

Parth Ganeriwala

SOFTWARE ENGINEERING INTERN · PH.D. CANDIDATE · GRADUATE RESEARCH ASSISTANT

ASSIST Research Lab, Florida Institute of Technology | Avidyne
Melbourne, FL 32901

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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.

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 ResilientX**; 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

Surveying the Landscape of Transfer Learning: Common Knowledge and Beyond

Under Review

P GANERIWALA, N NEOGI AND S BHATTACHARYYA

IEEE Transactions on Pattern
Analysis and Machine Intelligence

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

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

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 SANAIE, 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 SANAIE, M MUSCALA, S GILBERT, E WINER, M DORNEICH, J LATHROP, P GANERIWALA , C CHAMBERS AND S BHATTACHARYYA	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	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