Dr. Nimisha Roy
College of Computing, Georgia Tech
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APPOINTMENTS

Full-Time Lecturer College of Computing, Georgia Institute of Technology, Atlanta, GA *Teaching: Large Undergraduate and Graduate Computer Science courses (700+ students in a class)* *Research: Computing Education, Impact of AI in Teaching CS*	August 2022- Present
Instructor Online Masters of Science in Analytics (OMSA) Program, Georgia Institute of Technology, Atlanta, GA	May 2023 - Present
Postdoctoral Fellow Georgia Institute of Technology, Atlanta, GA *Research: Sensing the Impacts of Climate Change on Unpredictable Volumetric Fluctuations in Surficial Soils; Analysis of Images from Insitu Xray Scanner developed at PARI, Japan; Ant Nest Structure Analysis; Autograding Visualizations in D3.js*	Jan – July 2022
Academic Guest Swiss Federal Institute of Technology Lausanne, Switzerland *Research: Microstructure Analysis of Cemented Sands*	June – July 2022

EDUCATION

Ph.D. in Computational Science and Engineering Georgia Institute of Technology, Atlanta, GA *Field of research: Computational analysis of porous media, Computer Vision and Machine Learning Applications in 3D Microstructure of Materials, Micro-macro mechanics of dry, MICP, and EICP Sands*	2017 – 2021
M.S. in Computational Science and Engineering Georgia Institute of Technology, Atlanta, GA	2017 - 2019
M.Sc. (Engg.) in Geotechnical Engineering Indian Institute of Science, Bangalore, India *Dissertation title: Shape Characterization of Granular Particles using Image-Based Techniques*	2015 - 2017

RESEARCH INTERESTS

- Integrating generative AI literacy into upper-level undergraduate computing courses

- Designing lower-level curricula that promote authentic, higher-order, and personalized learning.
- Sustainability Integration and Considerations in CS curriculum
- Scaling Academic Decision-Making Pipelines using AI
- Machine Learning and Big Data Analytics in Geosystems Engineering
- Data Mining and ML-driven Disaster Detection and Prediction
- Simulation and Analysis of N-D Porous Media Image Datasets
- Mechanics of Geomaterials under Static and Dynamic Loading

TEACHING AND MENTORING

Instructor of Record, Georgia Institute of Technology	
▪ CS 4641 Machine Learning	Fall 2025 - Present
▪ CS 3300 Introduction to Software Engineering	Fall 2021 - Present
▪ CS 3311 Junior Capstone Design	Fall 2022 - Present
▪ CS 3312 Project Implementation	Spring 2023 - Present
▪ CS 2340 Objects and Design	Jan 2023 - Present
▪ CSE 8803 Applied Natural Language Processing	Summer 2023 - Present
Faculty Mentor: Assisted and guided new faculty member in curriculum navigation and professional development.	Fall 2023
Research Advisor, *Georgia Tech*	
▪ Danrong Zhang: Co-Advisor And Ph.D. Committee Member	Fall 2022- Present
▪ Jiaojun Liu: Mentor And Ph.D. Committee Member	Fall 2021 – Present
▪ Karie Yamamoto: Mentor And Ph.D. Committee Member	Fall 2021 - Present
Teaching assistant, *Georgia Tech*	
▪ CSE 6242 Data and Visual Analytics	Spring 2021 - Present
▪ CS 7641 Machine Learning	Spring 2020
Head Teaching Assistant, *Georgia Tech*	
CS 4641 Machine Learning	Fall 2020
Graduate Lead Mentor, NSF ERC Center for Bio-mediated and Bio-inspired Geotechnics (CBBG)	
▪ Research Experience for Undergraduates/Teachers	Summer 2018; 2022
▪ Young Scholars Program	Summer 2018
Mentor, *Georgia Tech*	
Geo-Institute Graduate Student Organization Peer Mentorship Program	2021-2022

