Ranjani Narayanan
https://www.linkedin.com/in/ranjanin2

Email : rnarayanan35@gatech.edu
OrciD: 0000-0003-4351-6501
Mobile : +1 (908)-340-7845

EDUCATION

- **Doctor of Philosophy (Ph.D.) in Electrical and Computer Engineering** Aug 2021 – 2026 (Expected)
Georgia Institute of Technology, Atlanta
Dissertation: *Investigating a human-centered approach towards supporting Shared Mental Models in hierarchical human-agent teams for decision making.*
Advisor: Prof. Karen Feigh

- **Master of Science (MS) in Electrical Engineering** Aug 2019 – May 2021
University of Pennsylvania, Philadelphia **GPA:** *3.8/4.0*

- **Bachelor of Technology (B.Tech) in Electrical Engineering** Aug 2015 – May 2019
Sardar Patel College of Engineering, Mumbai **GPA:** *9.3/10.0*

RESEARCH EXPERIENCE

- **Graduate Research Assistant- Georgia Institute of Technology** Atlanta, GA
Advised by Prof. Karen M. Feigh, Cognitive Engineering Center *Feb 2022 - Present*

  ○ Designed and executed IRB-compliant, controlled human-in-the-loop studies to investigate the causal effects of AI-driven interventions on user behavior and performance. Applied human factors and cognitive engineering methods, including heuristic evaluations and cognitive walkthroughs, to iteratively develop and refine research hypotheses.
  ○ Developed and maintained multi-modal data collection and processing pipelines using process-tracing techniques; conducted statistical modeling and hypothesis testing to evaluate behavioral outcomes and team-level performance across experimental conditions.
  ○ Created and validated human-centered evaluation metrics to measure human-AI team effectiveness, trust calibration, reliance behaviors, workload, and decision-making performance within AI-supported systems.
  ○ Utilized statistical inference, mixed-effects modeling, and regression analyses to characterize behavioral, cognitive, and performance impacts of AI system designs.
  ○ Translated empirical findings into clear, actionable insights that informed the design and improvement of AI-assisted workflows and decision-support systems.
  ○ Published 8+ peer-reviewed papers in international journals and conferences, contributing interdisciplinary research at the intersection of human behavior, human-AI interaction, and AI-enabled systems.
  ○ Co-led the development of a successful three-year research grant proposal; communicated project plans and progress through written reports and presentations to stakeholders at the Office of Naval Research on annual and biannual cycles.

INDUSTRY EXPERIENCE

- **GE Aerospace Research** Niskayuna, NY
AI Fellow- Intern *June - Aug 2025*

  ○ Developed a structured dataset to evaluate the completeness of AI-generated responses in Q&A systems, with implications for decision-making support systems across various organizational applications.
  ○ Created a proof-of-concept method to improve model trustworthiness and safety by assessing (1) knowledge completeness and hallucinations in AI outputs, (2) adequacy of knowledge coverage for addressing user queries, and (3) query completeness relative to available knowledge.
  ○ Developed presentations and communicated research findings across the Research Center and GE Aerospace Business stakeholders.

- **GE Aerospace Research**   Niskayuna, NY
  AI Fellow- Intern   *June - Aug 2024*
    - Developed a proof-of-concept pipeline for automating Named Entity Recognition (NER) training and inference by combining an LLM (*Instruct* model) for dataset generation with a BERT-based transformer for applied training and deployment—enhancing efficiency and scalability in AI-assisted tasks.
    - Collaborated on a research initiative evaluating the robustness of LLMs to perturbations in arithmetic and interval labeling tasks, providing insights into model reliability, robustness, and applicability as decision-support systems in engineering and scientific applications.
    - Developed presentations and communicated research findings across the Research Center and GE Aerospace Business stakeholders.

