Getting an Advanced Degree in LTL Cybersecurity

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SYSTEMS ENGINEERING
COLORADO STATE UNIVERSITY

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Spoiler Alert:

There is no degree program for LTL cybersecurity.

Agenda

- Overview of Educational Opportunities

- Introduce the Panelist

- Questions and Answer Session

Pursuing Advanced Education for Cybersecurity

Traditional Track:

1. Batchelor's of Science in Computer Science

2. Master of Science in Computer Science

3. Ph.D. In Computer Science with concentration in cybersecurity

Rare

Non-Traditional Track:

1. Almost anything else

Options for learning cybersecurity

- Experience
  - Military
  - Job Duties
  - Self study

- Minors or Concentrations
  - Undergrad minor programs
  - Graduate Certificates

- Professional Education
  - Grimm
  - Sans
  - University Continuing Education

Security experts have many ways of getting their education.

Jeremy Daily
Associate Professor of Systems Engineering

- Formal education in mechanical engineering (Ph.D. from Wright State U.)

- Traffic Crash Reconstruction

- Digital Forensics

- Faculty of the Institute for Information Security (iSec) at University of Tulsa

- Co-Founder of the CyberTruck Challenge

- Hired into systems engineering at Colorado State University based on cybersecurity experience

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Programs of Study

https://www.engr.colostate.edu/se/

Features:

- Cater to working professionals

- Classes are 1 night per week
  - 5:15 to 8:00 Mountain Time

- Synchronous and Asynchronous
  - All lecturers are recorded

- Remote and In-person attendance
  - Leverages modern collaboration tools
  - Rigorous dissertation requirements for all doctoral students

Doctor of Philosophy (Ph.D.)

Master of Engineering (M.E.)

Doctor of Engineering (D.Eng.)

Master of Science (M.S.)
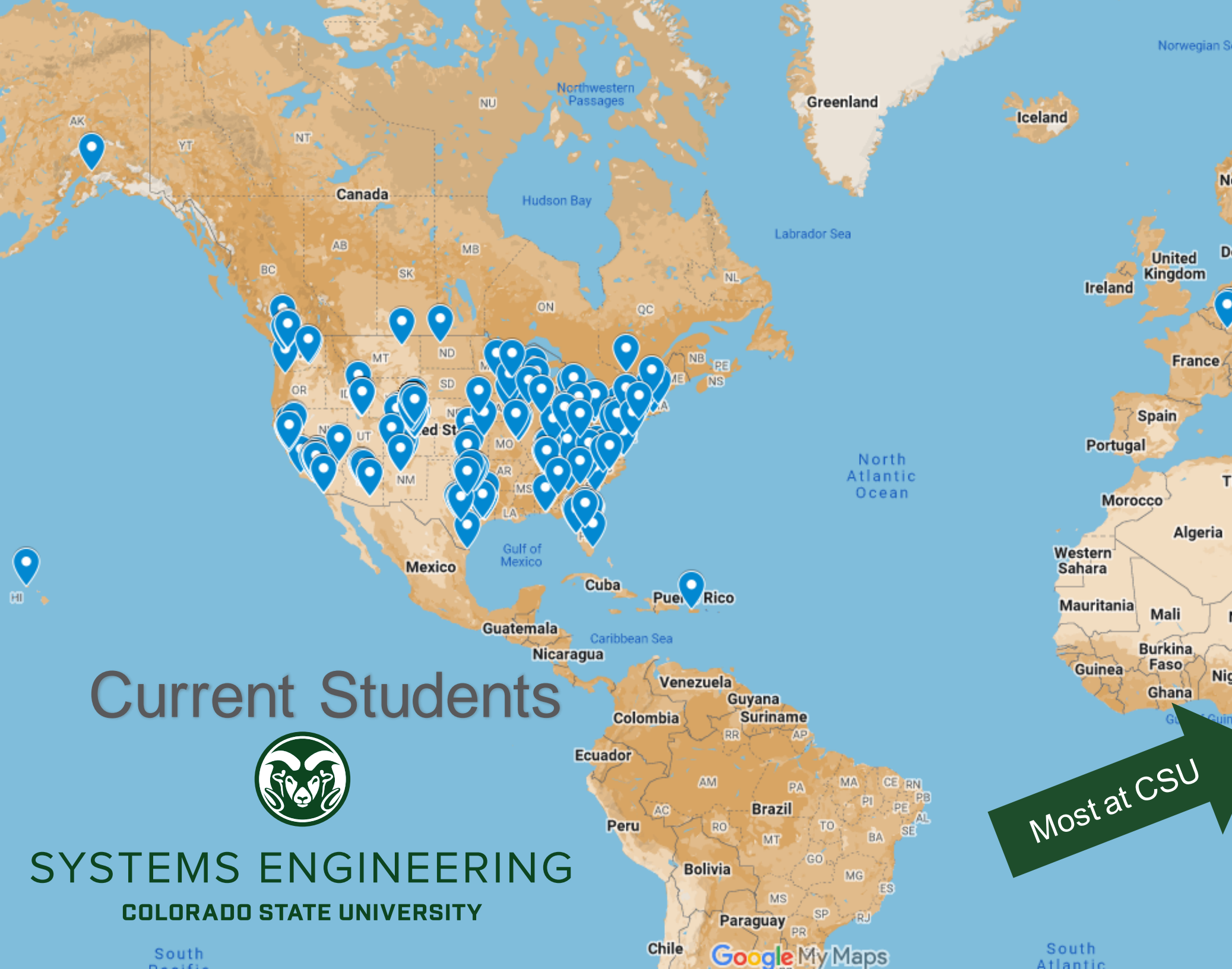
Accelerated B.S./Master's Program (AMP)

