EMANUELE BOSSI

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EDUCATION

Embry-Riddle Aeronautical University Prescott, AZ
B.S., Data Science Expected May 2026
Minor: Mathematics
Undergraduate Research Scholar (Official Recognition)
GPA: 4.0/4.0

Embry-Riddle Aeronautical University Prescott, AZ
B.S., Software Engineering Expected May 2026
GPA: 4.0/4.0

RESEARCH EXPERIENCE

Purdue University West Lafayette, IN
Undergraduate Research Fellow May 2025 – Present

Sensor-Scheduling for Cognitive State Estimation During Automated Driving
Jain Research Lab, Department of Mechanical Engineering
Advisor: Neera Jain

- Developed an information-theoretic framework for assessing physiological features relevance in estimating cognitive states in a dynamic environment
- Integrated dynamical systems modeling with machine learning techniques to predict driver reliance behavior and adapt autonomy levels accordingly
- Designed and validated a novel sensor scheduling algorithm that optimizes information gain while minimizing driver distraction
- Submitted a manuscript to 2026 IFAC World Congress
- Undergraduate Research Fellowship recipient

Embry-Riddle Aeronautical University Prescott, AZ
Undergraduate Research Assistant, Undergraduate Research Institute August 2024 – Present

Entropic Framework for Complex Network Structure Recovery
Department of Mathematics
Advisor: Abd AlRahman Rasheed AlMomani

- Developing and implementing an entropic framework for reconstructing high-dimensional coupled dynamical systems
- Applying the methodology to meteorology, epidemiology, and aircraft subsystem anomaly detection, addressing data-scarce, noise-contaminated regimes

Motorized Travelling Salesman
Department of Mathematics

- Final Project of *Introduction to Optimization*
- Developed a hybrid combinatorial–optimal control framework for a motorized Traveling Salesman Problem, combining brute-force route optimization with minimum-time, dynamically feasible trajectory planning under bounded steering and acceleration using Pontryagin's Minimum Principle and multi-arc BVP solvers (bvp4c)
- Implemented GA-initialized BVPs with homotopy continuation to refine control regularization, achieving a lower final cost than the instructor's reference solution and reducing total traversal time from ~19.9 s to ~13.3 s, validating improved optimality and numerical robustness

Military Drone Detection Systems
Department of Electrical, Computer and Software Engineering
Advisor: Ahmed I Sulyman

- Capstone Project *Team Lead*
- Designing and developing an Aerial Warning System that uniquely solves the problem of detecting Group 1 and Group 2 drones deployed near Airfield
- Developing a distributed sensor network using passive detection systems and embedded machine learning to identify and track UAS targets in environments where conventional detection methods fail

Uncovering Direct Influence Networks of Takeoff Weight
Department of Mathematics
Advisor: Abd AlRahman Rasheed AlMomani

- Applied information-theoretic measures to identify and rank the most informative flight features for takeoff weight estimation, reducing dimensionality while preserving explanatory power
- Developed a principled feature selection framework combining entropy-based analysis with dimensionality reduction, improving interpretability and trustworthiness of aviation data analytics for safety and environmental applications
- Ranked in the top 25 out of 132 teams at the PRC Data Challenge organized by EUROCONTROL
- Accepted to present at 2026 AIAA SciTech Forum

PUBLICATIONS

For an updated list of publications, please visit: https://bossiemanuele.github.io/publications/.

- **Bossi, E.**, AlMomani, R. (2026). *Entropic Framework for Complex Network Structure Recovery*. (In preparation)
- **Bossi, E.**, Diggans, C. Tyler, AlMomani, R. (2025). *Boltzmann-Shannon Index: A Geometric-Aware Measure of Clustering Balance*. (Pre-Print Available; submitted to APL Machine Learning)

- **Bossi, E.**, Jeevanandam S., Jain, N. (2025). *A Sensor-Scheduling Approach to Predict Human Reliance on Automation During Automated Driving*. (Submitted to 2026 IFAC World Congress)
- **Bossi, E.**, AlMomani, R. (2025). *Uncovering Direct Influence Networks of Takeoff Weight: Network Science and Information Theoretic Approach*. In 2026 AIAA Science & Technology Forum. (Accepted)
- **Bossi, E.**, Ahmed, F. (2025). *Enhancing Sentiment Analysis with Feature Extraction and Dimensionality Reduction in Traditional Machine Learning Models*. In Intelligent Systems Conference (pp. 166-183). Cham: Springer Nature Switzerland.