AWARDS/HONORS

QS Reimagine Education Awards Shortlisted Badge from QS Quacquarelli Symonds! This is a prestigious platform to recognise and celebrate the pioneers of education across the world.	Fall 2025
William D. 'Bill' Leahy Jr. Outstanding Instructor Award by College of Computing	Spring 2025
USEI Sustainability Grant for embedding AI tools in Undergraduate Curriculum	Summer 2025

Technology Fee 2025 Award, Georgia Tech. "Enhancing Educational Outcomes through Open-Source LLM Deployment"	Summer 2025
Provost Teaching and Learning Fellowship, *Provost and the Center for Teaching and Learning* to strengthen teaching and learning in college through special initiatives, Georgia Tech.	Fall 2024 – Fall 2026
Transformative Teaching and Learning Innovation Incubator faculty grant award, Issued by Center for Teaching and Learning for creating faculty incubator space to enable pedagogical innovation	Spring 2024
Invited Member to 2024 Computing Research Association Conference: an invitation-only conference for the leadership of the North American computing research community.	Spring 2024
Recognized by the *Indian Geotechnical Society* as **one of the top 75 Indian women leaders in the world** in the field of Geotechnical Engineering.	December 2023
Invited Academic Guest, *Swiss Federal Institute of Technology Lausanne, Switzerland*	Summer 2022
CSE Outstanding Graduate Student Instructor Award, *Georgia Tech*	2022
George F. Sowers Distinguished Graduate Student Award, *Sowers Symposium, School of CEE, Georgia Tech*	2022
Selected as the **2022 CEE Future Faculty Fellow,** Georgia Tech	2022
Outstanding Geomaterial Research Award, *Sowers Symposium, School of CEE, Georgia Tech*	2021
Thank a Teacher Certificate, *Center for Teaching and Learning, Georgia Tech.* • *Introduction to Software Engineering* • *Objects and Design*	 2021,2022,2023 2023,2024,2025
Paul M. Mayne Graduate Student Award, *Sowers Symposium, School of CEE, Georgia Tech*	2020
Invited Visiting Scholar, *3SR, Université Grenoble Alpes, France*	Fall 2019
James S. Lai Outstanding Graduate Student Award, *Sowers Symposium, School of CEE, Georgia Tech*	2018
M/S HEICO outstanding paper award, *Indian Geotechnical Society in 6IYGEC, India.*	2017
MEMBERSHIPS AND COLLABORATIONS	
Member • American Society of Civil Engineers • Association for Computing Machinery	 Fall 2019 - Present Fall 2022 - Present
Elected Representative in the Georgia Tech Faculty Governance - Faculty Representative for the Student Regulations Committee	Summer 2023- Present
Invited Judge • Annual Undergraduate Research Symposium, Georgia Tech • Annual Postdoctoral Research Symposium, Georgia Tech • Bi-Annual Junior Design Expo, Georgia Tech	 Spring 2023 Fall 2022 2022 - Present