Graduate Certificate in Systems Engineering Practice

Current Students

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Most at CSU

Systems Engineering by the Numbers

24 Certificate Students

56 M.E. Students

45 M.S. Students

186 Ph.D. Students

29 D.Eng. Students

About Us

Systems Cyber

Our research group focuses on cybersecurity challenge for embedded systems found in heavy vehicles and diesel engines.

Panel Introduction

Goal: Identify with some of our panelists and envision a path towards continued education.

Christos Papadopoulos
University of Memphis

- Professor, Computer Science
- 2018-20 Program manager, DHS S&T
- Working in Cybersecurity for > 20 years
- Automotive Cybersecurity for the last 3 years
- Like to work at the intersection of Industry and Academia, highly interested in training and education opportunities
- Shade tree mechanic

David Nnaji

Education
2021 - MS Systems Engineering at CSU
2018 - BS Mechanical Engineering at the
University of Tulsa

My Story
2018 – Joined TU HD Vehicle Cybersecurity Reseach Group
2019 – Research Assistant at CSU under Dr. Jeremy Daily
2021 – Product Cybersecurity at Cummins
2022 – Completed Thesis
Present – Test and Automation Engineer at Tesla

**Cummins 2021
– Columbus, IN**

Tesla Factory 2021 - Fremont, CA

**TU CyTeX 2018
– Denton, TX**

Cybersecurity Thesis project 2022, Fort Collins, CO

Joe Lotz

Director of Cybersecurity and Functional Safety

Work History

Current - PACCAR Embedded - Dir of CySec and FuSa

2019 - PACCAR India - Director of Engineering

2017 - Peterbilt Motors Co - Systems Engineer

2008 - Kenworth Truck Co - Design Engineer

2000 - LSI Logic - Engineering Technician

1995 - US Marine Corps

Formal Education

Current - Doctor of Philosophy - Systems Engineering
2007 - Master of Science - Electrical Engineering
2005 - Bachelor of Science - Electrical Engineering

Research Interests

Commercial Vehicles – Cybersecurity, Human Machine Interfaces (HMI)

