STEPHEN TIMOTHY GORDON II

Curriculum Vitae
(318) 773-4871 stephentgordonii@gmail.com Shreveport, LA 71047
linkedin.com/in/stephen-gordon-4207a71a2

EDUCATION

Louisiana Tech University **Ruston, LA**
Ph.D. in Engineering, Concentration: Materials and Infrastructure Systems – GPA 3.95 *2021 – 2026*

- Dissertation: *Additive Manufacturing Using Fly-Ash-Based Geopolymer Cement Cured by Ohmic Heating*
  - Advisor Committee Chair: Dr. Shaurav Alam, PE
  - Committee: Dr. Sven Eklund, Dr. John Matthews, Dr. David Hall, Dr. Joan Lynam

Louisiana Tech University **Ruston, LA**
M.S. in Engineering (MSE): Electrical Engineering *2021 – 2025*

- Graduate coursework spanning electrical characterization, materials science, mechanics, and computational methods.
  - Committee Chair: Dr. Matthew J. Hartmann

Louisiana Tech University **Ruston, LA**
B.S. in Electrical Engineering, Minor in Mathematics *2017 – 2021*

- Focus: power systems, control systems, analog and digital circuit design. Transferred from East Texas Baptist University (2015–2016)

RESEARCH INTERESTS

- Sustainable construction materials: fly ash utilization, geopolymer synthesis, and performance characterization
- Additive manufacturing and 3D concrete printing for structural and infrastructure applications
- Geopolymer engineering: mechanical performance, durability, and field-scale deployment
- Infrastructure rehabilitation: cured-in-place pipe, pipeline repair materials, and service-life modeling
- Electrical curing systems for cementitious materials: ohmic, dielectric, and inductive heating
- Smart and self-sensing construction materials: embedded sensors, geopolymer batteries, structural health monitoring
- Engineering education, laboratory pedagogy, and construction materials curriculum development
- Applied large language models (LLMs) for construction project management and field data analysis

CERTIFICATIONS & LICENSURE

- Engineer in Training (EIT), State of Louisiana (2022)
- NCEES FE Exam, Electrical & Computer Engineering (2021)
- FCC Technician Class Amateur Radio Operator, KG5RLJ (active)

RELEVANT GRADUATE COURSEWORK

Materials Science: Modern Engineering Materials, Continuum Mechanics

Civil & Geotechnical: Trenchless Technology (CIPP, HDD, Microtunneling), Advanced Foundation Engineering (pile-group and retaining-wall design)

Electrical & Optical: Optoelectronics, Special Topics in Electrical Engineering (Micro and Nano-Electromechanical Systems, Information Theory, Integrated Circuits)

Computation & Systems: Finite Element Analysis, Systems Simulation (Arena), Numerical Solution of PDEs, Theory of Probability, Formulation & Solution of Engineering Problems

ACADEMIC APPOINTMENTS

Instructor of Record, ENGR 1222: Engineering Problem Solving III **Mar 2026 – May 2026**
Louisiana Tech University *Ruston, LA*

- Delivered lectures and laboratory instruction to 2 sections (49 students) in electromechanical systems, engineering design, Arduino-based fabrication and troubleshooting, SolidWorks/Mathcad, technical communication, and engineering economics
- Facilitated hands-on engineering problem-solving activities and supervised student project development

Instructor of Record, CVEN 3023: Construction and Building Materials **2023 – 2026**
Louisiana Tech University *Ruston, LA*

- Developed and delivered the undergraduate course, curriculum through assessment, across six terms to 259 students (Spring 2023; Winter 2023–24; Spring 2024; Winter 2024–25; Spring 2025; Winter 2025–26), each term running paired lecture and laboratory sections
- Lecture topics: aggregates, Portland cement and concrete mix design, geopolymer cement, steel and aluminum, wood, plastics, and asphalt; expanded the curriculum with units on advanced/additive manufacturing, composites and adhesives, corrosion mechanics, thermal expansion and thermal stress, statics in construction, and foundation engineering
- Designed and supervised ASTM-standard laboratories: aggregate gradation and properties (C136, C127, C128), concrete mix-design and cylinder testing (C39), polymer/CIPP/HDPE tensile and flexural testing (D638, D790), IZOD impact with xenon-arc weathering (D256), plus metal, wood, and hardness/noise testing
- Estimated, sourced, and procured aggregates and cement each term, building a working relationship with Century Ready Mix (Ruston, LA); evaluated students via exams, lab reports, and technical presentations
- Prepared course assessment data and reports supporting ABET 2026 accreditation for both the Civil Engineering (CVEN) and Construction Engineering Technology (CET) programs

