AERONEWS

COLLEGE OF ENGINEERING | DEPARTMENT OF AEROSPACE ENGINEERING

2025 - 2026 ISSUE

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#4 BEST UNDERGRADUATE AEROSPACE ENGINEERING SCHOOLS WITH PH.D.

U.S. News & World Report, 2026

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Message From the Chair

Embry-Riddle's Aerospace Engineering (AE) Department continues its strong upward trajectory, marked by exceptional achievements across our academic programs, research enterprise and student accomplishments. As I complete my first year as chair, I am grateful for the dedication and excellence demonstrated by our faculty, students and staff. Their collective efforts continue to reinforce our department's standing as a national leader in aerospace engineering education and research.

In 2026, our undergraduate Aerospace Engineering program was ranked #4 nationally by "U.S. News & World Report," marking yet another year in which we have placed among the very top programs in the country. This sustained excellence reflects the strength of our curriculum, the quality of our students and the commitment of our faculty. Our graduate programs remain strong as well, with continued growth in both master's and doctoral enrollments and an increasingly vibrant research portfolio.

Our students continue to excel at the highest levels. This year, Aerospace Engineering accelerated M.S. student Daniella Bezuidenhout was named to the Aviation Week 20 Twenties, adding to Embry-Riddle's tradition of producing nationally recognized young leaders in the aerospace field. In competition settings, our students achieved first place in the AIAA SciTech 2026 Capture the Satellite Challenge, under the guidance of faculty advisors Drs. Cagri Kilic, Di Wu and Hao Peng. Their accomplishment showcases not only technical expertise but also teamwork, creativity and problem solving at the frontiers of aerospace technology.

Faculty research productivity remains robust, spanning areas of national priority such as autonomy, space systems, aerospace materials and flight sciences. Several major new awards this year highlight the breadth and impact of our research:

- **DOE ARPA-E:** 4D Printing of Multifunctional Structural Batteries for Aerospace Applications
  PI: DR. SAMAN FARHANGDOUST ($500K)
- **NIH Award: Bone Age Determination for the 21st Century:** Using AI to Broaden and Diversify a 60-Year-Old Gold Standard and Overcome Reader Bias
  PI: DR. ANOUCK GIRARD (EMBRY-RIDDLE SHARE: $1.05M)
- **AFOSR DURIP:** High-Speed X-Ray Imaging for Shock/Droplet Interactions and Cavitation Studies
  PI: DR. SURABHI SINGH AND COLLEAGUES ($449,994)
- **NASA SBIR Phase II: RIDDANCE:** Removal of Irregular Debris using Double Assisted Nets with Controlled Enhancement
  PI: DR. DAEWON KIM (EMBRY-RIDDLE SHARE: $408,494)
- **DARPA CIDAR Challenge Grant:** Eagle-PI: Machine Learning-Driven Passive Range Estimation Enhancement
  PI: DR. HEVER MONCAYO ($200K)
- **NSF ERI:** Advancing Design of Chaotic Systems with Higher-Dimensional Analysis and Human-in-the-Loop Reinforced Learning
  PI: DR. DAVID CANALES GARCIA ($200K)

These accomplishments reflect the growing national visibility of our department as well as our strength in emerging research areas. This year's feature articles on AI-enabled aerospace systems and advances in hypersonics highlight two of our signature areas — fields in which our faculty and students are making important contributions and shaping the future of aerospace research.

We also acknowledge and celebrate the careers of three distinguished faculty members who retired this year: Dr. John Ekaterinaris, Prof. Glenn Greiner and Dr. J. Gordon Leishman. Their decades of scholarship, mentorship and service have left a lasting legacy on our department and on generations of aerospace engineers.

As we look ahead, we remain committed to fostering an environment characterized by excellence, innovation and student-centered leadership. I invite you to explore this edition of AeroNews, which shares many of the accomplishments and stories that make our department a vibrant and impactful community.

Warm regards,

Anouck R. Girard

Anouck Girard, Ph.D.
Professor and Chair
Department of Aerospace Engineering

RESEARCH NEWS

ADVANCING THE FUTURE OF AEROSPACE: AI, AUTONOMY AND INTELLIGENT SYSTEMS

VODCA Lab: Physics-Informed Learning for Safe Spacecraft Autonomy

Drs. Anouck Girard (Embry-Riddle) and Ilya Kolmanovsky (University of Michigan)

The Vehicle Optimization, Dynamics, Control and Autonomy (VODCA) Lab develops learning-based approaches for safe and autonomous spacecraft operations in uncertain environments. Their research reduces onboard computational burden while maintaining physical consistency — a key requirement for real-time autonomy.

One major contribution is the temporal Hamiltonian Neural Network, which learns unknown dynamical systems while preserving physical invariants such as energy. This structure improves state estimation accuracy when paired with adaptive Kalman filtering.

The lab also develops Constraint-Informed Neural Networks (CINNs) that integrate advanced neural architectures with constraint enforcement mechanisms to ensure safety and computational efficiency. These methods have been validated in spacecraft state estimation and rendezvous problems on elliptic orbits.

SRGE Lab: AI for Space Robotics and Lunar Operations

Dr. Cagri Kilic

The Space Robotics and Generative Estimation (SRGE) Lab applies AI and machine learning to robotics and space systems. The lab's research connects perception, estimation and control for autonomous robotic platforms operating in complex environments.

Current projects include machine learning for robotic state estimation, reinforcement learning for locomotion and interaction and AI-assisted space weather monitoring using solar imagery.

Through a NASA Florida Space Grant Consortium project, the lab also develops AI-based methods for lunar terrain characterization and mobility planning. These efforts focus on improving localization, mapping and hazard detection under uncertain surface conditions, supporting future lunar exploration missions.

XDLab: Agentic AI and Simulation-Driven Space Operation, System and Economy

Dr. Di Wu

The XDLab group is developing a foundational agentic AI framework for space systems, integrating reinforcement learning, numerical methods and large language models within physics-consistent dynamics. Foundation models serve as high-level reasoning components operating over validated numerical artifacts, emphasizing adaptability and explainability.

The lab also advances a simulation-driven debris governance framework that integrates space situational awareness data with physics-based debris modeling. By incorporating structured policy iteration supported by large language models, this work enables quantitative assessment of mitigation strategies and their long-term environmental impact on uncertain surface conditions, supporting future exploration missions.

Asteroid Dynamics and Low-Thrust Deflection Modeling

Dr. Francisco Crespo Cutillas

This research develops stable Hamiltonian models to describe asteroid dynamics and evaluate low-thrust deflection strategies. Machine learning is used to construct efficient dynamical representations from high-fidelity gravitational simulations.

By abstracting complex gravitational behavior into computationally efficient models, this work supports feasibility analysis for planetary defense missions.

Space Technologies Laboratory

Dr. Troy Henderson

Research in the Space Technologies Laboratory advances AI-driven autonomy for space missions, spanning both trajectory design and navigation. One effort develops reinforcement learning algorithms for low-thrust spacecraft guidance under deterministic and stochastic dynamics, enabling adaptive orbit transfers, inclination changes and asteroid rendezvous while reducing reliance on the Deep Space Network. Another effort focuses on autonomous landing navigation for lunar and Martian missions, combining IMU measurements, Kalman filtering and LSTM networks to estimate spacecraft heading in GPS-denied or disturbed environments, improving landing safety and robustness and supporting the transition from ground-monitored operations to fully autonomous deep-space navigation.