Industry Engagement Coordinator – For School of Computing Instruction at Georgia Tech	Fall 2023 - Present
Capstone Coordinator - For School of Computing Instruction at Georgia Tech	Summer 2025 - Present
Invited Panel Member, Life after CBBG, NSF ERC CBBG *Annual Meeting 2022*, NMSU.	2022
Postdoctoral Representative, Committee for Diversity and Inclusion, School of CEE, *Georgia Tech*	2022
Curriculum Committee Member, NSF ERC CBBG	2020-2021
Vice-President, *Student Leadership Council,* NSF ERC CBBG.	2018-2019
Organizing committee member ▪ IS Atlanta, Atlanta, GA ▪ 5th ICFGE, Bangalore, India ▪ International Conference on Soil and Environment, Bangalore, India	 Fall 2018 Fall 2016 Fall 2016
Session Chair, IS Atlanta, Atlanta, GA	Fall 2018
Public Relations Coordinator, *Asha for Education- Georgia Tech, a non-profit organization dedicated to the support of primary education of underprivileged children*	2018 – 2020
University Collaborations • Dr. Dimitrios Terzis - Swiss Federal Institute of Technology Lausanne, Switzerland • Dr. Leon Van Passsen - Arizona State University, USA (currently in Delft University of Technology, Netherlands) • Dr. Cino Viggiani - Universite Grenoble Alpes, France • Dr. Takashi Matsushima - University of Tsukuba • Dr. Raphael Blumenfeld - University of Cambridge	 Fall 2020 – Present Spring - Fall 2021 Fall 2019- Present Fall 2022 – Present Fall 2022 – Present
Industry Collaborations • Laurent Forny - Nestle, Switzerland • Dr. Satoshi Matsuura – PARI Japan • ATI Specialty Materials, North Carolina, US	 Summer 2022- Present Spring 2022 - Present Spring 2022- Fall 2022
Research Internship, Indian Institute of Science, Bangalore, India	Summer 2014
Industry Internship • Madhucon Infra Pvt Ltd., Hyderabad, India • Tata Steel, Jamshedpur, India	 Summer 2013 Fall 2012
Outreach Service with Drew Charter School, NSR ERC CBBG	2018
PEER REVIEW ACTIVITIES	
Editorial Board Member, Scientific Reports, Nature.	Summer 2023 - Present
Journal Handling Editor ▪ Editor for **fifteen** articles in *Scientific Reports*	2023-2024

Journal and Conference Reviewer ▪ Reviewed **four** articles in *Granular Matter* ▪ Reviewed **seven** articles in *Indian Geotechnical Journal* ▪ Reviewed **one** article in *Open Geomechanics* ▪ Reviewed **two** articles in G*eomicrobiology* ▪ Reviewed **two** articles in *Discover Materials* ▪ Reviewed **three** submissions in *SIGCSE Technical Symposium* ▪ Reviewed **four** submissions in *ITICSE* ▪ Reviewed **four** submissions in *CompEd* ▪ Reviewed **one** submission in *Electronics* ▪ Reviewed **one** submissions in *AI*	2020 - Present

PUBLICATIONS (*NUMBER OF CITATIONS: 251*)

JOURNALS

1. Zhang, D., **Roy, N.**, Wang, R., & Frost, J. D. (2025). Predicting tornado-induced building damage: A comparative study of tree-based models and graph neural networks. International Journal of Disaster Risk Reduction, 105525.
2. Zhang, D., Huang, H., Smith, N. S., **Roy, N.**, & Frost, J. D. (2025). From Pixels to Damage Severity: Estimating Earthquake Impacts Using Semantic Segmentation of Social Media Images. arXiv preprint arXiv:2507.02781.
3. Huang, H., Zhang, D., Masalava, A., Roozbahani, M. M., **Roy, N.**, & Frost, J. D. (2025). Enhancing the fidelity of social media image data sets in earthquake damage assessment. Earthquake Spectra, 87552930251335649.
4. Zhang, D., Jindal, D., **Roy, N**. *et al.* (2024) Enhancing landslide susceptibility mapping using a positive-unlabeled machine learning approach: a case study in Chamoli, India. *Geoenviron Disasters* **11**, 21. https://doi.org/10.1186/s40677-024-00281-w
5. Zhang, D., **Roy, N.**, & Frost, J. D. (2024). A data-driven approach to optimize the design configuration of multi-sleeve cone penetrometer probe attachments. Computers and Geotechnics, 169, 106248.
6. **Roy, N.,** Frost, J. D., & Roozbahani, M. M. (2023). Quantifying three-dimensional bodies and throats of particulate system pore space. *Powder Technology*, 415, 118160. https://doi.org/10.1016/j.powtec.2022.118160
7. **Roy, N.,** Frost, J. D., & Terzis, D. (2023). 3-D contact and pore network analysis of MICP cemented sands. *Granular Matter*, 25(4), 62. https://doi.org/10.1007/s10035-023-01347-6
8. Zhang, D., Huang, H., **Roy, N.**, Roozbahani, M. M., Frost, J. D. (2023). Black Marble Nighttime Light Daily Data for Disaster Damage Assessment. *Remote Sensing*. 15(17):4257. https://doi.org/10.3390/rs15174257
9. Matsumura, S., Kondo, A., Nakamura, K., Mizutani, T., Kohama, E., Kobayashi, T., **Roy, N.,** & Frost, J.D. (2023). 3D image scanning of gravel soil using in-situ X-ray computed tomography. Sci Rep 13, 20007. https://doi.org/10.1038/s41598-023-46772-y
10. **Roy N.,** Frost J.D. and Viggiani G. (2022) "Pore Space Evolution of Sand Assembly under Shear: An Experimental Study using X-ray Tomography." *Granular Matter* 24, 63. https://doi.org/10.1007/s10035-022-01225-7.

