Mitch Gerhardt

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RESEARCH SUMMARY

I bridge technical, educational, and policy communities around responsible AI use in STEM higher education, drawing on industry experience at two Fortune 100 firms and academic work spanning four levels of analysis: students, instructors, institutions, and national contexts. My research uses qualitative, quantitative, and mixed methods from education, sociology, engineering, and STS to study instructor mental models, graduate student AI adoption, and AI governance at Virginia Tech, Cornell, and through a Fulbright Brazil collaboration, with methodological contributions to LLM-infused qualitative research.

EDUCATION

Ph.D. in Engineering Education, Virginia Tech, GPA: 3.95/4.00 — May 2027 (expected)

PhD Candidate (advanced Fall 2025); Committee: A. Katz (Chair), C. Faber, H. Matusovich, N. Pitterson
2025 NSF GRFP Honorable Mention; 2024 Google PhD Fellowship Nominee; 2023–2024 Davenport Fellow

M.S. in Computer Science, Virginia Tech, GPA: 3.90/4.00 — December 2026 (expected)

Committee: S. Hooshangi (Chair), A. Katz, S. Das. Coursework: *ML*, *NLP*, *AI Tools for Software Engineering*

Graduate Certificate, Cognition and Education, Virginia Tech, GPA: 4.00/4.00 — May 2025

B.S. in Electrical Engineering (*Magna Cum Laude*), Virginia Tech, GPA: 3.69/4.00 — December 2020

SELECTED RESEARCH EXPERIENCES

Graduate Research Assistant — Aug. 2025 – Present
Department of Engineering Education, Virginia Tech — Blacksburg, VA
NSF CAREER #2339702: "Minds and Machines: Engineering Faculty Mental Models of Generative AI and Instructional Decisions"

- Conducted qualitative interviews with 170 engineering faculty to study how AI shapes instructional decisions, assessment practices, and workplace norms
- Dissertation explores faculty decision-making when determining AI's role in their classrooms

Principal Investigator, Multi-Institutional GAI Survey Study — May 2025 – Present
IRB-approved study of STEM graduate students' generative AI adoption — Multi-institutional

- Designed and deployed survey across six R1 U.S. institutions, yielding 370+ responses - one of the largest empirical datasets on STEM graduate students' GAI use to date
- Findings reveal significant polarization in how graduate students relate to AI, impacting disciplinary understanding, advising relationships, and perceived legitimacy with peers
- Mixed-methods design pairing descriptive statistics, correlational analyses, and demographic models with planned qualitative interviews on socialization and norms around GAI use

SELECTED JOURNAL & CONFERENCE PUBLICATIONS

2025	**Gerhardt, M.**, Madboly, M., Pitterson, N., Dringenberg, E., & Ahn, B. "Collaborative (in)decision: A Preliminary Investigation of the Differences in Undergraduate Engineering Capstone Students' Collaborative Behaviors." *International Journal of Engineering Education*.
2024	Katz, A., **Gerhardt, M.**, & Soledad, M. "Using Generative Text Models to Create Qualitative Codebooks for Student Evaluations of Teaching." *International Journal of Qualitative Methods*.
In Revision	**Gerhardt, M.**, Coloyan Fleming, G., Wei, S., & Katz, A. "Leveraging Large Language Models in Engineering Education Research: Methods and Applications." Book chapter, *2027 Cambridge International Handbook on Engineering Education Research Methods*.
In Revision	**Gerhardt, M.**, & Katz, A. "Improving GAI Qualitative Research Workflow Quality: Techniques and Documentation Strategies." *Studies in Engineering Education*, Special on GAI in Methods.