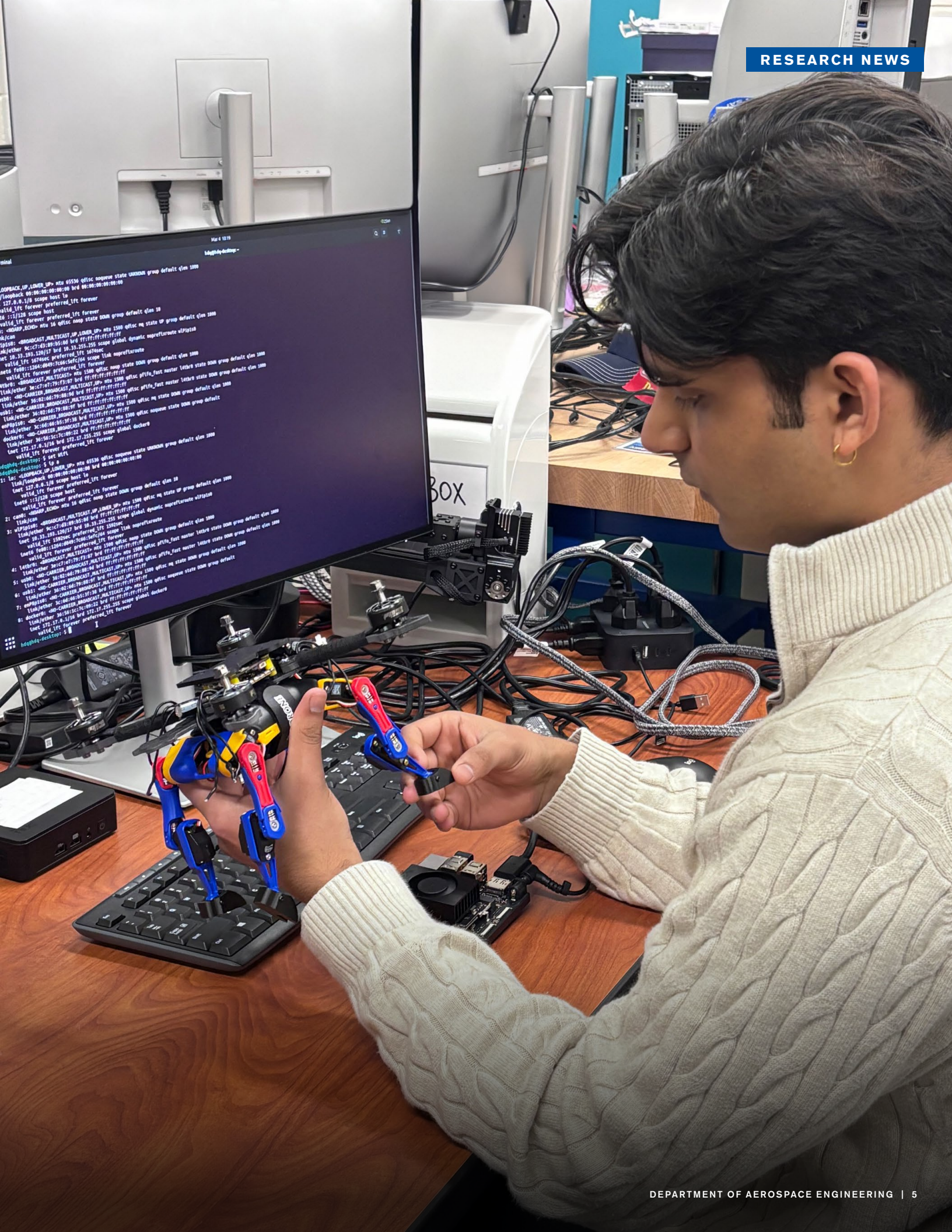
STAR Group: Machine Learning for Cislunar Dynamics and Rendezvous Safety

Dr. David Canales Garcia

The STAR Group applies machine learning to challenges in cislunar mission design.

One line of research analyzes chaotic trajectories in the Earth–Moon system. By leveraging dynamical systems tools and training ML models to extrapolate complex behavior efficiently, the team reduces computational cost while enabling large-scale prediction of trajectory stability.

Another effort integrates neural-network-based Control Lyapunov–Barrier Functions to manage uncertainty while jointly enforcing stability and safety. The group also investigates LiDAR-based navigation using machine learning to process 3D point clouds for pose estimation, supporting autonomous docking and in-orbit operations.



Reinforcement Learning and Immersive Aerospace Education

Drs. Hao Peng, David Canales Garcia and Morad Nazari

Recent contributions include reinforcement learning-based spacecraft attitude estimation and collaborative research on extended reality and AI-enhanced interactive learning environments for aerospace education. These efforts explore how intelligent systems can improve both spacecraft autonomy and engineering education.

CFAL: Physics-Informed Machine Learning for Fluid Dynamics and Aerodynamics

Dr. Michael Kinzel

The Computational Fluids and Aerodynamics Laboratory (CFAL) applies machine learning to advance modeling and prediction in complex fluid systems. A primary research focus is the use of Physics-Informed Neural Networks (PINNs) to model atmospheric boundary layers, where sparse measurements and high uncertainty traditionally limit predictive accuracy.

By embedding governing physical laws directly into neural network training, PINNs maintain physical consistency while improving predictive capability. CFAL integrates these approaches with classical potential flow methods and modern computational fluid dynamics (CFD), creating hybrid modeling frameworks that enhance both efficiency and fidelity.

These tools support a range of aerospace applications, including atmospheric energy harvesting for long-endurance uncrewed aerial systems.

A second research thrust involves developing surrogate aerodynamic load models using Gaussian process regression and neural networks. These models replace traditional lookup tables with function-based representations derived from high-fidelity CFD datasets. While they require an initial investment in CFD computation, they significantly improve flexibility, efficiency and uncertainty quantification in engineering analysis.

CFAL is expanding this work through collaboration with the University of Southampton to reduce CFD dependence and enable more cost-effective aerodynamic modeling workflows.

Machine Learning for Atmospheric Re-Entry Optimization

Drs. Riccardo Bevilacqua and Emanuela Gaglio

Atmospheric re-entry presents complex aerodynamic and thermal challenges that demand rapid and robust design methods. Drs. Bevilacqua and Gaglio apply machine learning to develop optimal control profiles for targeted re-entry trajectories.

These learning-based approaches identify control strategies that simplify downstream vehicle design, particularly in areas related to guidance, control and aerothermal load management.

In collaboration with CFAL, the team is integrating improved aerodynamic models derived from CFD-informed machine learning methods, advancing both performance and computational efficiency in re-entry system design.

