

# PRAGATHI DURGA RAJARAJAN

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## EDUCATION

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### B.S. Computer Science - University of Texas at San Antonio (UTSA) August 2022 - May 2026

- Concentrations: Data Science, Software Engineering | Minor: Mathematics | GPA: 3.98 / 4.0

## RESEARCH EXPERIENCE

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### UTSA Vision and AI Lab | Undergraduate Research Fellow

Spring 2025 – Present

Advisor: Dr. Amanda Fernandez

- Investigating data pruning for efficient deep learning by developing PyTorch implementations combining randomization and pruning metrics to systematically analyze trade-offs among dataset size, training time, accuracy, and model interpretability.
- Co-developed Q-MAST (Query-based Materials Analysis with Semi-supervised Transformer), which uses image-conditioned, class-aware queries for semantic segmentation in few-shot scenarios to improve defect-class IoU (intersection over union) by 90% over existing approaches. [R01]
- Independently developed a SAM2 training and validation repository for SEM and micrograph datasets; designed few-shot pipelines and improved defect-class IoU on the Stainless-25 dataset beyond prior baselines. [W01, R01, J01, P02]
- Co-authored a CVPR 2025 MM4Mat Workshop spotlight paper within weeks of joining the lab (contributed model refinements, result analyses, and multimodal defect-detection experiments) [W01]

### UTSA Cloud Systems Lab | Undergraduate Research Assistant

Spring 2025 – Summer 2025

Advisor: Dr. Palden Lama

- Implemented a distributed DNN inference pipeline using PyTorch RPC to deploy model shards across Raspberry Pi and GPU nodes. Then, identified model partition points on the Pareto-optimal frontier of the latency-throughput tradeoff. [C03, P03]
- Developed a benchmarking repository for CNNs to measure resource utilization on edge devices. [P05]

### UTSA Engaging Computing Group | Undergraduate Research Assistant

Spring 2024 – Present

Advisor: Dr. Fred Martin

- Designing an interactive, project-based after-school AI literacy curriculum for high school students, emphasizing data, algorithms, and ethical reasoning.
- Developed and evaluated interactive AI literacy tools (FaunaForest, IntoTheRabbitHole, AI-See) using gamified learning; published first-author papers at flagship CS education conferences. [C01, C04, C05, J02, P06, P07, P08]
- Conducted pilot studies of AI-Ed tools with middle-school students, analyzing interactions and feedback to identify effective pedagogical design strategies. [C01, C02, C04, C05, J02, P06, P07, P08]
- Led design and instruction of 3 modules (Image Recognition, Search Algorithms, Decision Trees) at UTSA's AI for Everyone summer camp, integrating hands-on exploration to strengthen engagement and learning. [C01, C02]
- Extended and conducted qualitative analyses for TrainYourSnakeAI and DoppelBot, evaluating how interactive gameplay facilitates learning in reinforcement learning and data ethics. [C06]

### UTSA Systems and Networks Lab | Undergraduate Research Intern

Summer 2023 – Present

Advisor: Dr. Rajendra Boppana

- Conducting research on ML-driven IoT malware detection, exploring LLM-based feature extraction from PCAP data and ML models to improve anomaly-detection accuracy and inference speed. [P04]
- Led development of a preliminary honeynet data-collection pipeline using screen, netcat, and Linux utilities to capture and forward IoT network traffic for malware-analysis experiments.
- Simulated ransomware-like stressed conditions to collect system data for training machine learning models for ransomware detection. [P10, P11]

## **PUBLICATIONS**

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### **Conference Proceedings (Peer Reviewed)**