My Story

- Started professional life as an Embedded Engineer
- Focus was on cabin electronics and controls
- Graduated to System Owner
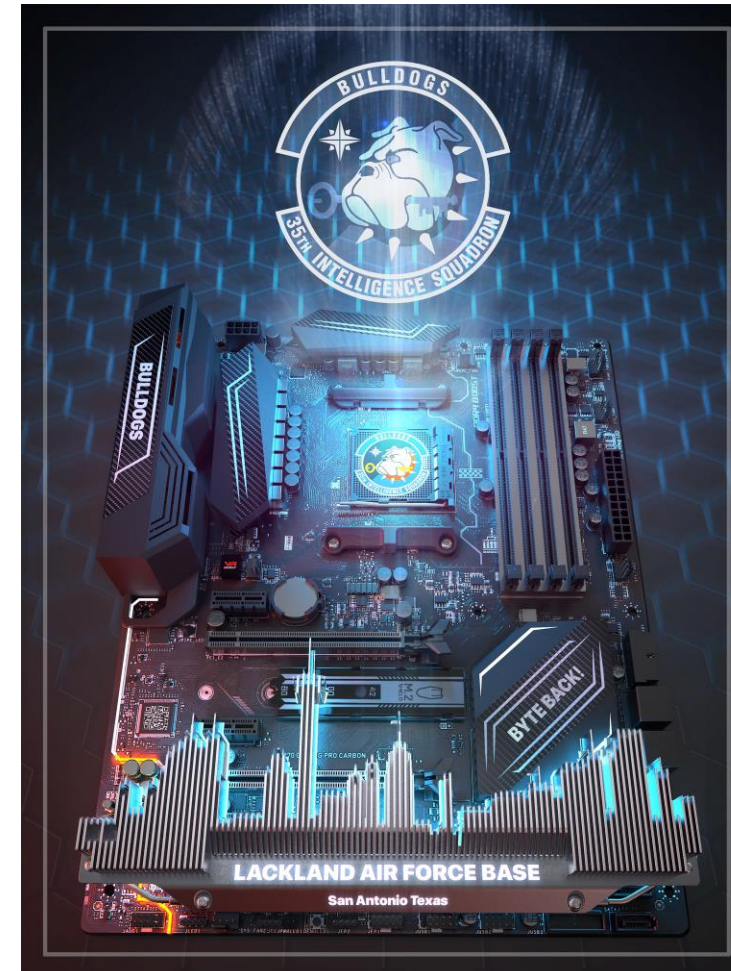- Developed and lead the Functional Safety and Cybersecurity orgs

Marshall Huffaker

Deputy Director of the 47th Cyberspace Test Squadron

Work History

Current – Air Force – Deputy Dir of Operations

2019 – Air Force – Systems Engineer

2009 – Northrop Grumman - Systems Engineer

2005 – Northrop Grumman – Intelligence Analyst

2000 – US Army – Intelligence Analyst

Formal Education

Current - Doctor of Philosophy - Systems Engineering
2012 - Master of Science – Software Engineering
2010 - Bachelor of Science – Computer Information Systems

Certifications

Certified Information Systems Security Professional (CISSP)
Certified Systems Engineering Professional (CSEP)

Research Interests

Offensive and Defensive Cybersecurity
Cyber-Physical Systems
Model Based Systems Engineering (MBSE)
MBSE Driven System Testing

My Motivation

- To provide reliable systems for our uniformed service members.

Rik Chatterjee: Graduate Research Assistant at CSU

- Formal Education in Computer Science and Information technology from India

- Four Years of experience as a Software Engineer

- Wanted to explore further into cyber security in embedded networks and Subhojeet kept talking about *'Hacking Trucks'*

- Graduate student in Systems Engineering at CSU:
    - Presented paper at VehicleSec 2023 co-located with NDSS on protocol vulnerabilities of J1939
    - Developed challenges problems for DARPA AMP Program

Carson Green: Undergraduate Research Assistant at CSU

- Bachelors in Electrical Engineering – May 2024
  - Circuit design / validation
  - Biosensor Senior Design project

- Introduced to vehicle cybersecurity by Dr. Daily, have been contributing research since 2022
  - Developing the *Ultimate Truck Hacking Platform*
  - Kenworth Truck-in-a-Box
  - Event Data Recorder chip-swapping
  - Student/staff at the CyberTruck, CyberBoat, CyberAuto, CyberTractor challenges

- Want to help secure our transportation and keep learning valuable skills

Sean Bumgarner

Sean Bumgarner. Sean is a Master's student at Colorado State University.
Sean's research interests include:
- Adapting Systems Engineering for the trucking industry
- Driver behavior
- Heavy vehicles communication systems Integrations with Telematics Service Providers
- Heavy vehicle cybersecurity
- Establishing recommended practices for the industry.

Sean has mathematics degree from Saint John's University in Collegeville, MN and an industrial engineering degree from North Dakota State University in Fargo, ND.

Panel Questions

- What is your reaction to Sean's answers to these questions?

  – **What made you decide to pursue an advanced degree (i.e. beyond a Batchelor's degree)?**

  – **Have you ever heard of an advanced degree program for trucking cybersecurity?**

  – **How have you demonstrated value to your organization by utilizing skills and techniques learned in graduate school?**

  – **How is the graduate education helpful for dealing with cybersecurity issues?**

  – **How does the graduate education help beyond cybersecurity?**

  – **Do you have any other comments you'd like to share about graduate studies in LTL trucking?**

- How do you pay for advanced education?

- What's your least favorite part of pursing and advanced degree?

- Audience Questions