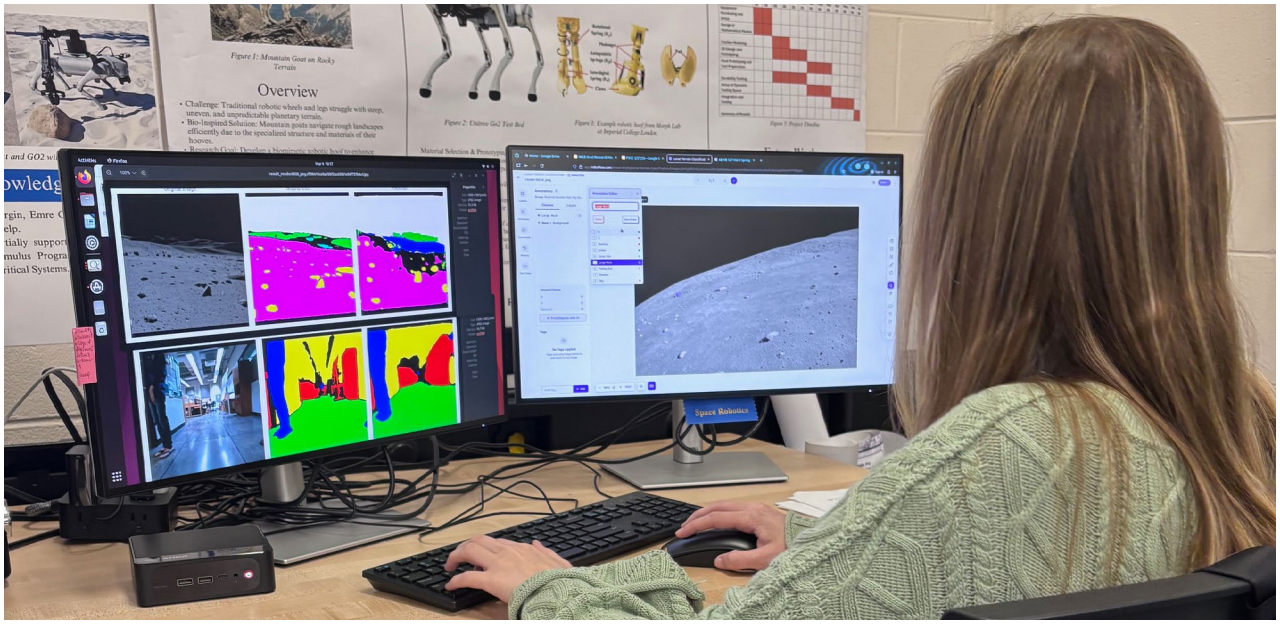
Experimental Aerodynamics and Data-Driven Flow Reconstruction

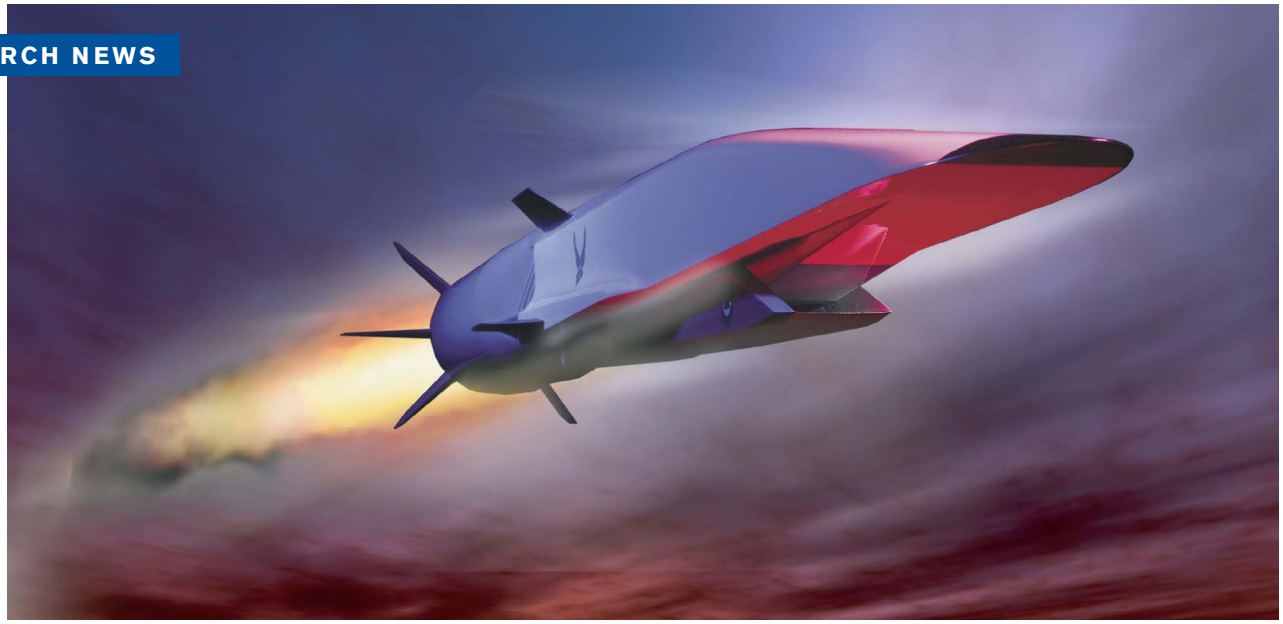
Dr. Ebenezer Gnanamanickam

The Experimental Aerodynamics Group, which operates the wind tunnel facility in MicaPlex, applies machine learning techniques based on Proper Orthogonal Decomposition (POD) to enhance aerodynamic measurement capabilities.

Current research focuses on characterizing airflow behind naval vessels to better understand unsteady wind conditions that affect helicopter takeoff and landing operations. While modern experiments provide high-resolution flow data, practical constraints in instrumentation and facility configuration can limit measurable velocity components.

Using POD-based machine learning methods, the team reconstructs difficult-to-measure flow quantities from available experimental data. Recent work published in Experiments in Fluids demonstrates how these techniques expand the functional capability of the wind tunnel, enabling more comprehensive ship-airwake analysis and broader aerodynamic investigations.





Embry-Riddle Goes Hypersonic with Two New Facilities

Drs. Luke Hill, Andrew Bustard and Eric Matlis

With funding made possible by the state of Florida, three Aerospace Engineering faculty members are advancing groundbreaking work in hypersonics through the development of two new state-of-the-art facilities for testing and research. Drs. Luke Hill, Andrew Bustard and Eric Matlis are leading the university's hypersonics research and facility development efforts.

The first facility, a 3,000-square-foot expansion of the university's Low-Speed Wind Tunnel Annex, is slated for groundbreaking in summer 2026 at the Research Park on Embry-Riddle's Daytona Beach Campus. The new space will house a world-class, high-enthalpy, free-piston reflected-shock tunnel designed for aerothermal research under conditions relevant to re-entry and high-Mach-number hypersonic flight. When completed, it will be only the second university-based facility of its kind in the United States (the other is at Caltech in Pasadena, California) and one of just three nationwide.

The second facility, scheduled to begin construction in summer 2027, is a new 55,000-square-foot building that will accommodate additional wind tunnels and supporting hardware, including a Mach 6 Ludwieg-tube tunnel intended for aerodynamic testing and workforce development.

To support the design of these facilities, the Aerospace Engineering faculty members are consulting with leading global experts in high-speed aerothermal tunnels. The team recently visited Caltech to meet with faculty operating the T5 shock tunnel and will travel to Oxford, England, to study a T6 tunnel, as well as to Germany's Aerospace Center in Göttingen, where several advanced high-speed facilities operate. Future visits include Sandia National Laboratories in Albuquerque, New Mexico, to observe its reflected shock tube and tunnel systems.

Once operational, Embry-Riddle's new facilities will enable investigations of complex, unsteady and high-temperature phenomena in supersonic and hypersonic flows, including real-gas effects at temperatures approaching 10,000 Kelvin and Mach numbers between 5 and 20. The research aims to advance the understanding of nonthermal-equilibrium effects on laminar–turbulent transition, shock–boundary-layer interactions and combustion processes in shock-heated flows.

The researchers will generate high-quality datasets to validate numerical methods, improve CFD fidelity and refine high-temperature flow models essential to the design of high-speed vehicles. Together, these laboratories will provide cutting-edge university capabilities in high-enthalpy flow physics.