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#### **Accepted:**

- C01. **Pragathi Durga Rajarajan** and Fred Martin. 2026. On Teaching Image Recognition to Children at a Summer Camp. In Proceedings of the 57th ACM Technical Symposium on Computer Science Education. (SIGCSE-TS 2026) ACM. *[Accepted - To Appear]*
- C02. Kayleigh Stallings, Nicole Tian, Elif Yayla Ercek, Haven Kotara, Devin Marinelli, **Pragathi Durga Rajarajan**, Daniel Schumacher, Ismaila Sanusi, and Fred Martin. 2026. AI for Everyone: Engaging Middle Schoolers through Collaborative, Ethical, and Multimodal AI Learning. In Proceedings of the 57th ACM Technical Symposium on Computer Science Education. (SIGCSE-TS 2026) ACM. *[Accepted - To Appear]*
- C03. Adiba Masud, Nicholas Foley, **Pragathi Durga Rajarajan**, and Palden Lama. 2025. Where to Split? A Pareto-Front Analysis of DNN Partitioning for Edge Inference. IEEE 11th International Conference on Edge Computing and Scalable Cloud (EdgeCom), New York, United States. *[Accepted - To Appear]*
- C04. **Pragathi Durga Rajarajan** and Fred Martin. 2025. IntoTheRabbitHole: A Web Application for Teaching Middle School Students About Search Algorithms. In Proceedings of the 30th ACM Conference on Innovation and Technology in Computer Science Education V. 1 (ITiCSE 2025). ACM, New York, NY, USA, 340–346. <https://doi.org/10.1145/3724363.3729080> **[Best Paper Nominee]**
- C05. **Pragathi Durga Rajarajan**, Adrian Cisneros and Fred Martin. 2025. FaunaForest: A Novel Software Tool for Teaching Decision Trees to Middle School Students. IEEE Integrated STEM Education Conference (ISEC), Princeton, NJ, USA, 2025, pp. 1-8, doi: 10.1109/ISEC64801.2025.11147419.
- C06. Cesar Hinojosa, Priyanka Kumar, **Pragathi Durga Rajarajan**, and Fred Martin. 2025. TrainYourSnakeAI: A Novel Tool to Teach Reinforcement Learning to Middle School Students. In Proceedings of the 56th ACM Technical Symposium on Computer Science Education V. 1 (SIGCSE-TS 2025). ACM, New York, NY, USA, 506–512. <https://doi.org/10.1145/3641554.3701907>

#### **Under Preparation/Review:**

- R01. Logan Robinson, Daniel Mohanadhas, Sergio J. Contreras, **Pragathi Durga Rajarajan**, Michelle Hope Voges, Cyana Zaragosa, Patrick Henry Warren, Elizabeth S. Sooby, Amanda S. Fernandez. Q-MAST: Query-based Materials Analysis with Semi-supervised Transformer. *[under review at a top computer vision venue]*

### **Non-Archival Workshop Papers (Peer Reviewed)**

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- W01. Logan Robinson, Pedro Davila, Sergio Contreras, **Pragathi Durga Rajarajan**, Daniel Castillo, Michelle Voges, Cyana Zaragosa, Patrick Warren, Elizabeth S. Sooby, Amanda S. Fernandez. 2025. Evaluation and a New Benchmark for Defect Detection in Materials Fabrication. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshop on Multimodal Models for Materials (MM4Mat), Nashville TN.

### **Journal Proceedings (Peer Reviewed)**

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#### **Under Review:**

- J01. **Pragathi Durga Rajarajan**, Richard C. Powell, Anika Pulido, Michelle H. Voges, Cyana Zaragosa, Amanda S. Fernandez. 2025. Multimodal Few-Shot Image Segmentation for Defect Detection. UTSA Journal of Undergraduate Research and Scholarly Works.
- J02. **Pragathi Durga Rajarajan** and Fred Martin. Designing Effective Software Tools for Enhancing K-12 AI Education. 2025. UTSA Journal of Undergraduate Research and Scholarly Works.

### **Posters**

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\* archival conference posters

- P01. \* Priyanka Kumar, Panhapiseth Lim, **Pragathi Durga Rajarajan**, and Phillip Driscoll. 2026. Learning AI Ethics with EvolveMoralMaze: An Analysis of Student Outcomes and Misconceptions. In Proceedings of the 57th ACM Technical Symposium on Computer Science Education V.2 (SIGCSE-TS 2026), St. Louis, MO, USA. ACM, New York, NY, USA, 3 pages. *[Accepted - To Appear]*
- P02. **Pragathi Durga Rajarajan** and Amanda Fernandez. 2025. Multimodal Few-Shot Image Segmentation for Defect Detection. UTSA College of AI, Cyber, and Computing H-E-B Community Innovation Scholars and Team Research Projects Showcase.
- P03. Nicholas Michael Foley, Adiba Masud, **Pragathi Durga Rajarajan**, and Palden Lama. 2025. Where to Split? A Pareto-Front Analysis of DNN Partitioning for Edge Environments. UTSA College of AI, Cyber, and Computing H-E-B Community Innovation Scholars and Team Research Projects Showcase.
- P04. \* **Pragathi Durga Rajarajan**. 2025. Fast Attack Detection in Internet of Things (IoT) Devices Utilizing Machine Learning and Network Traffic Data. RSA Security Scholar Poster Exhibition. RSA Conference. <https://www.rsaconference.com/rsac-programs/security-scholar/poster-boards>
- P05. Nicholas Michael Foley, **Pragathi Durga Rajarajan**, Adiba Masud, and Palden Lama. 2025. Benchmarking Distributed DNN Inference in an Edge Environment. UTSA Office of Undergraduate Research Spring 2025 Showcase.
- P06. **Pragathi Durga Rajarajan**. 2025. FaunaForest: From Prototype to Paper. UTSA Honors College Experiential Learning Fair (Honors ELF Spring 2025). **[1st Place in Research Track]**
- P07. **Pragathi Durga Rajarajan** and Fred Martin. 2025. Designing Effective Software Tools for Enhancing K-12 AI Education. San Antonio Honors Research Symposium. **[1st Place Winner]**
- P08. **Pragathi Durga Rajarajan**, Adrian Cisneros, and Fred Martin. 2024. FaunaForest: A Tool to Teach Decision Trees to Middle School Students. UTSA School of Data Science Los Datos Conferences Poster Session (UTSA SDS Los Datos 2024). **[2nd Place Winner]**
- P09. **Pragathi Durga Rajarajan**. 2024. Deep Learning and Explainability for Improved Drug Discovery. UTSA CS Course-Based Undergraduate Research Experience Showcase.
- P10. **Pragathi Durga Rajarajan**. 2023. Researching at the Intersection of Cybersecurity and Data Science. UTSA Honors College Experiential Learning Fair (Honors ELF Fall 2023).
- P11. **Pragathi Durga Rajarajan** and Anusha Abdulla. 2023. Using Simulated Data to Detect Ransomware. University of Texas at Austin Gateway to Graduate Studies in Science (G2S2 2023).

