




ARTHUR AMORIM

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PROFESSIONAL SUMMARY

PhD Computer Science candidate specializing in formal methods and provable security for critical infrastructure systems. My research lies at the intersection of formal methods, cyber-physical system security, and type theory, with a focus on making safety-critical systems resilient to stealthy and protocol-level attacks.

EDUCATION

- **University of Central Florida** 2023 - Present
Ph.D. Computer Science (Expected 2026)
Orlando, FL
 - Advisor: Dr. Gary T. Leavens
 - Research Focus: Formal methods for cyber-physical system security, runtime verification, type theory
- **University of Central Florida** 2023 - 2025
M.S. Computer Science
Orlando, FL
 - GPA: 3.93/4.00
- **Tusculum University** 2018 - 2022
B.S. Mathematics, Minor Computer Science
Tusculum, TN
 - GPA: 3.81/4.00, Magna Cum Laude

RESEARCH EXPERIENCE

- **Idaho National Laboratory, DOE**  2022 - Present
PhD Intern: National & Homeland Security
Idaho Falls, ID
 - Developed DATUM (Dynamically Assured Typed Universal Messaging), a novel protocol verification framework combining static verification with runtime monitoring using refined multiparty session types
 - Designed runtime enforcement mechanisms for cyber-physical systems, targeting UAV autopilot systems and industrial control protocols
 - Applied formal methods and theorem proving in F* to provide mathematical guarantees for system safety properties under adversarial conditions
 - Validated approach on MAVLink protocol used in ArduPilot and PX4 systems, demonstrating practical applicability to critical infrastructure
- **CyManII Cybersecurity Manufacturing Innovation Institute**  2025 - Present
PhD Intern
Joint Appointment
 - Joint appointment with INL addressing U.S. cybersecurity challenges against evolving threats in manufacturing systems
 - Focus on making DATUM practical and deployable in widely-used industrial protocols, including Modbus
 - Collaborate with industry partners to retrofit legacy manufacturing systems with provable security mechanisms
- **ORISE Omni Alliance, DOE**  2022 - 2024
STEM Intern
Idaho Falls, ID
 - Performed modeling and translation from functional specifications to executable low-level code
 - Bridged theoretical formal methods research with practical implementation requirements for critical infrastructure applications

PUBLICATIONS & PRESENTATIONS

C=CONFERENCE, I=INVITED TALK

- [C.1] Arthur Amorim, Max Taylor, Trevor Kann, Gary T. Leavens, William L. Harrison, Lance Joneckis (2025). **UAV Resilience Against Stealthy Attacks**. In *International Conference on Unmanned Aircraft Systems (ICUAS 2025)*.
- [C.2] Arthur Amorim, Max Taylor, Trevor Kann, William L. Harrison, Gary T. Leavens, Lance Joneckis (2025). **Enforcing MAVLink Safety & Security Properties via Refined Multiparty Session Types**. In *2025 NASA Formal Methods Symposium (NFM 2025)*.
- [C.3] Arthur Amorim, Trevor Kann, Max Taylor, Lance Joneckis (2024). **Towards Provable Security in Industrial Control Systems via Dynamic Protocol Attestation**. In *IEEE Workshop on Industrial Control System Security (ICSS 2024)*, co-located with ACSAC.
- [C.4] Max Taylor, Arthur Amorim (2025). **Enhancing Cyber-Physical System Dependability via Synthesis: Challenges and Future Directions**. In *International Conference on Dependable Systems and Networks Workshops*, co-located with DSN.
- [I.1] Max Taylor, Arthur Amorim (2025). **Dynamically checking protocols with DATUM**. Invited talk at *Digital Innovation Center of Excellence (DICE) 2025*.
- [I.2] Max Taylor, Arthur Amorim (2025). **Automated Reasoning for UAV Safety & Security: The DATUM Protocol Stack**. Invited talk at *High Confidence Software and Systems Conference 2025*.

SKILLS

- **Programming & Verification Languages:** F*, OCaml, Python
- **Formal Methods:** Theorem proving, Runtime verification, Static analysis, Protocol verification, Session types
- **Security Frameworks:** seL4 microkernel, Software isolation, Protocol attestation
- **Cyber-Physical Systems:** UAV autopilots (ArduPilot, PX4), Industrial control systems, Embedded systems
- **Communication Protocols:** MAVLink, Modbus, Protocol verification and enforcement
- **Research & Development:** Interactive theorem provers, Verification frameworks, Type theory
- **Mathematical & Analytical Tools:** Mathematical logic, Static analysis, Runtime monitoring, Formal specification

HONORS AND AWARDS

- **Outstanding Calculus Student Award**
Labry College of Science, Math and Business, Tusculum University 2019
- **Division 2 Athletics Director Association Academic Achievement Award**
Recognition for academic excellence in collegiate athletics 2019