

# 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

<b>Programming</b>	Java, C/C++, Python, Visual Basic, Bash, MATLAB, MySQL, MongoDB, LaTeX
<b>Web &amp; API Development</b>	Django, FastAPI, Node.js, PHP/Apache, REST APIs
<b>Frontend</b>	HTML5, CSS3, JavaScript, React.js, JQuery
<b>Data Analytics</b>	Jupyter, pandas, Dask, Statsmodels, Seaborn, MySQL Workbench, Neo4j, Elasticsearch
<b>Machine Learning Libraries</b>	scikit-learn, XGBoost, OpenCV, nltk, pandas, scipy
<b>Deep Learning / LLMs</b>	TensorFlow, PyTorch, Keras, Cuda, TensorRT, BERT, GPT, Hugging Face Transformers
<b>Formal Verification</b>	NuSmv/NuXmv, Uppaal, AGREE, TLA+ - Coq (Class Projects)
<b>Robotics &amp; Systems Engineering</b>	Robot Operating System (ROS), AADL, SysML, Gazebo, RViz, Agile Software Development
<b>Other Tools</b>	Docker, Git, Perforce, GitHub Actions, NLP Modules, SparkAR Studio, Android Studio, Arduino
<b>Project Tools</b>	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 with **Collins Aerospace, Iowa State University, Raytheon 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 ("Automated Framework to Extract Software Requirements from Source Code").
- Supervised and coordinated with undergraduate students towards the development process.

## Publications

### Modular Test-time Input-Space Refinement for Few-Shot Segmentation

Under Review

MAH KHAN, P GANERIWALA, A ALVAREZ AND S BHATTACHARYYA

NeurIPS 2025

### 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

Under Review

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

<b>Can Someone Prove Your Operator Won't Get Distracted? A Gentle Introduction to Formal Methods in Human Factors</b>	Accepted
S GILBERT, <b>P GANERIWALA</b> , 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
<b>Modeling and Formal Analysis of High-Assurance Mixed-Reality Systems</b>	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, <b>P GANERIWALA</b> , C CHAMBERS AND S BHATTACHARYYA	DASC 2025
<b>Systems Engineering with Architecture Modeling, Formal Verification and Human Interactions for Learning-Enabled Autonomous Agent</b>	Accepted
<b>P GANERIWALA</b> , R JONES, M MATESSA, S BHATTACHARYYA, J DAVIS, S ROLLINI, H PUROHIT, N NEOGI	INCOSE Systems Journal
<b>Design and Validation of Adaptive Learning-Enabled Increasingly Autonomous Systems</b>	Accepted
<b>P GANERIWALA</b> , M MATESSA, S BHATTACHARYYA, R JONES, J DAVIS, P KAUR, S ROLLINI, N NEOGI	SysCon 2025
<b>Automating Physics-Based Reasoning for SysML Model Validation</b>	Accepted
C CHAMBERS, S MUELLER, <b>P GANERIWALA</b> , S BHATTACHARYYA AND C SEN	SysCon 2025
<b>Runway vs. Taxiway: Challenges in Automated Line Identification and Notation Approaches</b>	Accepted
<b>P GANERIWALA</b> , A ALVAREZ, A ALQAHTANI, S BHATTACHARYYA, MAH KHAN, N NEOGI	SysCon 2025
<b>Exploring Machine Learning Engineering for Object Detection and Tracking by Unmanned Aerial Vehicle (UAV)</b>	Accepted
A GUNA, <b>P GANERIWALA</b> , AND S BHATTACHARYYA	ICMLA 2024
<b>ALINA: Automated Line Identification and Notation Algorithm</b>	Accepted
MA H KHAN, <b>P GANERIWALA</b> , S BHATTACHARYYA, N NEOGI AND R MUTHALAGU	CVPR VDU Workshop 2024
<b>AssistTaxi: A Comprehensive Dataset for Taxiway Analysis and Autonomous Ops</b>	Accepted
<b>P GANERIWALA</b> , S BHATTACHARYYA, S GUNTHER, B KISH, MA H KHAN, A DHADOTI AND N NEOGI	ICMLA 2023
<b>Towards Knowledge Extraction and Parsing of XML Metadata for SysML System Architecture Modeling</b>	Accepted
C CHAMBERS, <b>P GANERIWALA</b> , S BHATTACHARYYA, C SEN AND N NUR	UEMCON 2023
<b>Automated Framework to Extract Software Requirements from Source Code</b>	Accepted
C MISKELL, R DIAZ, <b>P GANERIWALA</b> , K SLHOUB, F NEMBHARD	NLPIR 2023
<b>Assuring Learning-Enabled Increasingly Autonomous Systems (ALEIAS)</b>	Accepted
N NARAYAN, <b>P GANERIWALA</b> , R JONES, M MATESSA, S BHATTACHARYYA, J DAVIS, H PUROHIT AND S ROLLINI	Systems Conference 2023
<b>IPAssess: A Protocol-Based Fingerprinting Model for Device Identification in IoT</b>	Accepted
<b>P GANERIWALA</b> , S NANDANWAR, A GUPTA, S BHATTACHARYYA AND R MUTHALAGU	IntelliSys 2023
<b>Cross Dataset Analysis with Network Architecture Repair for Transfer Learning</b>	Accepted
<b>P GANERIWALA</b> , S BHATTACHARYYA, R MUTHALAGU AND N NEOGI	IEEE T-IV 2023
<b>Functional Reasoning of System Architecture in the System Modeling Language (SysML) With XML Representation</b>	Accepted
C CHAMBERS, <b>P GANERIWALA</b> , C SEN AND S BHATTACHARYYA	IDETC 2023
<b>Modeling IoT Behavior for Enforcing Security and Privacy Policies</b>	Accepted
A GUPTA, D CAMPOS, A DCOSTA, <b>P GANERIWALA</b> , S BHATTACHARYYA AND T OCONNOR	Computing Conference 2022
<b>Towards Generating System Arch and Formal Functional Description in AADL</b>	Accepted
A CHAUHAN, <b>P GANERIWALA</b> , C SEN AND S BHATTACHARYYA	IDETC 2022