## **AWARDS AND HONORS**

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### **Best Paper Nominee, ACM ITiCSE 2025**

Summer 2025

- First-author paper selected as one of four Best Paper nominees (out of 99 accepted papers) at the ACM Innovation and Technology in Computer Science Education (ITiCSE), a flagship international venue for computing education research.

### **Microsoft Emerging Leaders (Asynchronous Cohort)**

Summer 2025

- Selected for a competitive leadership development program focused on cultivating technical leadership, confidence, and personal branding for future innovators in technology.

### **UTSA Golden Feather Award**

Spring 2025

- One of UTSA's two highest student honors, recognizing exceptional leadership, academic excellence, and transformative contributions that leave a lasting institutional legacy.

### **1st Place Poster, UTSA Honors College Experiential Learning Fair**

Spring 2025

- Awarded first place in the Research track for presenting AI education research at the UTSA Honors College Experiential Learning Fair, a showcase highlighting experiential learning projects.

### **1st Place Poster, San Antonio Honors Research Symposium**

Spring 2025

- Awarded first place for research on AI education at a citywide symposium featuring top honors students from six universities and colleges in San Antonio, Texas.

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|---|-------------|
| <b>AI Scholar - Neuro-Inspired AI for the Edge</b>  | Spring 2025 |
| • Awarded for successful completion of the UTSA MATRIX AI Consortium's AI Spring School.  |             |
| <b>UTSA School of Data Science Undergraduate Research Fellow</b>  | Spring 2025 |
| • Selected for the inaugural cohort of UTSA's School of Data Science fellowship program supporting high-impact undergraduate research in AI and data science.                 |             |
| <b>RSAC Security Scholar</b>  | Fall 2024   |
| • Sole UTSA student selected to represent the university at the RSA Conference 2025, joining a national cohort of distinguished cybersecurity scholars.                       |             |
| <b>3rd Place Group Presentation, UTSA Roadrunner Experience Showcase</b>  | Fall 2024   |
| • Recognized for presenting cybersecurity research to a panel of industry professionals and faculty judges.   |             |
| <b>2nd Place Undergraduate Poster, UTSA Los Datos Conference</b>  | Fall 2024   |
| • Received second place for poster on AI education at Los Datos, UTSA's annual data science conference.   |             |
| <b>Fellow, University of Texas at Austin's Gateway to Graduate Studies in Science</b>   | Fall 2023   |
| • Presented research and engaged with UT Austin faculty and graduate students through G2S2, a selective program fostering undergraduate pathways to graduate studies in STEM. |             |
| <b>UTSA Honors College Citymester Fellow</b>  | Summer 2023 |
| • Selected as one of a small cohort of fellows to partner with San Antonio nonprofits, businesses, and agencies on civic and career-integrated learning projects.             |             |
| <b>National Merit Commended Scholar</b>   | Fall 2021   |
| • Recognized by the National Merit Scholarship Program for exceptional performance on the PSAT/NMSQT.   |             |