PRESENTATIONS

- "*Uncovering Direct Influence Networks of Takeoff Weight: Network Science and Information Theoretic Approach*," AIAA SciTech 2026 Forum. Oral Presentation. Orlando, FL, January 2026.
- "The Future of AI in Engineering," ERAU AI Summit. Guest Speaker, Panel Session. Prescott, AZ, November 2025.
- "*Dimensionality Reduction: A Key to Optimizing Sentiment Analysis Models*," Intelligent Systems Conference (IntelliSys). Oral Presentation. Amsterdam, NL, August 2025.
- "*Don't Bother the Driver: Sensor-Scheduling for Cognitive State Estimation During Automated Driving*," Purdue University Summer Research Symposium. Oral Presentation. West Lafayette, IN, July 2025.
- "*Measuring Human Trust in Artificial Intelligence in Safety-Critical Systems*," Arizona Space Grant Symposium. Oral Presentation. Scottsdale, AZ, April 2025.
- "*AI-Driven Smart Agriculture for Climate Resilience*," Global Stage of Invent For The Planet 2025. Poster and Oral Presentation. College Station, TX, April 2025.
- "*Phishing in the Digital Age: Surveying Public Awareness and Leveraging AI for Defense*," National Conference on Undergraduate Research (NCUR). Oral Presentation. Pittsburgh, PA, April 2025.
- "*AI-Driven Optimization of the Actual Takeoff Weight (ATOW)*," Prescott Regional SciTech Fest. Poster Presentation. Prescott, AZ, March 2024.

PROFESSIONAL EXPERIENCE

True Course Simulations Prescott, AZ
Data Scientist Intern May 2024 – August 2024

- Developed machine learning models to optimize pilot training flight simulations, reducing data retrieval times by 70%
- Analyzed large datasets using Python and MySQL to extract actionable insights, improving decision-making efficiency
- Collaborated with cross-functional teams to design a predictive model for pilot aptitude, increasing program completion rates by 35%

Jointek Srl Somma Lombardo, IT
Data Scientist Intern May 2023 – August 2023

- Processed and analyzed historical sales and procurement data using SQL and Python, enhancing data retrieval efficiency by 30%

- Designed predictive analytics models for business operations, improving decision making
- Created visual reports and dashboards in MS Power BI, improving stakeholder engagement and seniority business awareness

TEACHING EXPERIENCE

Embry-Riddle Aeronautical University Prescott, AZ

Teaching Assistant, Operating Systems August 2025 - Present

- Developing a comprehensive course notebook to supplement lectures, guiding in-class activities, and grading programming assignments and exercises
- Prof. King

Teaching Assistant, Physics III for Engineers Laboratory August 2025 - Present

- Setting up experiments, reviewing course content, assisting students during lab sessions, and grading lab notebooks
- Prof. Gretarsson

Teaching Assistant, Software Engineering Practices January 2025 - Present

- Developing interactive quizzes to assess students' understanding of the course material, assisting students with the semester-long project and grading project's milestones
- Prof. King

Teaching Assistant, Machine Learning & Big Data Analysis August 2024 - Present

- Developing new 400-level machine learning course structure (lectures, quizzes, and exams), hosting review sessions, grading assignment and presenting material to 120 students across 4 sections
- Led the design and management of the course project, defining its structure, deliverables, evaluation criteria, and grading process to ensure clarity, rigor, and fairness
- Achieved the highest course rating in the college, which helped the instructor be recognized as "Teacher of the Year" by CBSI
- Prof. Warner

West Virginia University Institute of Technology Beckley, WV

Teaching Assistant, Computer Science January 2023 – July 2023

- Developed course material and taught middle school students Computer Science core concepts covering various topics such as problem solving, web developing and machine learning

HONORS & AWARDS

Aviation Week 20 Twenties Award Class of 2026	2026
Invent for the Planet 2025 – Engineering Challenge Global-Stage Finalist	2025
Department of Computer Science Outstanding Student Award	2023

GRANTS & FELLOWSHIPS

Embry-Riddle Undergraduate Research Institute Ignite Prize Award ($1,000)	2025-2026
Purdue University Summer Undergraduate Research Fellowship ($10,000)	2025
Embry-Riddle Undergraduate Research Institute Eagle Prize Award ($6,000)	2024-2025
Embry-Riddle CBSI Philanthropy Council Award ($8,900)	2023-2025
Embry-Riddle Soccer Athletic Grant ($60,000)	2023-2026
Embry-Riddle Transfer Scholarship Award ($30,000)	2023-2026

LEADERSHIP & OUTREACH

Embry-Riddle Aeronautical University Data Science Club Founder and President	2025-2026
Senior Capstone Project Team Lead	2025-2026
Embry-Riddle Aeronautical University Men's Soccer Varsity Vice-Captain	2025-2026
Undergraduate Research Team Leader	2024-2026

PROFESSIONAL AFFILIATIONS

Princeton Engineering - Pathways to Graduate School	2025 - Present
ISSNAF Mentoring Program for Students	2025 - Present
IEEE Eta Kappa Nu Honor Society	2025 - Present
Tau Beta Pi Engineering Honor Society	2024 - Present
Phi Kappa Phi Honor Society	2024 - Present
National Society of Leadership and Success Honor Society	2024 – Present