11. Zhang, D., **Roy N., and** Frost J.D. (2022) "Machine Learning for Prediction of Soil Type using Modified Cone Penetration Probe." *Under Review in Geosciences.*
12. **Roy, N.,** Vangla, P., Frost J.D. and Latha, G.M. (2021) "An Enhanced Automated Particle Angularity Measurement Method, "*Journal of Testing and Evaluation*. https://doi.org/10.1520/JTE20210048
13. **Roy, N.** (2021). Pore Space Architecture of Particulate Materials: Characterization and Applications (Doctoral dissertation, Georgia Institute of Technology).
14. Cao, J., **Roy, N.,** & Frost, J. D. (2020). Relating Shear-Induced Evolution in Topology of Pore Networks to Sand Specimen Response. *Géotechnique Letters*, 1-19. https://doi.org/10.1680/jgele.18.00222
15. Frost, J. D., **Roy, N.**, Chen, C. C., Park, J. Y., Jang, D. J., Lu, Y., & Cao, J. (2019). Quantitative Analysis of Microstructure Properties and their Influence on Macroscale Response. *KSCE Journal of Civil Engineering*, 23(9), 3777-3792. https://doi.org/10.1007/s12205-019-0713-y
16. Vangla, P., **Roy N.** and Latha, G.M (2018) "Image based shape characterization of granular materials and its effect on kinematics of particle motion". *Granular Matter,* 20 (1), 6. https://doi.org/10.1007/s10035-017-0776-8

BOOK CHAPTER

1. Frost, J. D., **Roy, N**., Roozbahani, M., Lu, Y., Cao, J., and Vangla, P. (2019). "Pores—The Almost Invisible Part of Soil". *Frontiers in Geotechnical Engineering*, Latha G.M. (Ed), Springer, Singapore, pp. 1-14
2. Latha, G.M., Vangla, P. and **Roy, N** (2018) "Image-based characterization techniques for geotechnical applications". *Geotechnics for Natural and Engineered Sustainable Technologies*, Developments in Geotechnical Engineering, Krishna, A. M., Dey, A., and Sreedeep, S (Eds.), Springer Singapore, DOI 10.1007/978-981-10-7721-0, pp. 145-162.

CONFERENCES

1. **Roy, N**., Horielko, O., & Olufisayo, O. (2026, February). Benchmarking AI Tools for Software Engineering Education: Insights into Design, Implementation, and Testing. Accepted in SIGCSE 2026.
2. **Roy, N.**, Horielko, O., & Olufisayo, O. (2025, October).Integrating AI Tools in Advanced Computer Science Curricula: A Case Study of Course Redesign. Accepted in CompEd 2025.
3. **Roy, N**., Borela, R., & Olufisayo, O. (2025, October).Integrating Sustainability into Software Engineering Education: A Course Redesign Initiative. Accepted in CompEd 2025.
4. Borela, R., Soylu, M. Y., Lee, J., & **Roy, N.**(2025, August).What Computing Faculty Want: Designing AI Tools for High-Enrollment Courses Beyond CS1. In Proceedings of *ACM Conference on International Computing Education Research* https://doi.org/10.1145/3702653.3744327
5. **Roy, N.**, Horielko, O., & Olufisayo, O. (2025, August).Benchmarking of Generative AI Tools in Software Engineering Education: Formative Insights for Curriculum Integration. In Proceedings of *ACM Conference on International Computing Education Research* https://doi.org/10.1145/3702653.3744328
6. Alavala, N., **Roy, N**., McDaniel, M., Roozbahani, M. M., Borela, R., & Babolhavaeji, P. (2025, June). Beyond Buzzwords: Making Sustainability a Pillar of the Computing Curriculum. In Proceedings

of the *30th ACM Conference on Innovation and Technology in Computer Science Education* V. 1 (pp. 389-395).