Graduate Teaching Assistant **2021 – 2026**
Louisiana Tech University *Ruston, LA*

- **ENGT 2202, Applied Engineering Mechanics** *(Fall 2021, 2022)*: lectures, laboratories, exam proctoring, grading
- **CVEN 3023, Construction and Building Materials** *(Winter 2021–22; Spring 2022; Winter 2022–23)*: laboratory instruction, student mentoring, course material preparation
- **CVTE 4753, Soils in Construction** *(Fall 2023, 2024, 2025)*: laboratory supervision, grading, student office hours

TEACHING READINESS

Prepared to teach immediately:

- Construction and building materials
- Materials testing and ASTM laboratory methods
- Engineering design and problem solving
- Electrical circuits and electronics
- Additive manufacturing / 3D printing

Prepared to teach with short preparation:

- Statics and mechanics of materials
- Introduction to foundation engineering
- Power systems

Proposed new course:

- Sustainable construction materials and concrete additive manufacturing

RESEARCH EXPERIENCE

Graduate Research Assistant **2021 – 2026**
Louisiana Tech University, College of Engineering & Science *Ruston, LA*

- Designed and built a prototype 3D printer using ohmic heating to rapidly cure Class F fly ash geopolymer mixes, expanding the practical curing envelope for cementitious binders
- Conducted SEM and XRF characterization of Class C and F fly ash; executed ASTM mechanical testing (compression, flexure, tensile, impact; C39, C78, C496)
- Developed a geopolymer alkali battery using graphite conductive admixtures targeting smart self-sensing infrastructure
- Performed creep, flexural, and tensile analysis of cured-in-place pipe (CIPP) liner samples for water infrastructure rehabilitation
- Built a Searle's apparatus to evaluate halloysite nanotube (HNT) insulating coatings; confirmed reduced thermal conductivity and improved thermal energy storage
- Conducted rheological and electrical-conductivity measurements on fresh geopolymer mixes at multiple stages of activation
- Presented research at NASTT No-Dig (2022–2024), World of Coal Ash (2024), and the International Net-Zero Future Conference, Oslo, Norway (2024), as sole presenter on self-arranged international travel

3D Printer Technician, Prototyping Laboratory **2019 – 2020**
Louisiana Tech University *Ruston, LA*

- Maintained and operated FDM and SLA systems (MakerBot, Creality, Anycubic, Kywoo); designed components in SolidWorks, Fusion 360, and Blender; prepared print files with Cura, ChituBox, PrusaSlicer, and MakerBot Print
- Assisted students and faculty with CAD modeling, print preparation, and fabrication workflows

RESEARCH & ENGINEERING PROJECTS

Ohmic-Curing 3D Printer for Fly Ash Geopolymer Materials | *2021–2026*

- Designed and fabricated a prototype additive manufacturing system embedding ohmic electrodes in the print head to cure Class F fly ash geopolymer paste in place, reducing set time from hours to minutes
- Characterized electrical conductivity and compressive/flexural strength vs. curing parameters; first-author paper submitted to Ain Shams Engineering Journal; presented at World of Coal Ash (2024)

Electrical Characterization Platform for Cementitious Materials | *2021–2026*

- Developed an apparatus measuring electrical-conductivity, resistivity, and resistance of fresh and cured geopolymer mixes (fly ash, slag, hybrid binders) at multiple activation stages; contributed to three peer-reviewed publications and a non-destructive fresh-mix quality method for 3D printing

Geopolymer Alkali Battery for Smart Self-Sensing Infrastructure | *2022–2024*

- Developed proof-of-concept geopolymer batteries using graphite conductive admixtures; demonstrated electrochemical cell behavior in cementitious form factors toward embedded energy harvesting and structural health monitoring

Thermal Characterization of Halloysite Nanotube Insulating Coatings | *2022–2023*

- Built a custom Searle's apparatus to measure thermal conductivity of HNT insulating primer coatings on structural substrates; demonstrated statistically significant reductions in conductivity (published in Construction and Building Materials, Vol. 392)

