HUGH COLEMAN

One Trinity Place ◆ San Antonio, TX 78212 ◆ hughcoleman1@pm.me ◆ hcolema1@trinity.edu

EDUCATION

TEXAS A&M UNIVERSITY — College Station, TX

Ph.D. in Computer Science starting in Fall 2025

TRINITY UNIVERSITY — San Antonio, TX

B.S. in Computer Science — May 2025

Grade: 3.808, Honors Thesis, Dean's List

AWARDS AND HONORS

Horizon Fellowship, Texas A&M College of Engineering	2025-present
Outstanding Senior Research Award, Trinity University	2025
Dean's Scholarship, Trinity University	2021-present
NSF Student Travel Grant Recipient, IEEE MASS 2024	2024
NTGPA Scholar, GPA Midstream North Texas Scholarship	2022-present

RESEARCH EXPERIENCE

AIR FORCE RESEARCH LABORATORY — Rome, NY

Advanced Course in Engineering — May 2024 - August 2024

- Worked on a government project integrating Mythic agents into in-house Command and Control (C2) software Rebellion for enhanced UX, deconfliction, and operational diversification.
- Automated C2 payload generation, agent tasking and listener generation.
- Created software to create and post through bot accounts on Mastodon server to serve misinformation for simulated operations.
- Used local LLMs to identify and deploy mass misinformation in simulated operations.
- Developed kinetic drone software for C2, navigation, swarm and ordinance deployment for simulated operations.
- Conducted malware analysis through reverse engineering, static and dynamic analysis on packed malicious software to assess threat behavior and mechanisms.
- Crafted cryptography scheme optimized for over-the-air rekeying.
- Created FPGA hardware PUF for validating devices.

TRINITY UNIVERSITY — San Antonio, TX

Honors Thesis, Department of Computer Science — August 2023 - present

- Conducting thesis research under the supervision of Prof. Sheng Tan, focusing on the intersection of federated learning and vehicular ad hoc networks (VANETs).
- Developed a Dynamic Vehicle Selection and Adaptive Aggregation Asynchronous based Asynchronous Federated Learning scheme to optimize federated learning performance in vehicular networks.
- Presented first-author research poster on federated learning at IEEE MASS 2024 in Seoul, South Korea.

PROFESSIONAL EXPERIENCE

TEACHING ASSISTANT — San Antonio, TX
Principles of Theoretical Computer Science, Trinity University — Fall 2023, Fall 2024

- Held office hours, midterm and final exam review sessions.
- Graded quizzes and homeworks.

USAA — San Antonio, TX
Software Engineer Intern, Bank — May 2023 - August 2023

- Developed serverless banking applications using AWS and Terraform.
- Implemented AWS Step Functions state machine to orchestrate account eligibility verification processes on USAA deposit account decisioning.
- Engineered authentication microservice using Terraform to provision AWS infrastructure and develop API for retrieving member identification tokens.
- Implemented Datadog dashboard to measure reliability and cost of AWS banking services.

RICE UNIVERSITY — Houston, TX
OwlSpark Startup Accelerator, Class 9 — May 2021 - August 2021

- Created a Python application to analyze 6,448 miles of Texas Railroad Commission natural gas pipeline data to identify 353 potential clients for computational fluid dynamics software.
- Presented to Chevron Technology Ventures after pitching at Bayou Startup Showcase.
- Identified key pain points by conducting 29 customer interviews with industry professionals across the industry.

GATHERX ANALYTICS — Houston, TX
Co-Founder and Developer — May 2020 - August 2021

- Created web-based product key authentication system for subscription sales and management.
- Led, developed, and managed free trial product verification for a six-month pilot test with operational datasets from potential clients.
- Built test code solution to improve system reliability for critical computational fluid dynamics engine calculations for data analytics platform and deployed to codebase.
- Presented at Rice University Bayou Startup Showcase pitch event.

PUBLICATIONS

1. **Hugh Coleman,** Sheng Tan, and Zi Wang, “Poster: Dynamic Vehicle Selection and Adaptive Aggregation for Asynchronous Federated Learning Enabled VANET,” in *2024 IEEE 21st International Conference on Mobile Ad-Hoc and Smart Systems (MASS), IEEE,* Sep. 2024, pp. 480–481.

Travel Grant Application - AeroCyber Workshop
Prescott, Arizona

Recommendation Letter of Support for Mr. Hugh Coleman

I am pleased to support Hugh’s application for a travel grant to attend the AeroCyber Workshop. As their research advisor at Texas A&M University, I've had the opportunity to mentor and collaborate closely with Hugh on Digital Twinning projects. He is an extraordinarily motivated student whose participation in this conference will significantly benefit his academic and professional development.

Hugh is not funded and does not have travel money to attend the conference. The Student Travel Grant will help him defray his travel expenses, boarding, and lodging expenses. I am willing to cover the cost-grant differential from other funding sources.

Financing Hugh's trip to the AeroCyber Workshop will benefit him and the broader academic community by encouraging collaboration and knowledge sharing. I heartily endorse Hugh for this travel award and appreciate your consideration of this request. Please do not hesitate to contact me if you need any additional information.

John A. Hamilton, Jr., Ph.D.
Professor of Computer Science & Engineering
Director, Texas A&M Cybersecurity Center

As a senior computer science student preparing to begin my PhD studies in cybersecurity this fall, I am eager to attend the ERAU-NASA-NSF Aerospace Cybersecurity Workshop to deepen my understanding of security challenges in aviation and space systems. My research on mobile computing in vehicular networks (VANETS) has ignited my interest in expanding these concepts to aerospace applications, particularly drone networks and swarm technologies.

My senior honors thesis on federated learning in VANETS directly connects to many aerospace cybersecurity challenges. While I have experience with ground vehicles, I would like to learn more about communication protocols and security mechanisms for aerial vehicles, especially considering the unique constraints of drone operations. I'm particularly interested in V2V communication frameworks for drone swarms, secure mobile sensing in dynamic aerial environments, and robust network security for unmanned aerial systems.

During my internship at the Advanced Course in Engineering at the Air Force Research Laboratory, I gained experience with command and control systems, cryptography schemes for over-the-air rekeying, and hardware security - all critical elements for securing aerospace systems. This experience exposed me to the complexity of protecting mobile computing platforms in sensitive operations. However, I recognize that aerospace systems present unique challenges beyond earthbound networks, including greater constraints on power, communication range, and the potential severity of security breaches.

As I prepare to dive deeper into these topics during my PhD, attending this workshop would provide invaluable preparation by:

- Expanding my understanding of the feasibility and consequences of emerging cyber and cyber-physical attacks within the aerospace sector, helping me identify relevant research problems for my doctoral work.
- Exposing me to cutting-edge security challenges specific to drone swarms and aerial networks that aren't typically covered in traditional cybersecurity curricula.
- Providing hands-on experience through the CTF competition that simulates realistic threats to aerospace systems.
- Connecting me with researchers and practitioners who can offer insights into potential threat mitigation strategies for mobile aerial networks.

As I consider focusing my PhD research on security in V2V communication, I would like to learn more about security mechanisms for autonomous drone swarms and decentralized aerial computing. This workshop represents an ideal opportunity to explore the latest developments in the field before committing to a specific research direction. Embry-Riddle's expertise in both aviation and cybersecurity makes this workshop particularly valuable for identifying emerging research problems at this intersection.

My goal is to develop novel security frameworks that enable safe and resilient operation of connected aerospace systems. The ERAU-NASA-NSF workshop would be instrumental in helping me understand the practical constraints and requirements of these systems from both academic and operational perspectives, ultimately guiding my contributions to this critical field.