7. Liding, Z. C., **Roy, N.**, & Borela, R. (2025, June). Tracking the Progression of Errors Across Successive CS1 Code Submissions. In *Proceedings of the 30th ACM Conference on Innovation and Technology in Computer Science Education V. 2* (pp. 801-801).
8. **Roy, N.**, Olufisayo, O., & Horielko, O. (2025, February). Empowering Future Software Engineers: Integrating AI Tools into Advanced CS Curriculum. In Proceedings of the 56th ACM Technical Symposium on Computer Science Education V. 2 (pp. 1747-1747).
9. **Roy, N.**, Olufisayo, O., & Tu, H. (2025, February). Scaling Academic Decision-Making with NLP: Automating Transfer Credit Evaluations. In Proceedings of the 56th ACM Technical Symposium on Computer Science Education V. 2 (pp. 1603-1604).
10. Feijóo-García, P. G., **Roy, N.**, & Omojokun, O. (2024). Learning by Teaching: Insights on Student-Created Instructional Videos for Large CS Classes. In Proceedings of the 2024 on Innovation and Technology in Computer Science Education V. 2 (pp. 817-817).
11. Feijóo-García, P. G., & **Roy, N.** (2024, March). Active Learning at Large-Scale: Using Video Tutorials to Learn by Teaching. In Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 2 (pp. 1932-1932).
12. Watts R.H., …., **Roy, N.(**2024) Building Bridges Across the Curriculum: A Shared Framework Engages Students in Lifelong Learning that Matters. *USG Teaching & Learning Conference*, Athens, Georgia.
13. Hull, M., Vivian P., Murray,H., **Roy**, **N.,** Tung, E., Routray, S., Guerin,C., Chen, J., Wang, Z. J., Lee, S., Roozbahani, M. M., and Chau, D. H. (2023). VISGRADER: Automatic Grading of D3 Visualizations." *IEEE Transactions on Visualization and Computer Graphics.*
14. Borela, R., and **Roy, N.** (2023). Creating Equitable Grading Practices with Rubrics: A Teaching Assistant Training Activity. *In Proceedings of ICER 2023.* https://doi.org/10.1145/3568812.3603485
15. **Roy, N.** (2022). "Geometry Based Segmentation of N-D Binary Images." 2022 Georgia Scientific Computing Symposium, Atlanta, GA.
16. **Roy N.,** Frost J.D., and Dimitrios T. (2021). "Three-dimensional microstructural analysis of MICP cemented sand samples." American Geophysical Union Fall Meeting, New Orleans, LA.
17. **Roy N.** and Frost J.D. (2020). "Three-dimensional characterization of pore space architecture in granular materials." Interpore2020, Qingdao, China.
18. **Roy N.**, Vangla P., Latha, G.M. and Frost J.D. (2018). "Assessment of merits and demerits of angularity measurement techniques using image analysis". *IS-Atlanta 2018*, Atlanta, Georgia, USA.
19. Borela R., **Roy N.** and Frost J.D. (2018). "Machine learning for DEM model calibration on experimental data". IS-Atlanta 2018, Atlanta, Georgia, USA.
20. Cao J., Roozbahani M. Mahdi, **Roy N.**, and Frost J.D. (2018). "Quantitative Analysis of Pore Tortuosity in Three-dimensional Porous Media". IS-Atlanta 2018, Atlanta, Georgia, USA.
21. **Roy, N.**, Vangla, P. and Latha, G.M. (2017). "A Novel image based method for characterisation of particle shape and its effect on packing density". In Proceedings of 6th Indian Young Geotechnical Engineers Conference, 10-11 of March, NIT Trichy, India.
22. Vangla, P., **Roy, N.** and Latha, G.M (2016) "Quantification of particle morphology through image based techniques and its importance in forensic studies". Proceedings of 5th International Conference on Forensic Geotechnical Engineering, Paper #22, 8-10 December 2016, Bangalore, India.