CIPP Liner Structural Analysis for Water Infrastructure Rehabilitation | *2021–2024*

- Performed creep compliance, flexural modulus, and tensile testing on cured-in-place pipe liner specimens per ASTM F1216 at Louisiana Tech, providing service-life data for pressure-pipe rehabilitation

Fly Ash Geopolymer Composites for Sustainable Pavement and Space Applications | *2022–2024*

- Co-investigated corn-stover/fly-ash geopolymers for pavement base/subbase and regolith-based cementitious materials for lunar construction; results published in Environments (2024) and Frontiers in Space Technologies (2024)

Synthetic Vitrified Fly-Ash Aggregates for Concrete | *2023–2024*

- Developed a process converting Class F fly ash into synthetic fine aggregate by high-temperature vitrification, milling the resulting clay-like material to a fineness modulus of 2.84 (within ASTM limits); benchmarked compressive strength of concrete made with synthetic vs. natural aggregate per ASTM C39 (3-, 7-, and 28-day). Presented at the International Net-Zero Future Conference, Oslo (2024)

Transient Thermal FEA of Ohmic vs. Convection Geopolymer Curing | *2022–2024*

- Performed transient thermal finite element analysis in SolidWorks, comparing ohmic and convection curing envelopes of geopolymer cementitious materials, including skin-effect modeling and analytical thermal-power calculations; results informed electrode geometry and curing parameters for the ohmic-curing 3D printer

MATLAB Machine Vision for Non-Destructive Surface Porosity Estimation | *2023–2024*

- Developed a MATLAB image-processing pipeline (thresholding, morphological operations, connected-component analysis) for non-destructive surface-porosity estimation of hardened concrete and geopolymer specimens, enabling rapid quality assessment without destructive cross-sectioning

Long-Term Creep-Rupture Testing for CIPP Manufacturers | *2022–2024*

- Built test setups and processed long-term creep-rupture data for cured-in-place pipe (CIPP) liner products on behalf of leading industry manufacturers, supporting service-life characterization of pressure-pipe rehabilitation liners (collaborative project led by Dr. Shaurav Alam)

Structural FEA of an Aluma-Form Dead-End Crossarm | *2022*

- Performed finite element structural analysis of a fiberglass dead-end transmission crossarm under combined conductor and guy loading, evaluating stress distribution and deflection against allowable limits

Discrete-Event Simulation of Coastal Hurricane Evacuation | *2024*

- Built an Arena discrete-event model of multi-modal barrier-island and mainland hurricane evacuation (cars, vans, buses, shuttles on staggered schedules), analyzing intersection bottlenecks and clearance times to compare evacuation-route strategies

GRANTS, FUNDING & SCHOLARSHIPS

Graduate Research Assistantship, Louisiana Tech University College of Engineering & Science (2021–2026), full-time funded research position supporting dissertation work on geopolymer additive manufacturing and electrical characterization

Graduate Teaching Assistantship, Louisiana Tech University (2021–2026), funded instructional position supporting ENGT 2202, CVEN 3023, and CVTE 4753

Argent Memorial Scholarship, North American Society for Trenchless Technology (NASTT) (2023), competitive merit scholarship in trenchless technology and infrastructure rehabilitation

Student Scholarship, South Central Chapter of NASTT (SC-NASTT) (2023), regional competitive scholarship for infrastructure research and professional engagement

TECHNICAL SKILLS

Novel Experimental Setup: Experience with developing a novel 3D printer for geopolymer, utilizing a diverse range of material testing standards and integrating them into a final product.

Programming & Computing: Python (data analysis, automation, machine vision), MATLAB (signal processing), VHDL, C, 6502 Assembly, Linux server administration, containerized application deployment

Engineering Software & CAD: SolidWorks (including FEA), Autodesk Fusion 360, LTspice, EAGLE CAD, Arena System Simulation, Mathcad, Inkscape

Laboratory & Materials Testing: Geopolymer synthesis and characterization, ASTM mechanical testing (compression, flexure, tensile, impact), SEM, XRF, rheological analysis, electrical and ohmic characterization, thermal conductivity measurement, PCB design and fabrication

Additive Manufacturing: FDM and SLA system operation, maintenance, and custom development; geopolymer extrusion system design; slicing (Cura, ChituBox, PrusaSlicer, MakerBot Print)