Dr. Mark Ricklick, Dr. Seetha Raghavan and Dr. William Engblom

Embry-Riddle Participates in UCAH

Drs. Mark Ricklick, Seetha Raghavan and William Engblom

Embry-Riddle is also leading a three-year collaborative effort with Argonne National Laboratory (ANL) in Illinois and Lockheed Martin to develop a novel, low-cost device for long-duration hypersonic materials testing. The project is funded by the Joint Hypersonics Transition Office through the University Consortium of Applied Hypersonics (UCAH) and is led by Aerospace Engineering faculty members Drs. William Engblom (PI), Mark Ricklick (co-PI) and Seetha Raghavan (co-PI). The team aims to replicate hypersonic flight conditions — up to Mach 7 — within the device and to use X-ray diagnostics at ANL to capture data on materials degradation. These insights will help identify more affordable materials capable of withstanding extreme hypersonic environments, supporting the development of lower-cost hypersonic systems.

In September of last year, the Aerospace Engineering team presented a status report at the UCAH Fall Forum. At the event, the team's project poster earned the top vote among more than 30 entries from leading hypersonics programs.

At Embry-Riddle, we are not just studying hypersonics — we are helping define its future. By giving our students access to emerging technologies and real-world applications, we are preparing the next generation of innovators.

Anouck Girard, Ph.D.
Professor and Chair
Department of Aerospace Engineering

Honoring A Legacy of Service, Scholarship and Student Impact

The Department of Aerospace Engineering proudly recognizes the retirement of three distinguished faculty members whose careers have helped shape Embry-Riddle Aeronautical University.

Professor Glenn Greiner

Professor Glenn Greiner earned his B.S. (with Honors) and M.S. degrees from Embry-Riddle's Aerospace Engineering Department in 1981 and 1990. He began as an instructor from 1982 to 1994, worked in the Flight Dynamics and Control Division at NASA Langley Research Center and returned in 1998 as an adjunct before joining full time in 2010. As undergraduate program coordinator from 2012 to 2022, he oversaw 64% enrollment growth, from 1,204 to 1,974 students, while strengthening student quality and national reputation.

Greiner served on numerous committees and led the Certificate in Airworthiness Engineering program for Northrop Grumman engineers, earning national recognition from the National Engineers Council and the Distinguished Engineering Project Achievement Award during Engineers Week 2017. He received the Aerospace Engineering Outstanding Teacher Award in 2015 and the inaugural Aerospace Engineering Outstanding Service Award in 2022.

Dr. John Ekaterinaris

Dr. John Ekaterinaris earned his Ph.D. from the Georgia Institute of Technology in 1987. Before joining Embry-Riddle in 2012 as a Distinguished Professor, he served at NASA Ames Research Center, worked in industry and held a professorship in Greece.

An internationally recognized expert in computational fluid dynamics, he has been ranked in Elsevier's top 2% of researchers for career scholarly impact. He mentored numerous graduate students and served as Editor-in-Chief of "Aerospace Science and Technology," overseeing thousands of manuscript submissions annually.

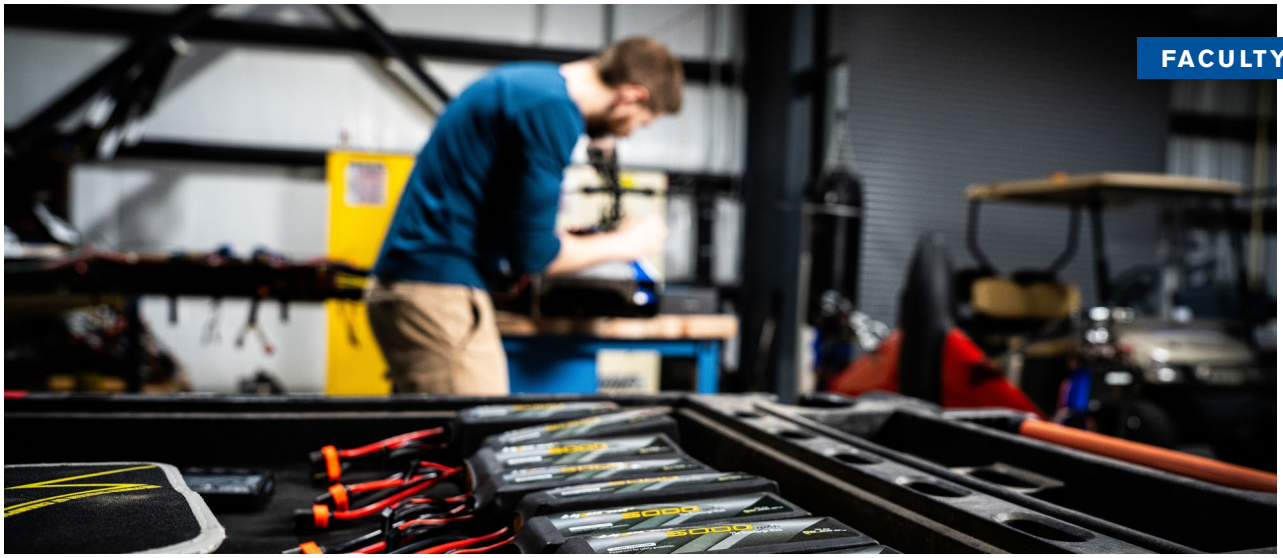
During his tenure, he taught undergraduate and graduate aerodynamics courses, including Compressible Flow, Turbulent Flow and Advanced Compressible Flow.

Dr. J. Gordon Leishman

Dr. J. Gordon Leishman holds a D.Sc.(Eng), Ph.D. and First Class Honors B.Sc. from the University of Glasgow. After serving as a senior aerodynamicist at Westland Helicopters and later as Minta Martin Professor at the University of Maryland, he joined Embry-Riddle as a Distinguished Professor in 2014.

An internationally recognized authority in rotorcraft and wind turbine aerodynamics, he has authored more than 200 technical papers, advised 17 Ph.D. and 60 M.S. students and has consistently ranked in Elsevier's top 2% of researchers, including 33rd worldwide in aerospace engineering in October 2025.

During his tenure, he taught advanced aerodynamics courses, authored three influential books including "Principles of Rotorcraft Aerodynamics" and "Introduction to Aerospace Flight Vehicles." He founded the AIAA Design/Build/Fly team, guiding them to a first-place finish in 2024 and four consecutive top-three placements.



Building the Future of Experimental Flight

Dr. Kyle Collins and Kati Callahan

The Center for Advanced Air Mobility (CAAM) at Embry-Riddle continues to support a strong mix of externally and internally funded projects centered on experimental flight testing, advanced uncrewed systems and certification-focused research. Across these efforts, student and faculty teams are moving from development into meaningful flight validation while staying aligned with sponsor goals.

One major effort is CAAM's role in DARPA's ALBATROSS program, in collaboration with Mississippi State University. The broader goal of the program is to reduce the energy required for electrically powered glider-type uncrewed aircraft by leveraging natural lift sources such as thermals, ridge lift and dynamic soaring. CAAM's responsibility is developmental flight testing, including evaluation of onboard sensors that detect water and ground surfaces. The team has integrated LiDAR and infrared cameras onto an RC glider platform and is preparing for over-water data collection.