- **Autodesk**
  Machine Learning Intern   *May - Aug 2022*
    - Extracted and structured user-stored features to enhance the scalability of AutoCAD's metadata corpus; applied NLP methods to parse and evaluate metadata quality from over 1M users, producing a clean unsupervised dataset of 55K high-quality samples.
    - Engineered features and generated high-dimensional transformer embeddings for clustering models, increasing effective data coverage from 23% to 92% and enabling more robust insights from large-scale user data.

JOURNAL PUBLICATIONS

- **Narayanan, R.** & Feigh, K. (accepted, 2025). Designing for Oversight: An Empirical Investigation of the Dual Impact of AI Dependency and Information Abstraction on Human Supervision in Decision-Making Teams. *International Journal on Human Computer Interaction.*
- Walsh, S. E., **Narayanan, R.,** & Feigh, K. (under review, 2025). The Role of Shared Mental Models in AI-advised Decision Support. *IEEE Transactions on Systems, Man, and Cybernetics: Systems*

CONFERENCE PUBLICATIONS

- **Narayanan, R.,** Cohen, M., Feigh, K., & Cooke, N. Two Sides of the Same Coin? Joint Perspectives from Shared Mental Models and Interactive Team Cognition Theories on Human-AI Team Cognition. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 2025.* 0(0). doi:10.1177/10711813251358788
- Peshave, A., Hossain, K., Kubricht, J., **Narayanan, R.,** Burpee, Z., & Agarwal, A. (accepted, 2025). Evaluating Large Language Models on Arithmetic and Interval Labeling Problems with Syntactic Perturbations. *2025 IEEE International Conference on Data Mining Workshops (ICDMW).*
- **Narayanan, R.** & Feigh, K. Human Assessment of AI Errors and its Impact on Hybrid Teaming for Decision Making. *2025 IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA), Duisburg, Germany, 2025, pp. 103-110. doi:10.1109/CogSIMA64436.2025.11079477* **(Winner of Best Student Paper Award)**
- **Narayanan, R.** and Feigh, K. M. (2025). Impact of Team Models in Hierarchical Human-Agent Decision-Making Teams. In Proceedings of the 20th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications - Volume 1: GRAPP, HUCAPP and IVAPP, ISBN 978-989-758-728-3, ISSN 2184-4321, pages 452-463. doi:10.5220/0013097400003912 **(Nominated for Best Paper & Best Student Paper Awards)**
- **Narayanan, R.,** Walsh, S. E., & Feigh, K. M. (2023). Development of Mental Models in Decision-Making Tasks. *Proceedings of the 67th Human Factors and Ergonomics Society Annual Meeting.* doi:10.1177/21695067231192195

BOOK CHAPTERS

- **Narayanan, R.** & Feigh, K. (accepted, 2025). How well do we rely on reliance? On the under-utilization of reliance-based metrics towards studying human response to automation assistance. *Advancements in Human Agent Teaming Research Infrastructure: Testbeds, Metrics, and Concepts. Editors Erin K. Chiou, Douglas S. Lange, Jason H. Wong, Julie Marble. CRC Press, Taylor & Francis.*

WORKSHOP PROCEEDINGS

- **Narayanan, R.,** & Feigh, K. M. Influence of Human-AI Team Structuring on Shared Mental Models for Collaborative Decision Making. *In Proceedings of Workshop on Theory of Mind in Human-AI Interaction at CHI 2024.*

Technical Skills

- **Programming:** Python, R, MATLAB
- **Data Tools:** Pytorch, Tensorflow, Keras, Huggingface, OpenCV, Scikit-learn, Pandas   **Big Data:** AWS(EC2, S3)
- **Simulation & Other Toolkits:** Simulink (MATLAB)
- **Research Methods:** Statistical modeling & data analysis, Data Visualization, Human-subject study design, Survey and Interview design, Mixed-methods research (quantitative & qualitative analytics)
- **AI/ML:** Customizing model architecture, performance optimization through model fine-tuning, transfer learning, design of novel loss functions, metrics, and benchmarks; Object Detection & Semantic Segmentation; Reinforcement Learning; Natural Language Processing; supervised and unsupervised learning

Honors & Awards

- **IEEE CogSIMA 2025 - Best Student Paper Award** For the conference paper on "Human Assessment of AI Errors and its Impact on Hybrid Teaming for Decision Making".
- **VISIGRAPP 2025 - Nominated for Best Paper & Best Student Paper Awards** For the conference paper on "Impact of Team Models in Hierarchical Human-Agent Decision Making Teams".
- **CRIDC Poster Competition Winner, Georgia Institute of Technology (2024)** For my poster on Shared Mental Models for Human-AI Teaming.

