Parth **Ganeriwala**

Software Engineering Intern · Ph.D. Candidate · Graduate Research Assistant
ASSIST Research Lab, Florida Institute of Technology | Avidyne
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Education

Florida Institute of Technology — *Melbourne, Florida*
Ph.D. in Computer Science: GPA - 4.0/4.0 — *January 2023 - May 2026*

- Research Interests: Formal Methods, Artificial Intelligence, Machine Learning, Deep and Transfer Learning, LLMs and Automation
- *Dissertation:* **What is Common Knowledge Across Domains? Investigating Shared Representations in Transfer Learning** *(Advisor: Dr. Siddhartha Bhattacharyya)*

Florida Institute of Technology — *Melbourne, Florida*
M.S. in Computer Science: GPA - 4.0/4.0 — *May 2022 - December 2023*

- Core subjects: Artificial Intelligence, Database Systems, Formal Methods, Advanced Software Engineering, Speech Recognition.

Skills

Programming	Java, C/C++, Python, Visual Basic, Bash, MATLAB, MySQL, MongoDB, LaTeX
Web & API Development	Django, FastAPI, Node.js, PHP/Apache, REST APIs
Frontend	HTML5, CSS3, JavaScript, React.js, JQuery
Data Analytics	Jupyter, pandas, Dask, Statsmodels, Seaborn, MySQL Workbench, Neo4j, ElasticSearch
Machine Learning Libraries	scikit-learn, XGBoost, OpenCV, nltk, pandas, scipy
Deep Learning / LLMs	TensorFlow, PyTorch, Keras, Cuda, TensorRT, BERT, GPT, Hugging Face Transformers
Formal Verification	NuSmv/NuXmv, Uppaal, AGREE, TLA+ - Coq (Class Projects)
Robotics & Systems Engineering	Robot Operating System (ROS), AADL, SysML, Gazebo, RViz, Agile Software Development
Other Tools	Docker, Git, Perforce, GitHub Actions, NLP Modules, SparkAR Studio, Android Studio, Arduino
Project Tools	Jira, Trello, Miro, Notion, Slack, Teams

Experience

ASSIST Research Lab, Florida Institute of Technology — *Melbourne, FL*
Research Professional — *August 2021 - Present*

- Working with a team of research professionals for formal methods of verification and run-time assurance, ML, IoT, robotics, and cyber security.
- Collaborating on NASA's ***University Leadership Initiative (Round 8)*** as part of a **Florida Tech**-led multi-university/industry team to develop a framework for **trustworthy, increasingly autonomous aviation safety systems**; partners include ***Penn State, NC A&T State, UF, Stanford, Santa Fe College, Uni of New Mexico, Collins Aerospace, and ResilienX***; part of awards totaling up to $20.7M over three years.
- Collaborating with ***Collins Aerospace, Iowa State University, RTX Technologies Research Center (RTRC), and Smart Information Flow Technologies (SIFT)***, funded by ***DARPA*** with the task of formally modeling human cognitive behavior representation with respect to cyber-sickness in AR/VR systems.
- Advising a Ph.D. student on transfer learning, automated data labeling, and assurance frameworks for vision-based classification in autonomous aircraft systems funded by ***NASA***, addressing safety and reliability challenges in aviation technologies.
- Collaborating with ***Penn State University*** on the application of **Large Language Model (LLM) translation** for cognitive architectures, focusing on enhancing the integration of LLMs to facilitate communication and knowledge transfer within cognitive systems.
- Contributed with ***Critical Frequency Design***, funded by ***Naval Air Systems Command***, with the task of developing a modeling approach for designing, maintaining, and supporting air and sea platform fiber optic communications technology.
- Collaborated with ***Rockwell Collins and Soar Tech***, funded by ***NASA*** with the task of formally verifying the autonomous agent to assure safety as well as the logical correctness of the safety-critical system.
- Collaborated with **professors on the development of research proposals** on diverse topics, including cognitive agents on human behavior, the assurance of artificial intelligence in safety-critical systems, and the fine-tuning of LLMs for domain-specific queries.
- Investigated the development of a **cognitive-enhanced agent** for automatically piloting aircraft in dense urban environments which emphasized safe and reliable takeoff/landing among aerial traffic without human intervention.
- Developed an **autonomous aircraft perception system** for accurately detecting and labeling line markings on an airport taxiway.
- Presented **AssistTaxi**, a novel dataset for runway and taxiway analysis, contributing to autonomous operations.
- Advised **5 groups of computer science students** on the design, development, and deployment of software for their senior projects
- Mentored **undergraduate** and **high school students** on machine learning engineering approaches in the aerospace and systems domains, leading to **conference publications** that addressed real-world challenges in these fields.
- Assisted with the **formulation of quizzes and homework projects** for the courses: Python, Database Systems, Web Applications, Big Data and Management, and Software Metrics.
- Recognized with multiple honors and leadership roles, including **Outstanding Student of the Year** at Honors Convocation 2025, **Inducted Member of Phi Kappa Phi**, and **President of the Florida Tech Badminton Club**.