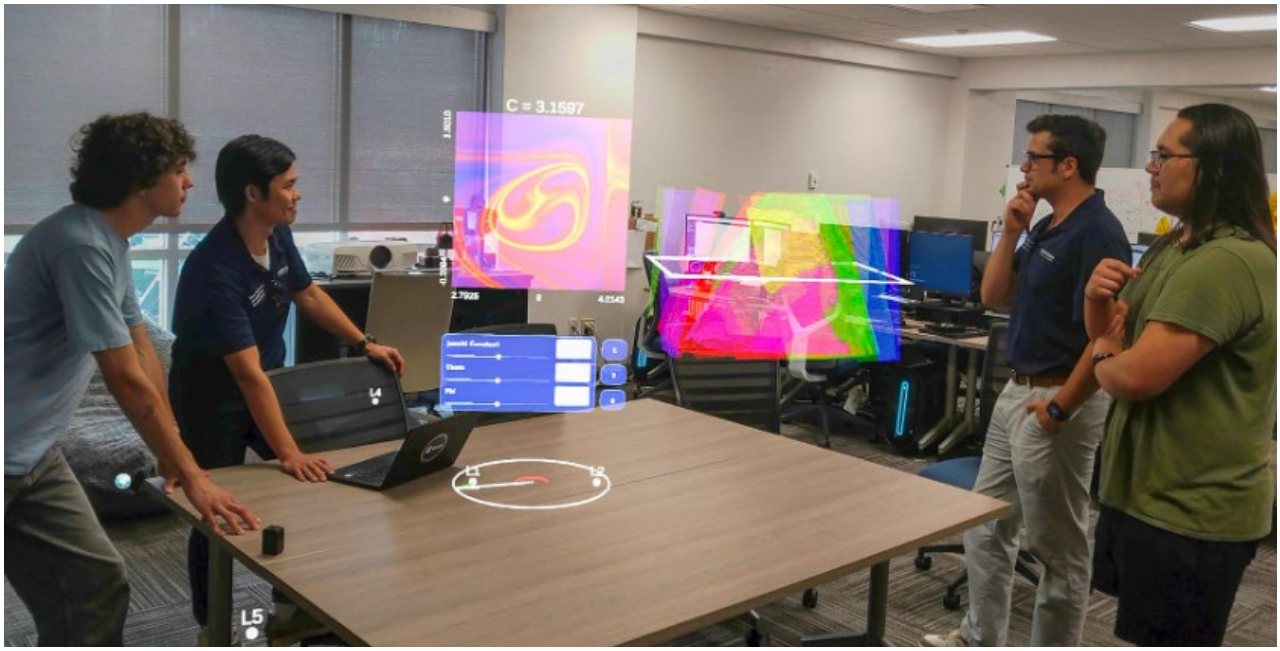
The Wayfarer project has entered a focused flight-test phase using an experimental Cessna 182. Current work centers on structured flight maneuvers to improve aircraft modeling and system calibration. The goal is to build high-quality flight data that supports ongoing research and future modifications.

Several internally funded projects are also progressing into flight experimentation. A project investigating a tail-sitter concept with unique propeller controls has completed fabrication of a dual-motor VTOL aircraft and has begun hover testing while refining flight controls.

In advanced air mobility and autonomous systems research, CAAM teams have developed and validated a vision-based aircraft detection and tracking system for uncrewed platforms. Work now focuses on improving reliability by integrating optical and LiDAR sensing in lightweight onboard systems.

On the certification side, the PSTLE project at the Prescott Campus is advancing installation of air data probe systems across a fleet of Cessna 172 aircraft. After consultation with FAA representatives, the team shifted from pursuing a Supplemental Type Certificate to a field approval pathway to reduce cost and timeline. The first aircraft has been instrumented and is moving through inspection.

Collectively, these initiatives reinforce CAAM's role as a hands-on flight research hub where students gain real-world testing experience while advancing practical solutions in uncrewed systems, advanced air mobility and applied aeronautics research.



Funding the Future

Through competitive research funding and industry partnerships, Embry-Riddle's Department of Aerospace Engineering is driving breakthroughs in aerospace systems, advanced air mobility, autonomy and space technologies.

- **DOE ARPA-E: Dr. Saman Farhangdoust ($500K)**

  Dr. Saman Farhangdoust has been awarded a $500,000 grant from the U.S. Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) to develop innovative structural battery technology for electric aircraft. Farhangdoust's research addresses one of the most significant challenges in advanced air mobility: energy storage. Current battery technologies limit the range and efficiency of electric aircraft, including emerging platforms such as electric vertical takeoff and landing (eVTOL) vehicles and air taxis. His work proposes a transformative solution by integrating energy storage directly into aircraft structures, such as wing ribs, creating multifunctional components that both bear loads and store energy. This approach introduces a new class of smart multifunctional structural battery systems designed to improve system-level energy capacity. The project also incorporates advanced 4D printing techniques, enabling materials to adapt to environmental conditions such as pressure, further enhancing safety and performance.

- **NIH Award: Bone Age Determination for the 21st Century: Dr. Anouck Girard (Embry-Riddle Share: $1.05M)**

  Adequate growth is a crucial health indicator in children; however, one of the biggest challenges in assessing its adequacy is the wide subject-to-subject variability in growth trajectories. The estimation of the bone age (BA) with a radiological image of the left hand and wrist describes the degree of maturation of a child's skeleton. For the past 60 years, the assessment of a child's BA has been the result of a visual match with one of the standards compiled in the Greulich and Pyle (G&P) Atlas (1959), a gold standard clinical practice that provides a set of radiographic data sampled from children at different ages. This clinical tool has several limitations that affect the accuracy of the BA assessment. Over the last century, the U.S. population has been reshaped by a larger number of children of international ancestry and the nutritional environment has fostered an obesity epidemic with a profound impact on children's growth and rate of physical maturation. A reliance on subjective evaluation, large standard deviations for each standard and the significant variability between clinicians' assessment of BAs make the G&P Atlas-based interpretation susceptible to poor prediction performance and a good candidate for AI-assisted reading. The project is a collaboration with a clinical team at the University of Michigan. Embry-Riddle will devise an AI-assisted BA determination system that will refine the G&P precision by narrowing intervals between standards and overcoming reader biases.

- **NASA SBIR Phase II: RIDDANCE: Dr. Daewon Kim (Embry-Riddle Share: $408,494)**

  The NASA SBIR Phase II RIDDANCE project is developing a promising solution to the growing challenge of orbital debris. At its core is a dual-net capture system designed to autonomously approach, slow, stabilize and securely contain irregular and tumbling debris before guiding it to controlled deorbit. The process works in two stages: the first net reduces the debris' motion to make it more manageable, while the second net provides secure containment. The system is designed to be scalable, cost-effective and largely autonomous, allowing it to handle debris of different sizes with minimal human involvement while reducing the risk of in-orbit collisions. Overall, RIDDANCE represents an important step toward more sustainable space operations and a cleaner, safer orbital environment for future missions.

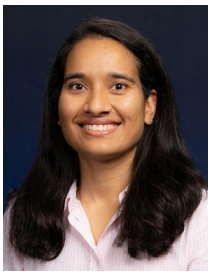
- **DARPA CIDAR Challenge Grant: Dr. Hever Moncayo ($200K)**

  Eagle-Passive Imaging (Eagle-PI) is an innovative framework developed for the Computational Imaging Detection and Ranging (CIDAR) Challenge by the Advanced Dynamics and Control Laboratory at Embry-Riddle Aeronautical University. The CIDAR Challenge was created by the Defense Advanced Research Projects Agency (DARPA) and is organized in three stages: White Paper Competition, Semifinal and Final. Through this initiative, the agency seeks to advance machine learning, computer vision and artificial intelligence solutions for long-range passive detection and ranging in tactical and civil applications, with the goal of achieving high-accuracy, low-latency distance measurements that match or exceed the performance of today's active range measurement systems. Eagle-PI, under the direction of faculty member Dr. Hever Moncayo and the leadership of Ph.D. candidate Gabriela Gavilanez, earned a $200,000 award in the White Paper Competition as one of the top five university- and small-business-led groups selected for initial funding. It later received an additional $50,000 in the semifinal stage after ranking among the nation's top performers in ranging accuracy.