Public Speaking and Academic Presentations

- **Paper Presentation** "Human Assessment of AI Errors and its Impact on Hybrid Teaming for Decision Making" at the IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA), Duisburg, Germany, 2025.
- **Paper Presentation** "Impact of Team Models in Hierarchical Human-Agent Decision Making Teams" at the International Conference on Human Computer Interaction Theory and Applications (HUCAPP, VISIGRAPP), Porto, Portugal, 2025.
- **Paper Presentation** "Influence of Human-AI Team Structuring on Shared Mental Models for Collaborative Decision Making" at the Workshop on Theory of Mind in Human-AI Interaction at ACM CHI 2024, Honolulu, Hawaii, May 2024.
- **Paper Presentation** "Development of Mental Models in Decision-Making Tasks" at the 67th Human Factors and Ergonomics Society Annual Meeting, Washington D.C., United States, October 2023.

Teaching Experience: Graduate Teaching Assistant

- **Graduate Teaching Assistant - Georgia Institute of Technology, Atlanta**   Fall 2021, Spring 2022
    - **Courses:** *Feedback Control Systems (ECE 3550, Undergraduate), Circuit Analysis (ECE 2040, Undergraduate)*
    - Assisted in delivering lectures, labs, or discussion sections to undergraduate students.
    - Held office hours to provide one-on-one academic support and clarify course material.

- **Graduate Teaching Assistant- University of Pennsylvania, Philadelphia**   Spring 2021, 2020
    - **Courses:** *Engineering Electromagnetics (ESE 112, Undergraduate), Feedback Control Systems (ESE 505, Graduate), Linear, Non-Linear and Integer Optimization (OIDD 910, Graduate)*
    - Created grading rubrics and evaluated homework, projects, quizzes, and exams fairly and consistently.
    - Provided constructive written and verbal feedback to help students improve performance.
    - Maintained accurate records of student grades and progress.

- **Teaching and Mentorship at Inspirit AI**   Remote, Summer 2021
    - **Course:** *AI and Computer Vision*
    - Guided high-school students in applying theoretical AI/ML concepts to practical problems.
    - Contributed to the development of course content, slides, and supplementary resources.
    - Conducted workshops and training sessions with students for Python coding on a need-by-need basis.

PROFESSIONAL SERVICE

- **Contributor in Social Action Research at Georgia Institute of Technology (Fall 2025):** Successfully completed a social action research program involving deep inquiry, qualitative observation, and real-world evaluation. Collaborated with a research team to identify opportunities to enhance the graduate student experience at Georgia Tech and developed actionable recommendations aimed at creating positive campus-level social impact.
- **Session Chair** for presentation track "Innovations in Research Methods" at the ASPIRE, 69th International Annual Meeting of the Human Factors and Ergonomics Society (HFES), Chicago, USA 2025.
- **Panel Discussion Moderator** ASPIRE, 69th International Annual Meeting of the Human Factors and Ergonomics Society (HFES), Chicago, USA 2025.
- **Peer Reviewing (Book)** Advancements in Human Agent Teaming Research Infrastructure: Testbeds, Metrics, & Concepts.
- **Peer Reviewing (Conferences)** ACM Conference on Human Factors in Computing Systems (ACM CHI), Human Factors and Ergonomics Society (HFES)
- **Alumni Interviewer, University of Pennsylvania:** Interviewer for incoming candidates of undergraduate students for academic years 2021-22 & 2022-23