Parth **Ganeriwala**

Graduate Research Assistant
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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
- *Title of Dissertation:* What is Common Knowledge Across Domains? Investigating Shared Representations in Transfer Learning *(Advisor: Dr. Siddhartha Bhattacharyya)*

Florida Institute of Technology
Melbourne, Florida

Master's Level Coursework 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.
- Research: Assuring Increasing Autonomous Systems with Non-Traditional Human-Machine Roles, which focuses on the design and development of assurance frameworks for mission, safety, and security-critical systems.

Skills

Programming	Java, C/C++, Python, MySQL, MongoDB, LaTeX
Web Technologies	Django with Python, HTML5/CSS, React.js, Node.js, JavaScript/JQuery, PHP/Apache
Data Analytics	Jupyter, pandas, numpy, Dask, MySQL Workbench, Neo4j, ElasticSearch, Statsmodels
Machine Learning Libraries	scipy, sci-kit learn, nltk, pandas, OpenCV, FastAPI
Deep Learning Frameworks	Tensorflow, Pytorch, Keras, Cuda, BERT, GPT, LLMs, TensorRT
Formal Verification	NuSmv/NuXmv, Uppaal, AGREE, TLA+ - Coq (Class Projects)
Other	SysML, AADL, Robot Operating System (ROS), Agile Software Development, NLP Modules

Experience

ASSIST Research Lab, Florida Institute of Technology
Melbourne, FL

Research Professional — *August 2021 - Present*

- Collaborating with ***Collins Aerospace, Iowa State University, Raytheon Technologies Research Center, 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 the implementation of 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.

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

Graduate Research Assistant — *May 2024 - July 2024*

- Developed a **decentralized framework for multiple autonomous agents** (robotic dogs, drones, mobile robots) to communicate and reach their goals..

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 ("Automated Framework to Extract Software Requirements from Source Code").
- Supervised and coordinated with undergraduate students towards the development process.

Publications

An Exploratory Analysis on Autogenerating System Diagrams from the Natural Language *Under Review*

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

Systems Engineering with Architecture Modeling, Formal Verification and Human Interactions for Learning-Enabled Autonomous Agent *Under Review*

P Ganeriwala, R Jones, M Matessa, S Bhattacharyya, J Davis, S Rollini, H Purohit, N Neogi *INCOSE Systems Journal*

CSADL++: A Formal Language for IoT Interaction Modeling *Under Review*

P Ganeriwala, N Narayan, F Nembhard, A Gupta and S Bhattacharyya *IEEE Systems Journal*

FLAIR:Few-Shot Learning for Grapheme Recognition in Ancient Scripts *Under Review*

P Ganeriwala, D Atturu and D Mitra *CVPR SINT4CH Workshop 2025*

Can Someone Prove Your Operator Won't Get Distracted? A Gentle Introduction to Formal Methods in Human Factors *Under Review*

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*

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

P Ganeriwala, C Chambers, S Bhattacharyya, I Amundson and J Babar *SPIN 2025*

Modeling and Formal Analysis of High-Assurance Mixed-Reality Systems *Accepted*

I Amundson, J Babar, P Wu, T Wang, D Musliner, R Goldman, J Gottlieb, A Newendorp, A Kohl, S Fieffer, S Khan, M Sanaei, S Gilbert, E Winer, M Dorneich, J Lathrop, **P Ganeriwala**, C Chambers and S Bhattacharyya *DASC 2025*

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 *SysCon 2025*

Automating Physics-Based Reasoning for SysML Model Validation *Accepted*

C Chambers, S Mueller, **P Ganeriwala**, S Bhattacharyya and C Sen *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 *SysCon 2025*

Exploring Machine Learning Engineering for Object Detection and Tracking by Unmanned Aerial Vehicle (UAV) *Accepted*

A Guna, **P Ganeriwala**, and S Bhattacharyya *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 *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 — *UEMCON 2023*

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

IPAssess: A Protocol-Based Fingerprinting Model for Device Identification in IoT — *Accepted*
P Ganeriwala, S Nandanwar, A Gupta, S Bhattacharyya and R Muthalagu — *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 — *IDETC 2023*

Modeling IoT Behavior for Enforcing Security and Privacy Policies — *Accepted*
A Gupta, D Campos, A DCosta, **P Ganeriwala**, S Bhattacharyya and T OConnor — *Computing Conference 2022*

Towards Generating System Arch and Formal Functional Description in AADL — *Accepted*
A Chauhan, **P Ganeriwala**, C Sen and S Bhattacharyya — *IDETC 2022*

A Multi-Dataset Effectiveness Analysis using IPAssess — *Draft Ready*
A Dhanawade, **P Ganeriwala**, and S Bhattacharyya — *ACM Networking 2024*

Enabling Formal Verification in a Common Model of Cognition — *Draft Ready*
P Ganeriwala, F Ritter, M Matsumuro, and S Bhattacharyya — *AAAI 2025*

Evaluating LLM Translation for Prompt-Enhanced ACT-R and Soar Models — *Draft Ready*
P Ganeriwala, S Wu, F Ritter, and S Bhattacharyya — *IEEE CogMI 2025*

Towards Translation of Cogitive Architectures to Formal Method Environments for Verification and Validation — *Draft Ready*
P Ganeriwala, H Purohit, S Bhattacharyya, J Davis, and N Neogi — *NASA Formal Methods 2026*

Surveying the Landscape of Transfer Learning: Common Knowledge and Beyond — *Draft Ready*
P Ganeriwala and S Bhattacharyya — *IEEE Transactions on AI*

Extracurricular Activity

Honors Convocation 2025 — *Melbourne, Florida*
Outstanding Student of the Year — *January 2024 - December 2024*

Phi Kappa Phi — *Melbourne, Florida*
Inducted Member — *February 2023 - Present*

Florida Tech Badminton Club — *Melbourne, Florida*
President — *August 2022 - Present*

Florida Institute of Technology — *Melbourne, Florida*
Course/Assignment Designer — *August 2021 - Present*