- **NSF ERI: Dr. David Canales Garcia ($200K)**

  This NSF Engineering Research Initiation (ERI) project establishes a new framework for analyzing and designing chaotic engineering systems by combining higher-dimensional modeling, knot theory and human-in-the-loop reinforcement learning. Addressing challenges in domains such as space mission trajectory design, where small uncertainties can lead to dramatically different outcomes, the work moves beyond traditional low-dimensional simplifications to reveal the true structure of complex dynamics. By leveraging topological representations and immersive visualization tools, including augmented reality, the project enables engineers to identify stability boundaries, uncover previously inaccessible design solutions and make more informed decisions in uncertain environments. A key innovation is the integration of symbolic insights from chaos theory into adaptive learning systems as well as improving decision efficiency, interpretability and design quality. Beyond its technical contributions, the project also emphasizes STEM engagement through K–12 curriculum development and interactive learning experiences, broadening access to advanced concepts in dynamical systems and engineering design.

New Faculty



Dr. Surabhi Bhadauria
Assistant Professor

Dr. Surabhi Bhadauria earned her Ph.D. and M.S. degrees in Aeronautics and Astronautics from Purdue University and a B.S. in Materials and Metallurgical Engineering from Punjab Engineering College in India. Her research focuses on astrodynamics and space situational awareness, with an emphasis on cislunar space surveillance, sensor network strategies for detecting and tracking space objects as well as supporting safe and sustainable space operations.

Dr. Andrew Bustard
Assistant Professor

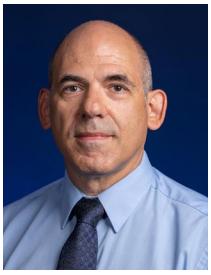
Dr. Andrew Bustard earned his Ph.D. in Aerospace Engineering from the University of Notre Dame in 2025. His research focuses on extending the operational capabilities of supersonic-combustion ramjets, with the goal of enabling ultra-fast global flight. He employs advanced surface measurement techniques, including pressure-sensitive paint and infrared thermography, which provide significantly higher spatial resolution than conventional measurement methods. His additional research interests include boundary-layer transition, hypersonic facility development and flow control.

Dr. Francisco Crespo Cutillas
Associate Professor

Dr. Francisco Crespo Cutillas' research integrates geometric and dynamical systems methods with applications in spacecraft trajectory design, orbital dynamics and celestial mechanics. His work emphasizes analytical and computational approaches to mission design, including spin–orbit modeling near small bodies. He has teaching experience in dynamical systems, orbital and attitude mechanics as well as applied mathematics. Prior to joining Embry-Riddle, he served as an associate professor in Chile and held research appointments at the University of Colorado Boulder and the Sydney Mathematical Research Institute.

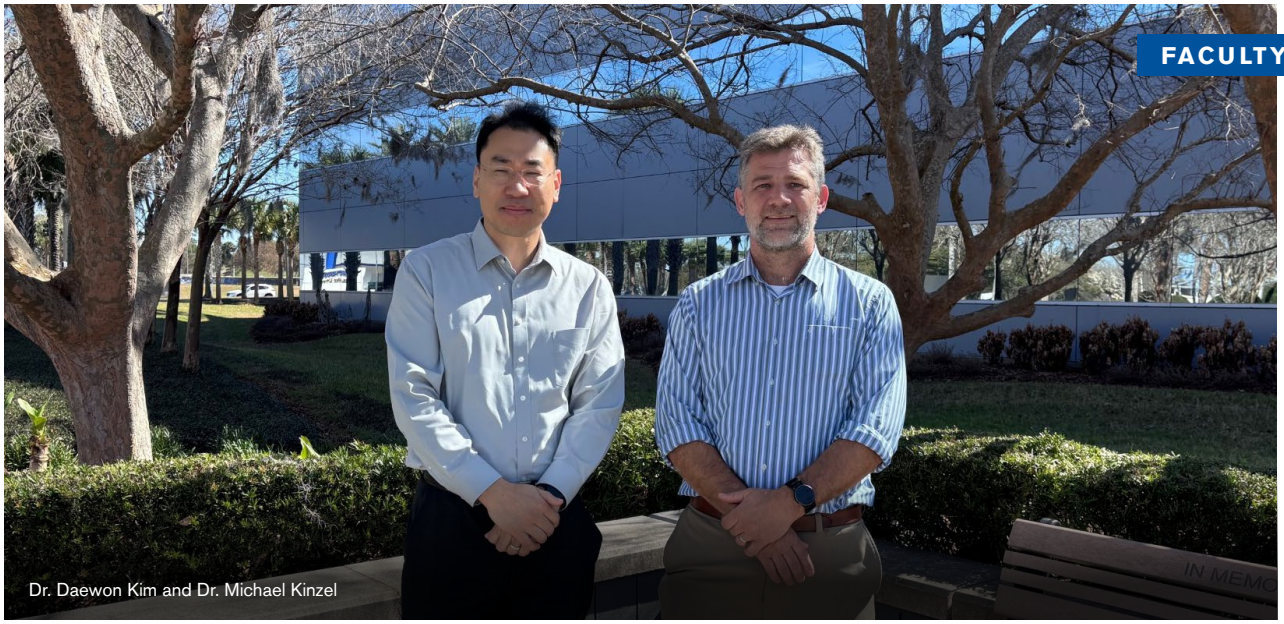
Dr. Alton Hutchinson
Assistant Professor

Dr. Alton Hutchinson earned his Ph.D. from Texas A&M University in December 2024. He joined Embry-Riddle Aeronautical University as a Visiting Assistant Professor in 2025 and now serves as an Assistant Professor in the Department of Aerospace Engineering. His research interests include sonic boom propagation and mitigation, high-speed aerodynamics, gas dynamics and numerical simulations. He has authored more than 50 publications and received 20 international awards.



Dr. Eric Matlis
Associate Professor

Dr. Matlis earned his Ph.D. from the University of Notre Dame in 2004. Before joining Embry-Riddle, he served as an associate research professor at the University of Notre Dame. His research interests include boundary-layer stability over a broad range of Mach numbers, flow-control, sensor development, acoustics of rotor systems and aerothermal research at high enthalpy hypersonic conditions. He has also developed novel methods in the utilization of non-equilibrium cold plasmas for sensing, wavefront aberration control and as a reconfigurable left-handed metamaterial. Matlis contributed to the development of the Notre Dame Quiet Mach 10 tunnel and is assisting in the development of a new hypersonic laboratory at Embry-Riddle. Matlis is an associate fellow of AIAA and has earned 5 patents.


Dr. Daewon Kim and Dr. Michael Kinzel

Faculty Honored for Exceptional Achievements

In recognition of their groundbreaking contributions and exceptional service, several faculty members have been honored with prestigious accolades. These achievements underscore the university's commitment to innovation and excellence in research and aerospace engineering:

- **Eagle Honored for Advancing Aeroacoustics Research:** **Dr. Anastasios Lyrintzis** was the 2025 recipient of the AIAA Aeroacoustics Award, an honor that recognizes seminal contributions to aircraft noise reduction. Lyrintzis was celebrated for pioneering numerical methods, including surface integral techniques that extend computational fluid dynamics results into far-field aeroacoustic analysis. His work has been recognized for significantly advancing research on noise mechanisms and mitigation. This award underscores the impact Lyrintzis has had on both education and aerospace research throughout his career.
- **Embry-Riddle Daytona Beach Campus Faculty Named AIAA Associate Fellows for Excellence in Aerospace:** **Dr. Daewon Kim** and **Dr. Michael Kinzel** were recognized for their outstanding contributions to aerospace engineering by being named to the 2026 AIAA Class of Associate Fellows. Kim earned his selection for his transformative work in future manufacturing technologies, adaptive structures and intelligent space systems, as well as his mentorship of emerging aerospace researchers. Kinzel was recognized for advancing research in high-fidelity modeling of fluid dynamics, aerodynamics and atmospheric phenomena. He has also made many contributions to computational tools, turbulence, multiphase flows and hypersonics. As AIAA Associate Fellows, they are recognized for their technical leadership and the impact their research has on the aerospace community.
- **Embry-Riddle Aeronautical University (AE) Faculty Earn 2025 Embry-Riddle Research and Innovation Awards:** **Dr. Yizhou Jiang** was among the nine Embry-Riddle faculty members who were recipients of the 2025 Embry-Riddle Research and Innovation Awards. Jiang earned the prestigious Innovation Award for disclosing multiple aerospace-relevant inventions, including advanced manufacturing techniques using lunar and Martian materials. He also worked on new wearable energy systems and filed a new patent. This recognition highlights the innovative work emerging from the Aerospace Engineering department thanks to professors like Jiang.