Submitted	**Gerhardt, M.**, Sun Y., Katz A., Deters J., Borrego M., Knight D., Clements H., & Budhathoki R. "Decade-Long Analysis of Skills Across 1 Million Doctoral and Master's-Level Mechanical Engineering Job Advertisements." *ASME Open Journal*.
In Prep.	**Gerhardt, M.**, Werth, A., & Kim, S. "Did You Get That? The affordances and challenges of AI-assisted transcription for qualitative research." *International Journal of Qualitative Methods*.
In Prep.	**Gerhardt, M.**, Katz, A., & Hooshangi, S. "Addictive GAI Use Among STEM Graduate Students: Dependency-Based Technological Diffusion." Targeting *SIGCSE 2026*.
Accepted	**Gerhardt, M.**, Shiekh, K., Katz, A., & Chaback, B. "It's like 'X': How Engineering Faculty Metaphors Construct (and Constrain) GAI Understanding." *2026 ASEE Annual Conference*.

SELECTED GRANTS & AWARDS

Co-Principal Investigator, NSF CCSS Seed Grant ($4,500), Cornell University — Fall 2025
Bridging the Conversational AI Gap: Synthetic Dataset Generation for Engineering Education Dialogue

- Developing methodology for synthetic multi-speaker speech datasets that preserve conversational phenomena (overlapping speech, pauses, turn-taking) critical to studying workplace learning; fine-tuning open-source ASR models on 500–1,000 ElevenLabs-generated dialogues

Co-Facilitator, Fulbright Brazil International Collaboration — Sept. 2025 & May 2026

- Selected with advisor and VT colleagues for intensive multi-day faculty development programs on GAI adoption; presented to 80+ engineering faculty from Brazilian universities on GAI fundamentals, assessment transformation, ethics, and institutional policy

NSF Graduate Research Fellowship Program, Honorable Mention — 2025
Google PhD Fellowship in Human-Computer Interaction, Nominee — 2025

SELECTED INVITED TALKS & WORKSHOPS

March 2026	**Workshop Lead**, "Effective GAI Course Policies for Graduate Instructors," Virginia Tech. IRB-approved cross-institutional workshop with the Graduate Honor System, CETL, and TLOS.
Dec. 2025	**Guest Lecturer**, "AI Research Ethics in Engineering Education," University of Pittsburgh ECE Graduate Seminar.
Nov. 2025	**Guest Lecturer**, "LLMs in Qualitative Engineering Education Research," UT Austin (Dr. M. Borrego).
Oct. 2025	**Invited Speaker**, Cornell DBER Research Group (2 presentations on LLMs in engineering education research).
May 2025	**Invited Student**, Virginia Tech Board of Visitors (discussed GAI adoption research with university leadership).

SERVICE

Associate Chair, Panelist, & Discussion Mediator, VT Graduate Honor System — Aug. 2023 – Present
Web Master & Search Committee Member, ASEE National Graduate Studies Division — June 2025 – Present
Mentor, NSF GRFP Applications, Cornell University — Fall 2025
Reviewer: ASEE Annual Conference (2024–2026), Frontiers in Education (2026), *International Journal of Qualitative Methods* (2024–2025), Capstone Design Conference (2024)

TECHNICAL SKILLS

Qualitative & Mixed Methods: Thematic analysis, Ethnography, Semi-structured & Key-informant interviews, Grounded theory, Ethnomethodology, Discourse & Conversational analysis, Phenomenology/phenomenography, Critical review, Survey design, Mixed-methods triangulation
Quantitative Methods: Multimodel inference, Tree-structured Parzen Estimation, Exploratory factor analysis
AI / Computational: Large language models, prompt & context engineering, LLM-infused qualitative research, RAG, agent-based systems, NLP, computational text analysis
Theoretical Frameworks: Mental models, practice-based learning, epistemic cultures, sociology of expertise, boundary work, symbolic interactionism, frame analysis, HCI, engineering studies, academic integrity
Programming & Tools: Python, Jupyter, JavaScript, C++, React, FastAPI, Docker, PyTorch, SQL, HuggingFace Transformers, ROS, DuckDB, MCP, Git, Quarto, AI-enabled software development