Software and Systems Engineering, Avidyne *Melbourne, FL*

Software Engineering Intern *May 2025 – Present*

- Designed and executed **end-to-end (E2E) test and evaluation (E2TE)** workflows for **aviation simulation software**, increasing test coverage across navigation, communication, and flight display systems by 25%.
- Developed, integrated, and debugged **C-based flight software modules** in the avionics stack, ensuring compliance with real-time, safety-critical, and DO-178C guidelines.
- Created and optimized **50+ system-level and flight-specific test cases** in simulation environments, reducing verification cycle time by 15%.
- Automated regression and validation processes by writing **Visual Basic and C test scripts**, accelerating simulation turnaround by 20%.
- Utilized **industry-standard tools** — Perforce (P4), Visual Studio, and proprietary avionics simulation frameworks — to streamline development and validation pipelines.
- Executed **hardware-in-the-loop simulations**, diagnosing and resolving execution issues to improve simulation-to-aircraft fidelity by 10%.
- Contributed to flight code development for Avidyne's **Quantum Open Avionics Platform**, supporting rapid prototyping of **customizable, next-generation avionics solutions**.

L3Harris Institute for Assured Information, Florida Institute of Technology *Melbourne, FL*

Graduate Research Assistant *May 2024 – July 2024*

- Developed a **decentralized framework** enabling **multiple autonomous agents**—robotic dogs, drones, and mobile robots—to coordinate, communicate, and reach shared goals.
- Collaborated with **developers and professors** to rigorously test the system in both **simulation** and **real-world environments**.

IRI Research, Florida Institute of Technology *Melbourne, FL*

Graduate Research Assistant *May 2023 - August 2023*

- Proposed and **implemented a framework using AI language models** to automatically extract software requirements from source code.
- Supervised and coordinated with undergraduate students towards the development process.

Publications

Translating Cognitive Architectures to Formal Verification *Under Review*

P Ganeriwala, C Chambers, S Bhattacharyya, S Gilbert, J Babar, M Dorneich, MAH Khan and I Amundson *NASA Formal Methods 2026*

Modular Test-time Input-Space Refinement for Few-Shot Segmentation *Under Review*

MAH Khan, **P Ganeriwala**, A Alvarez and S Bhattacharyya *IEEE Trans on Emerging Topics in Computational Intelligence*

Surveying the Landscape of Transfer Learning: Common Knowledge and Beyond *Under Review*

P Ganeriwala, N Neogi and S Bhattacharyya *IEEE Trans on Pattern Analysis and Machine Intelligence*

An Exploratory Analysis on Auto-generating System Diagrams from the Natural Language *Under Review*

C Chambers, **P Ganeriwala**, S Mueller, S Bhattacharyya and C Sen *IEEE Systems Journal*

Compositional Reasoning over System Architectures with Integrated Cognitive Model *Under Review*

P Ganeriwala, C Chambers, S Bhattacharyya, I Amundson, and J Babar *IEEE SysCon 2026*

Correlation-Threshold Feature Selection for Internet of Things (IoT) Device Identification under Domain Shift *Accepted*

A Dhanawade, **P Ganeriwala**, and S Bhattacharyya *ISAIM 2026*

AssistTaxi-v2: A Scalable Dataset for Taxiway/Runway Scene Understanding Under Diverse Conditions *Accepted*

P Ganeriwala, MAH Khan, A Alvarez, S Bhattacharyya, N Neogi and S Lehman *AIAA SciTech 2026*

Explainable Assurance through Compositional Verification with Cognitive Models *Accepted*

P Ganeriwala, C Chambers, S Bhattacharyya, and J Babar *IEEE RTSS/ESRA 2025*

Evaluating LLM Translation for Prompt-Enhanced ACT-R and Soar Models *Accepted*

P Ganeriwala, S Wu, S Bhattacharyya and F Ritter *BRIMS 2025*

Enabling Formal Verification in a Common Model of Cognition *Accepted*

P Ganeriwala, M Matsumuro, F Ritter and S Bhattacharyya *BRIMS 2025*

Integrating Reconfigurable Accelerators with Quantum Computing — *Accepted*
Pratibha, **P Ganeriwala** and N Mahmud — *IEEE QCE QCore Workshop 2025*

Adapt, But Don't Forget: Fine-Tuning and Contrastive Routing for Lane Detection under Distribution Shift — *Accepted*
MAH Khan, **P Ganeriwala**, S Lehman, A Alvarez, S Bhattacharyya and N Neogi — *ICCV 2COOOL Workshop 2025*

AI Driven Differentiation and Quantification of Metal Ions Using ITIES Electrochemical Sensors — *Accepted*
M Ahmed, **P Ganeriwala**, A Savvidou, N Breen, S Bhattacharyya, P Pathirathna — *Journal of Sensor and Actuator Networks 2025*