Machine Learning & AI: Self-hosted offline LLM deployment (Unraid Linux); retrieval-augmented generation (RAG); text-embedding models; applied inference pipelines for engineering document analysis

LABORATORY & INSTRUMENTATION EXPERIENCE

Electron & optical microscopy: field-emission SEM (FESEM), energy-dispersive X-ray spectroscopy (EDS), energy-dispersive X-ray fluorescence (EDXRF), optical microscopy

Mechanical testing: hydraulic compression and tensile/flexural load frames, IZOD impact, hardness (Barcol, durometer), per ASTM C39/C78/C496 and D638/D790/D256

Electrical & thermal characterization: custom ohmic/inductive measurement rigs, a purpose-built Searle's thermal-conductivity apparatus, thermocouple data logging, NI-DAQ acquisition

Fabrication: FDM and SLA 3D printing, PCB design and assembly, custom test-rig design and construction

PUBLICATIONS

Peer-Reviewed Journal Articles

Paneru, A., Sagar, V., Tarikuzzaman, M., Lynam, J.G., **Gordon II, S.T.**, & Alam, S. (2024). Innovative Pavement Materials: Utilizing Corn Stover and Fly Ash in Geopolymers. Environments, 11(192). doi:10.3390/environments11090192 (Impact Factor: 4.3)

Tarikuzzaman, M., Shank, A.M., Agan, E.G., Sagar, V., Lynam, J.G., **Gordon II, S.T.**, & Alam, S. (2024). Tensile Strength and Porosity of Regolith-Based Cement with Human Hair. Frontiers in Space Technologies, 5. doi:10.3389/frspt.2024.1448787 (Impact Factor: 2.4)

Tarikuzzaman, M., **Gordon, S.T.**, Alam, S., & Lynam, J.G. (2024). Direct Contact Membrane Distillation of Artificial Urine and Its Application in Plasticizing Lunar Regolith. Recycling, 9(5), 89. doi:10.3390/recycling9050089 (Impact Factor: 5.2)

Islam, M.R., Lynam, J.G., Eklund, S.E., Alam, S., Santiago, A.V., II, Nan, N., & **Gordon, S.T.** (2024). Loblolly Pine Needles Processing with Deep Eutectic Solvents to Develop Porous Structure. Bioinspired, Biomimetic and Nanobiomaterials, 13(3–4), 69–80. doi:10.1680/jbibn.24.00001 (Impact Factor: 0.6)

Hashm, H., Alam, S., **Gordon, S.**, et al. (2023). Halloysite Clay Nanotube Composites as Coating Materials with Enhanced Properties. Construction and Building Materials, 392. doi:10.1016/j.conbuildmat.2023.131961 (Impact Factor: 8.9)

Sharma, R., Seetala, N., Clower, W., Alam, S., **Gordon, S.**, et al. (2022). Synergistic Effect of Mill Scale and MoS_2 in Geopolymer Composites for EMI Shielding Application. Journal of Materials Science: Materials in Electronics, 33. doi:10.1007/s10854-022-08823-4 (Impact Factor: 2.8)

Under Review

Gordon, S., Alam, S., Chakma, T., et al. (under review). Investigation of Electrical Conductivity and Mechanical Strength of Geopolymer Paste for 3D Printing via Ohmic Curing. Ain Shams Engineering Journal. (Impact Factor: 6.2)

Peer-Reviewed Conference Proceedings

Gordon, S., Chakma, T., Hesser, M., et al. (2024). Styrene Emission Evaluation: An Innovative Controlled Test Setup. NASTT No-Dig Conference, Providence, RI.

Chakma, T., **Gordon, S.**, Alam, S., & Matthews, J. (2024). Exploring Rapid Solidifying Fly Ash Cementitious Materials for Making Structural Components. World of Coal Ash Conference, Grand Rapids, MI. uknowledge.uky.edu/woca/woca2024/day1/151

Book Chapter

Alam, S., **Gordon, S.**, Bassett, B., et al. (2025). Three-Dimensional Printing of Fly Ash-Based Geopolymer Materials. In M. Kioumarsi & B. Shafei (Eds.), Lecture Notes in Civil Engineering (Vol. 237, pp. 13–24). Springer. doi:10.1007/978-3-031-69626-8_2

