 3D; Lumion, Twinmotion; Photoshop and Illustrator.
Parametric & Generative Design:	Fusion 360; Dynamo, Grasshopper; PyAutoCAD, PyRevit.
Programming & Hardware:	C, C++, Python, Julia, MATLAB, R, ROS 2; Arduino, Raspberry Pi 4, Jetson Nano.
Languages:	English, Tamil, Spanish*.

Certifications Continued Learning

NPTEL -	RC-Road Bridge, Special Concretes, Repair of Concrete Structures, PSO/GA - Non-Traditional and Traditional Optimization Tools, Project Planning and Control.
Coursera -	3D Printing, Deep Learning and Neural Networks, Math for ML, MATLAB Programming.
LinkedIn Learning -	Algorithmic & Generative Design (Dynamo and Grasshopper), AR/VR-Unreal Engine, Construction Management, Infraworks, Synchro, Power BI, Sustainability (GBS: Energy Analysis).

References

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