## LEADERSHIP AND STUDENT ORGANIZATIONS

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| <b>Research Mentorship   Research Advisor</b>  | Spring 2025 – Present   |
| • Mentor to high school students conducting research on the psychological dimensions of large language models (LLMs).  |                         |
| <b>UTSA Honors College Research Student Panel   Panelist</b>   | Spring 2025             |
| • Invited as one of six student panelists to share undergraduate research experiences and discuss strategies for pursuing research opportunities to Honors College students.   |                         |
| <b>CodeQuantum Hackathon   Lead Design/Media Organizer</b>   | Summer 2024 – Present   |
| • Directed the Design/Media Team for a hackathon empowering marginalized genders in technology and created official promotional materials whose eye-catching designs increased visibility and enhanced the overall event experience. |                         |
| • Personally-designed promotional materials led to 150 participants and 6 sponsors joining the hackathon.  |                         |
| • Created a comprehensive public relations toolkit to standardize design and outreach for future Code-Quantum iterations.  |                         |
| <b>Rowdy Creators   Vice President, Media Director</b>   | Fall 2023 – Summer 2025 |
| • Oversaw media and outreach strategy, leading officers and organizing initiatives that achieved record attendance (approximately 100 participants vs. 20 prior year) at the 2024 kickoff meeting.                                   |                         |
| • Supported executive leadership and coordinated the semester workathon to help members complete ongoing creative and technical projects.  |                         |
| • Designed weekly promotional flyers, managed the organization's social media presence, and developed feedback surveys to enhance engagement and event turnout.  |                         |
| <b>UTSA ACM (ACM)   Member</b>   | Fall 2022 – Present     |
| • Active participant in professional development events, hackathons, and technical workshops organized by the UTSA ACM chapter.  |                         |

## **SKILLS**

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**Programming & Scripting:** Python, Java, C, Bash, JavaScript, HTML/CSS, PHP, SQL

**Machine Learning and Deep Learning:** PyTorch, TensorFlow, scikit-learn, CNNs, segmentation models, GANs, data pruning, distributed inference.

**Systems:** Linux, Docker, PyTorch RPC, Zeek/Bro, Argus, Wireshark.

**Web:** Flask, MongoDB, Git/GitHub.

**Languages:** English (fluent), Tamil (fluent), Spanish (intermediate).

## **SCHOLARSHIPS**

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**Jessie Mann Endowed Computer Science Scholarship in Memory of Robert Young** Fall 2025

- Awarded by the UTSA Department of Computer Science for academic excellence and merit.

**Allen N. Martinese Endowed Scholarship Fund in Computer Science** Fall 2025

- Awarded by the UTSA Department of Computer Science for outstanding academic achievement and merit in research and/or projects.

**Honors College Research & Internship Opportunity Scholarship** Summer 2025

- Awarded by the UTSA Honors College for research or internship experiences.

**Najim Center Experiential Learning Scholarship** Summer 2025

- Awarded by the UTSA Najim Center to support experiential learning, such as research, internships, etc.

**UTSA School of Data Science Fellowship Stipend** Summer 2025

- Awarded by the UTSA School of Data Science for completion of its Undergraduate Research Fellowship.

**Honors College Experiential Learning Award** Spring 2025

- Awarded by UTSA Honors College for travel support to IEEE ISEC 2025 research conference.

**Will Winsborough Memorial Endowed Scholarship for Computer Science** Fall 2024, Fall 2025

- Awarded by the UTSA Department of Computer Science for outstanding academic achievement and research excellence in computer security.

**Peter T. Flawn Presidential Honors Endowed Scholarship** Fall 2024, Fall 2025

- Awarded by UTSA Honors College for exceptional academic performance & distinction as a STEM major.

**Grace Hopper Celebration Scholarship, UTSA Computer Science Department** Fall 2024

- Awarded departmental scholarship to virtually attend the Grace Hopper Celebration, the world's largest conference for women in computing and technology.

**Carlos and Malú Alvarez Scholarship** Summer 2023

- Merit-based scholarship supporting high-achieving undergraduate students in the UTSA Honors College.

**UTSA Honors College Dean's Scholarship** Summer 2023

- Awarded for academic excellence & commitment to Honors College's interdisciplinary learning initiatives.

**UTSA Distinguished Presidential Scholarship** Fall 2022

- Prestigious university-wide scholarship awarded for exceptional academic performance and achievement.

**Highest Ranked Senior Scholarship** Spring 2022

- Awarded by the Texas Education Agency to the valedictorian of an accredited Texas high school in recognition of academic excellence.

## **VOLUNTEERING**

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**Tutoring and Phonics Lessons, 300 hours** Spring 2020 – Present

**Cibolo Center for Conservation, 90 hours** Summer 2023 – Summer 2024