FLAIR: Few-Shot Learning for Grapheme Recognition in Ancient Scripts — *Accepted*
P Ganeriwala and D Mitra — *CVPR SINT4CH Workshop 2025*

Few-Shot Learning for Grapheme Recognition in Ancient Scripts — *Accepted*
P Ganeriwala and D Mitra — *ACM Journal on Computing and Cultural Heritage 2025*

Can Someone Prove Your Operator Won't Get Distracted? A Gentle Introduction to Formal Methods in Human Factors — *Accepted*
S Gilbert, **P Ganeriwala**, J Lathrop, A Newendorp, S Fieffer, P Wu, I Amundson, C Chambers, A Kohl, S Khan, M Sanaei, J Babar, T Wang, D Musliner, R Goldman, J Gottlieb, S Gilbert, E Winer, M Dorneich and S Bhattacharyya — *HFES 2025*

Modeling and Formal Analysis of High-Assurance Mixed-Reality Systems — *Accepted*
I Amundson, J Babar, H Herencia-Zapana, S F Rollini, B Brussee, P Wu, T Wang, D Musliner, R Goldman, J Gottlieb, A Newendorp, A Kohl, S Fieffer, S Khan, M Sanaei, M Muscala, S Gilbert, E Winer, M Dorneich, J Lathrop, **P Ganeriwala**, C Chambers and S Bhattacharyya — *AIAA DATC/IEEE DASC 2025*

Systems Engineering with Architecture Modeling, Formal Verification and Human Interactions for Learning-Enabled Autonomous Agent — *Accepted*
P Ganeriwala, R Jones, M Matessa, S Bhattacharyya, J Davis, S Rollini, H Purohit, N Neogi — *INCOSE Systems Journal*

Design and Validation of Adaptive Learning-Enabled Increasingly Autonomous Systems — *Accepted*
P Ganeriwala, M Matessa, S Bhattacharyya, R Jones, J Davis, P Kaur, S Rollini, N Neogi — *IEEE SysCon 2025*

Automating Physics-Based Reasoning for SysML Model Validation — *Accepted*
C Chambers, S Mueller, **P Ganeriwala**, S Bhattacharyya and C Sen — *IEEE SysCon 2025*

Runway vs. Taxiway: Challenges in Automated Line Identification and Notation Approaches — *Accepted*
P Ganeriwala, A Alvarez, A Alqahtani, S Bhattacharyya, MAH Khan, N Neogi — *IEEE SysCon 2025*

Exploring Machine Learning Engineering for Object Detection and Tracking by Unmanned Aerial Vehicle (UAV) — *Accepted*
A Guna, **P Ganeriwala**, and S Bhattacharyya — *IEEE ICMLA 2024*

ALINA: Automated Line Identification and Notation Algorithm — *Accepted*
MA H Khan, **P Ganeriwala**, S Bhattacharyya, N Neogi and R Muthalagu — *CVPR VDU Workshop 2024*

AssistTaxi: A Comprehensive Dataset for Taxiway Analysis and Autonomous Ops — *Accepted*
P Ganeriwala, S Bhattacharyya, S Gunther, B Kish, MA H Khan, A Dhadoti and N Neogi — *IEEE ICMLA 2023*

Towards Knowledge Extraction and Parsing of XML Metadata for SysML System Architecture Modeling — *Accepted*
C Chambers, **P Ganeriwala**, S Bhattacharyya, C Sen and N Nur — *IEEE UEMCON 2023*

Automated Framework to Extract Software Requirements from Source Code — *Accepted*
C Miskell, R Diaz, **P Ganeriwala**, K Slhoub, F Nembhard — *ACM NLPIR 2023*

Assuring Learning-Enabled Increasingly Autonomous Systems (ALEIAS) *Accepted*

N Narayan, **P Ganeriwala**, R Jones, M Matessa, S Bhattacharyya, J Davis, H Purohit and S Rollini *IEEE SysCon 2023*

IPAssess: A Protocol-Based Fingerprinting Model for Device Identification in IoT *Accepted*

P Ganeriwala, S Nandanwar, A Gupta, S Bhattacharyya and R Muthalagu *SAI IntelliSys 2023*

Cross Dataset Analysis with Network Architecture Repair for Transfer Learning *Accepted*

P Ganeriwala, S Bhattacharyya, R Muthalagu and N Neogi *IEEE T-IV 2023*

Functional Reasoning of System Architecture in the System Modeling Language (SysML) With XML Representation *Accepted*

C Chambers, **P Ganeriwala**, C Sen and S Bhattacharyya *ASME IDETC-CIE 2023*

Modeling IoT Behavior for Enforcing Security and Privacy Policies *Accepted*

A Gupta, D Campos, A DCosta, **P Ganeriwala**, S Bhattacharyya and T OConnor *SAI Computing Conference 2022*

Towards Generating System Arch and Formal Functional Description in AADL *Accepted*

A Chauhan, **P Ganeriwala**, C Sen and S Bhattacharyya *ASME IDETC-CIE 2022*