Dr. Anastasios Lyrintzis

AIAA Design/Build/Fly: Engineering Aircraft from Concept to Competition

Advised by Prof. Kimberly Heinzer and Dr. Ebenezer Gnanamanickam

The AIAA Design/Build/Fly team at Embry-Riddle Aeronautical University provides students with a comprehensive, hands-on experience in aircraft development. Since 2014, the Daytona Beach team has earned multiple top-three finishes and a first-place overall win in 2024 against international competition. More than 100 students participate each year, managing design, manufacturing, testing, research and development and supply chain coordination. The team produces three aircraft iterations annually while navigating formal design reviews and strict timelines. This year's mission centers on a multi-mission aircraft integrating passenger, cargo and banner-towing configurations. Through iterative testing and system optimization, the competition prepares students for real-world aerospace engineering challenges.

ERORA: Building the Foundation for Embry-Riddle's Future in Orbit

Advised by Drs. Francisco Crespo Cutillas, College of Engineering and Sean Crouse, College of Aviation

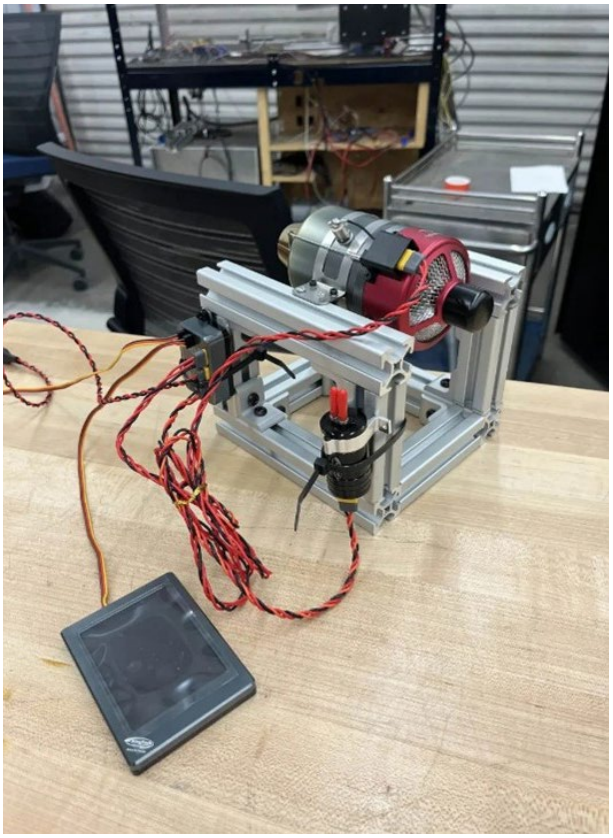
The Embry-Riddle Orbital Research Association (ERORA) is advancing student-led space systems development through the design and deployment of experimental satellites. Beginning with the Radiation Orbital Shielding Investigation Satellite, the team focuses on satellite architecture, manufacturing, integration and mission operations, providing hands-on experience in end-to-end spacecraft development.

Students collaborate across disciplines to build technical expertise in systems engineering, communications, power systems and orbital analysis. By emphasizing real mission workflows and operational readiness, ERORA equips members with industry-relevant experience. With long-term ambitions extending to lunar and Martian applications, ERORA is building the foundation for Embry-Riddle's future research presence in orbit.

Experimental Jet Engine Performance: Advancing Student-Led Propulsion Research

Advised by Dr. Mark Ricklick

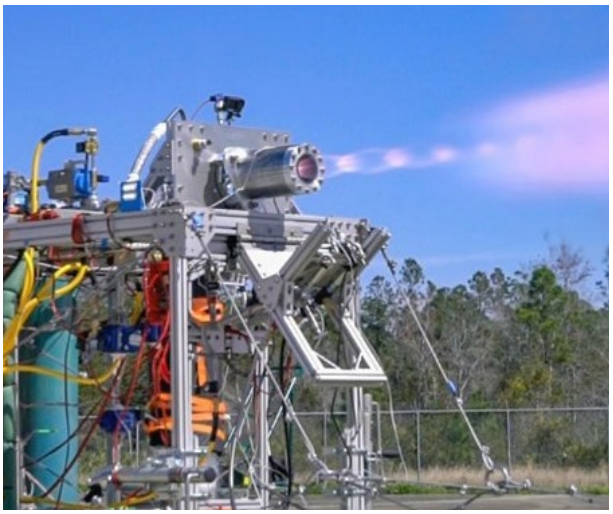
The Experimental Jet Engine Performance (XJEP) team designs, builds and tests jet engine components while collecting high-fidelity propulsion data in-house. Current projects span multiple experience levels, from foundational test cell fabrication to advanced turboshaft engine development. The recuperator project benchmarks KingTech engine performance before system integration. A modular afterburner platform evaluates flameholders, diffusers, fuel injectors and variable nozzles based on thrust and fuel efficiency metrics. Project Aether focuses on the design and assembly of a custom turboshaft engine, with cycle analysis complete and component manufacturing underway. Through experimental validation and system-level integration, XJEP equips students with applied experience in gas turbine engineering.



Experimental Rocket Propulsion Lab: Pushing the Limits of Liquid Engine Performance

Advised by Dr. Rick Perrell

The Experimental Rocket Propulsion Lab (ERPL) at Embry-Riddle Aeronautical University is advancing high-performance liquid propulsion through ambitious student-led development. After transitioning from hybrid to liquid bi-propellant systems, the team conducted a record-setting hot-fire of “Moe,” producing 2,250 pounds of thrust, the most powerful engine fired on the Daytona Beach Campus. Building on intermediate Triton testing, ERPL is now developing a flight vehicle targeting a 60,000-foot apogee. Students oversee electronics, fluid systems, structural integration and simulation as part of the full system lifecycle. Through rigorous testing and data-driven refinement, ERPL bridges classroom theory with advanced propulsion research.