CONFERENCE PRESENTATIONS & ACADEMIC ACTIVITIES

- Presenter, NASTT No-Dig Conference (2022, 2023, 2024)
- Presenter, World of Coal Ash Conference, Grand Rapids, MI (2024)
- Presenter, International Net-Zero Future Conference, Oslo, Norway (2024)
- Presenter, Louisiana Tech Graduate Research Symposium (2024 oral and poster; 2025)
- Presenter, Trenchless Technology Center (TTC) Industry Advisory Board events (2022–2024)
- Competitor, Conference of Southern Graduate Schools (CSGS) 3-Minute Thesis Competition (2024)
- Attendee, American Chemical Society Spring Conference (2024)

- Attendee, U.S. Air Force / StrikeWerx Problem Definition Workshop (2023)
- Attendee, U.S. Air Force / StrikeWerx Design Sprint (2024)

GUEST LECTURES & SELECTED PRESENTATIONS

- Guest Lecturer, Stress and Time Management, ENGR 550A Professional Development, Louisiana Tech University (subsequently adapted as a lecture in CVEN 3023)
- Automatic Packet Reporting System (APRS), technical talk on RF/digital packet communications, Louisiana Tech Amateur Radio Club
- KWIK D.O.G.: Rapid-Cured Geopolymer Construction Mix, Top Dog idea-pitch competition (2022)
- Poster, Center for Innovation in STEM and Industry Applications (CISIA), early geopolymer ohmic-heating work (2022)

PROFESSIONAL SERVICE & LEADERSHIP

Vice President (2025), Treasurer (2024), Louisiana Tech Graduate Student Council, elected leadership of the university-wide graduate student body

ABET Accreditation Support, Louisiana Tech (2023–2026), course assessment and student-outcome reporting for CVEN 3023 supporting both the Civil Engineering (CVEN) and Construction Engineering Technology (CET) programs

3-Minute Thesis Mentor Panelist (2025–26), coached graduate competitors on research communication; prior competitor at Louisiana Tech (2023, 1st place) and CSGS (2024)

Student Steel Bridge Competition (2024, hosted at Louisiana Tech), led planning-stage work and rebuilt the automated deflection-measurement sensor system for Windows 11 (NI-DAQ); authored installation and test procedures

Concrete Canoe Team Support (2023–2026), ASTM tensile, compressive, air-entrainment, and slump testing

STEM Outreach, authored robotics-kit instructional manuals for LSUS K–12 summer camps

MATHCOUNTS Grader (2025), graded student competition work for the LSUS MATHCOUNTS competition

Conference Presenter & Student Competitor, NASTT No-Dig Conference (2022–2024), student poster competition (1st 2022; 3rd 2023, 2024)

PROFESSIONAL MEMBERSHIPS

North American Society for Trenchless Technology (NASTT), Student Member (2022–present)

HONORS AND AWARDS

2023 First Place, Louisiana Tech University 3-Minute Thesis Competition

2024 Third Place, Louisiana Tech Graduate Student Research Symposium Poster Competition

2022–2024 First Place (2022), Third Place (2023, 2024), NASTT Student Poster Competition

2023 Argent Memorial Scholarship, NASTT; South Central NASTT Student Scholarship

Misc. “Shoot for the Moon” Award, Engineering Freshman Design Expo

2015–2016, 2020 Dean's List, East Texas Baptist University; Louisiana Tech University

REFERENCES

Dr. Shaurav Alam, PE, Associate Professor of Civil and Environmental Engineering, Louisiana Tech University (Ph.D. Committee Chair, Research Supervisor)
shaurav@LATech.edu | (318) 257-2053

Dr. Joan Lynam, Associate Professor of Chemical Engineering, Louisiana Tech University (Ph.D. Committee Member)
lynam@LATech.edu | (318) 257-3124

Dr. John Matthews, Professor, Construction Eminent Scholar Chair, Director of the Trenchless Technology Center, Louisiana Tech University (Ph.D. Committee Member)
matthews@LATech.edu | (318) 257-2852

Dr. Matthew J. Hartmann, Associate Professor of Electrical Engineering, Louisiana Tech University (M.S. Committee Chair)
hartmann@LATech.edu | (318) 607-5609

Dr. David E. Hall, Interim Academic Director and Professor of Mechanical Engineering, Louisiana Tech University (Ph.D. Committee Member)
dehall@LATech.edu | (318) 257-5113