23. Choudhary, A.K., **Roy, N.** and Sinha, A.K. (2015), "Utilization of Quarry Dust and Plastic Wastes in Highway Pavement Construction". Proceedings of Geosynthetics 2015, 15-18 February 2015, Oregon, Portland, USA, pp. 80-86.
24. Vangla, P., **Roy, N.,** Mendu, K. and Latha, G.M. (2014). "Digital image analysis for the determination of size and shape parameters of sand grains." In Proceedings of National Conference on Geo-Innovations, 30-31 of October, 2014, Bangalore, Paper # GC2.
25. Choudhary, A.K., **Roy, N.** and Sinha, A.K. (2014), "CBR behavior of waste plastic strip-reinforced stone dust". Proceedings of Indian Geotechnical Conference IGC 2014, December 18-20, 2014, Kakinada, India, pp. 635- 641.
26. Choudhary, A.K., **Roy, N.** and Sinha, A.K. (2014), "Utilization of Fly ash with plastic wastes as construction material in flexible pavements" Proceedings of National Conference on Geotechnical Engineering Practice and Sustainable Infrastructure Development, IGS Ludhiana Chapter, October 11-12, 2014, Ludhiana, India, pp. 78-87.

GRANTS/PROPOSALS

Grant / Award	Amount	Year	Role	Notes
GeoSynthetic Institute	$1.235M	2025	Co-PI	Data Science and AI applications to CEE students for Geosynthetic initiatives
Georgia Tech Undergraduate Sustainability Education Innovation Award	$10,000	2025	Co-PI	"Embedding Sustainability and SDG Learning in BrainBoost: A VIP on Generative AI for Education"
Georgia Tech Technology Fee Funds Initiative	$206,839	2025	Co-PI	Enhancing Educational Outcomes through Open-Source LLM Deployment
Provost Teaching & Learning Fellowship	$30,000	2024	Co-PI	"Advancing Gen AI Integration in CS Curriculum"
	$30,000	2025	Co-PI	"Integrating AI-Driven Collaborative Learning Tools in High-Enrollment Computer Science Courses"
Georgia Tech Sustainability Education Innovation Grants (3 × $10 000)	$30 000	2023	PI	Developed sustainability modules for CS 1301, 3300, 3311, 3312, 4641.
Sustainability Next Seed Grant	$35,000	2023	Co-PI	Transdisciplinary CS + CEE research on embedding sustainability into computing and transportation education
USEI BrainBoost VIP Program Grant	$10,000	2025	Co-PI	Leveraging AI to embed sustainability into personalized-learning tools in large undergrad CS courses
TTL Innovation Incubator Grant	$12,000	2024	PI	"Integrating Gen AI Pedagogy into Software Engineering Education"
VIP Seed Funds for Gen AI Integration	$5,000	2024	Co-PI	Pilot of AI-driven collaborative tools in high-enrollment CS courses
Google Cloud Research Credits	$5,000	2023	Co-PI	Cloud credits to support auto-graded, cloud-native coding exercises

PUBLISHED ARTICLES WRITTEN BY OTHERS ABOUT MY WORK	
• Top 75 Influential Indian Women in Geotechnical Engineering	December 2023
• Invited Academic Guest at EPFL, Switzerland	Spring 2023
• AT&T bootcamp Initiative	Summer 2025
• Best Instructor Award	Spring 2025
• Sustainability Grants	Fall 2022
• Provost Fellowship	September 2024
• Sustainability Seed Grant	October 2024
• Graduate Student Instructor Award	Spring 2022
• ICER conference presentation	Fall 2023