TALON: Life-Saving Aircraft Takes Shape

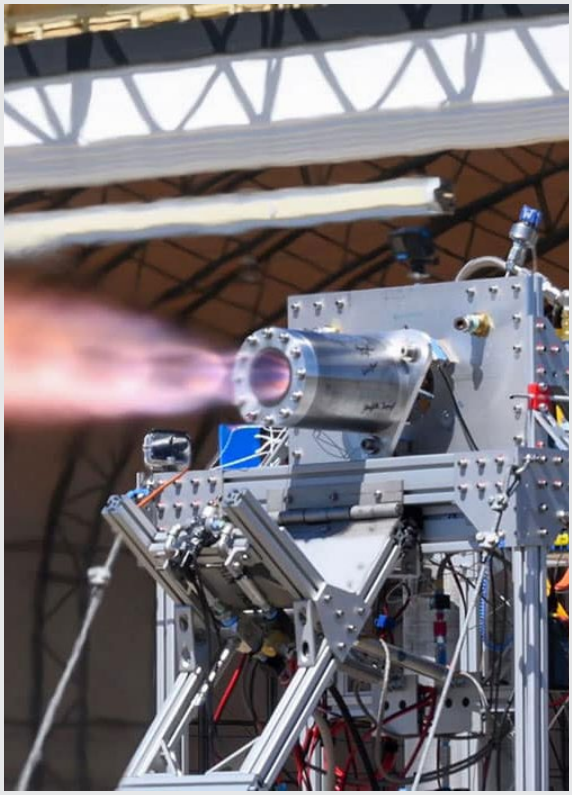
Advised by Dr. Kyle Collins

The Technology for Airborne Lifesaving and Operational Needs (TALON) project is a compact uncrewed vertical takeoff and landing aircraft designed to support emergency response missions. Developed by an Embry-Riddle student team, TALON was selected as one of 14 nationwide recipients of funding through NASA's GoAERO Prize competition. The aircraft incorporates self-adjusting landing gear and rotor redundancy to enhance operational reliability. Students are applying systems integration, flight testing and structural design principles while addressing complex humanitarian aviation challenges. The project demonstrates how applied engineering can directly support life-saving operations.

Hot-Fire Test: Embry-Riddle Club Launches Students' Rocket Ambitions

Advised by Dr. Rick Perrell

ERPL achieved a significant milestone with the successful hot-fire of Project Triton, the club's most powerful student-built engine at the time of testing. Undergraduate students designed, manufactured and fired the ethanol and liquid oxygen engine, demonstrating growth in liquid propulsion capability. The achievement paved the way for Project Moe, a more powerful engine now supporting an upcoming high-altitude launch attempt. The milestone reflects ERPL's continued focus on performance optimization, testing discipline and system-level engineering execution.



Capture-the-Satellite Team: First Place in National Autonomous Space Competition

Advised by Drs. Di Wu, Hao Peng and Cagri Kilic

Embry-Riddle students earned first place in the national Capture-the-Satellite competition for their autonomous spacecraft rendezvous and control system. Competing against 51 teams, the group designed a hybrid guidance architecture combining classical orbital mechanics with artificial intelligence. The team presented its winning solution at the AIAA SciTech Forum in Orlando and was recognized for technical precision, innovation and systems-level problem solving. The accomplishment reflects Embry-Riddle's emphasis on applied space systems engineering and competitive research excellence.

ERFSEDS: Designing, Building and Launching Rockets at Embry-Riddle

Advised by Dr. Rick Perrell

The Embry-Riddle Future Space Explorers and Developers Society (ERFSEDS), founded in 1992, is one of the university's oldest and largest student engineering organizations. The team leads hands-on rocketry projects from concept development through fabrication, testing and launch. Members design and fly high-powered rockets while gaining applied experience in structural analysis, propulsion integration, avionics and project management. ERFSEDS competes annually in the International Rocket Engineering Competition, with projects such as the two-stage Artemis vehicle targeting the 45,000-foot category. Through multiple concurrent subprojects and flight campaigns, ERFSEDS provides students with real hardware experience that mirrors modern aerospace development cycles.

Search and Rescue Technologies: Engineering Solutions for Critical Missions

Advised by Prof. Kimberly Heinzer

The Search and Rescue Technologies Club (SARTEC) at Embry-Riddle Aeronautical University provides students with hands-on experience designing and testing uncrewed aerial vehicles for real-world rescue missions. Open to students across disciplines, SARTEC fosters collaboration as members advance from foundational build skills to system integration and flight operations. Current development efforts focus on a deployable UAV equipped with thermal imaging to locate distressed individuals and support coordination with ground teams. Through outreach with the Civil Air Patrol and participation in National Engineers Week activities, SARTEC connects student innovation with operational search and rescue communities.

Rotating Detonation Laboratory: Advancing Next-Generation Propulsion

Advised by Dr. Scott Martin

Founded in November 2024, the Rotating Detonation Laboratory (RDL) aims to become one of the first undergraduate teams to test fire a Rotating Detonation Engine. The team plans its first hot-fire by the end of the spring 2026 semester. Rotating detonation technology sustains a detonation wave within a ring-shaped combustion chamber, enabling rapid constant-volume combustion that may increase engine efficiency compared to traditional designs. The RDL is building upon an Air Force Research Laboratory engine configuration previously tested by university groups to ensure reliable validation. Students have developed a specialized pre-detonator ignition system and used computational fluid dynamics modeling to guide design decisions prior to testing. The lab plans to submit findings to the 2027 AIAA SciTech Conference.

Congratulations on the Conferring of Your Aerospace Engineering Ph.D.

We proudly recognize and celebrate these scholars for their dedication, innovation and contributions to advancing knowledge in engineering and aerospace fields. Each dissertation represents years of rigorous research, curiosity and perseverance.

Please join us in congratulating the following doctoral graduates:

- **Naresh Ahuja:** Predictive data-driven model for microstructure design of fiber-reinforced composite material
- **Roberto Cuellar Rangel:** Autonomous low-thrust orbital maneuvers and interplanetary trajectory design using reinforcement learning in stochastic environments
- **Nicholas Reed:** Embeddable multi-material wireless micro-sensors utilizing additive manufacturing and enhanced microstructure
- **Paula Sanjuan Espejo:** Testing and modeling of a passively modulated air-oil cooler for turbofan applications
- **Devon Hardy:** Thermal management with supercritical carbon dioxide under extreme applications
- **Jie Hua:** Propeller noise prediction of an urban air mobility vehicle in an urban environment
- **Zefu Ren:** Synthetic gecko-inspired dry adhesive through two-photon polymerization for space applications
- **Nathan Schaff:** Online aircraft system identification using a novel parameter-informed reinforcement learning method
- **Zachary Stein:** In-situ investigations of calcium-magnesium-aluminosilicates (CMAS) infiltration effects on thermal barrier coatings under environments replicating jet engines
- **Nicolo Woodward:** Online estimation of unknown parameters for flexible spacecraft

Engineering the Future: Taylor Fazzini's Aerospace Journey

Taylor Fazzini ('17) has gone on to have an impressive career in aerospace as a modeling and simulation engineer at Northrop Grumman. After graduating from Embry-Riddle with a bachelor's degree in Aerospace Engineering and master's degree in Aerospace, Aeronautical and Astronautical Engineering from Georgia Tech, Taylor sharpened her technical expertise through Northrop's Future Technical Leaders Program, where she was able to contribute to major defense programs including the B-21 Raider.

Driven by a lifelong passion, Taylor remains committed to pushing technological boundaries while mentoring the next generation of engineers. She believes emerging tools like AI and digital design will transform the processes used in aerospace development, making engineering fundamentals more important than ever.

> **"Digital engineering is changing how we design and test aircraft, but curiosity and technical depth will always be at the heart of innovation," says Fazzini.**

BY THE NUMBERS

100 YEARS
EMBRY-RIDDLE AERONAUTICAL UNIVERSITY WAS FOUNDED IN 1926.

LARGEST
UNDERGRADUATE AEROSPACE PROGRAM IN THE COUNTRY BY ENROLLMENT

49
FACULTY MEMBERS

35
AVERAGE CLASS SIZE

3.3M
RESEARCH EXPENDITURES IN 2024

2,379
UNDERGRADUATE STUDENTS

108
GRADUATE STUDENTS

71
PH.D. STUDENTS

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David Canales Garcia
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Ph.D., Purdue University

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Research Assistant Professor and Director of the Eagle Flight Research Center (EFRC)
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Ph.D., Universidad de Murcia

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Department of Aerospace Engineering

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