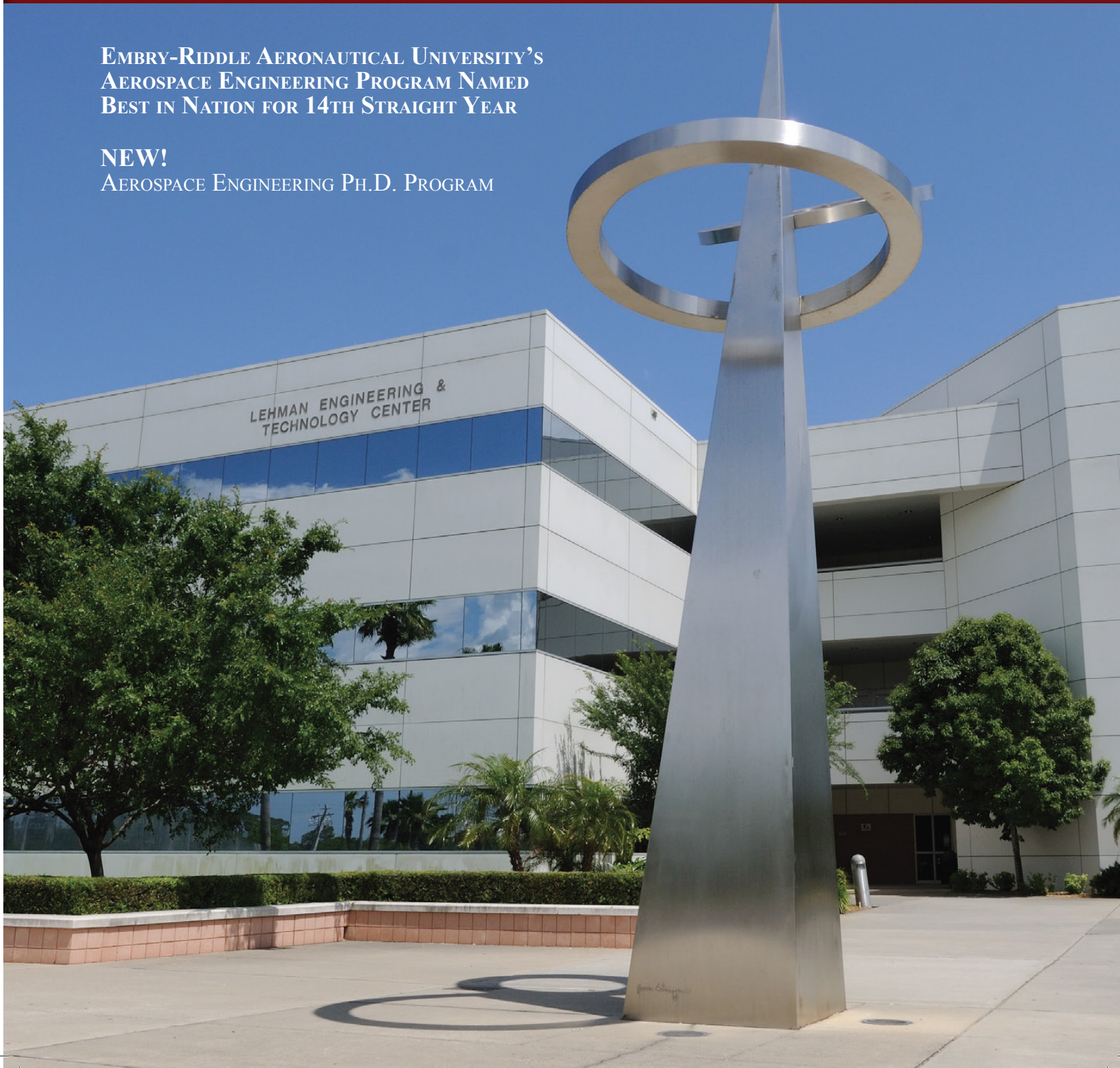


# AERONEWS

*DEPARTMENT OF AEROSPACE ENGINEERING AT EMBRY-RIDDLE AERONAUTICAL UNIVERSITY  
Newsletter covering 2012-2013 academic year*

EMBRY-RIDDLE AERONAUTICAL UNIVERSITY'S  
AEROSPACE ENGINEERING PROGRAM NAMED  
BEST IN NATION FOR 14TH STRAIGHT YEAR

**NEW!**  
AEROSPACE ENGINEERING PH.D. PROGRAM



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## MESSAGE FROM THE CHAIR



In January 2012, I joined Embry-Riddle Aeronautical University as the new Chair of the Department of Aerospace Engineering after 17 years at Purdue University. I feel honored to join this world famous Department and University. For the 14th year in a row, the "Best Colleges" guidebook published by U.S. News & World Report ranks Embry-Riddle Aeronautical University's undergraduate aerospace engineering program as number one in the category of non-Ph.D. granting Institutions.

Our design teams got 1st place in Team Space Transport Design Competition and 2nd & 3rd place Aircraft Design Competition (details inside). We have many ongoing design projects, including a nanosatellite project and a project to launch a rocket into space (project Icarus) – details also inside.

Embry-Riddle made aviation history in NASA's Green Flight Challenge, where they successfully built a gas/electric-battery hybrid plane—the first of its kind ever to transition from gas to full-electric power in flight. Current FAA grants include work for the determination of transport category runway friction coefficient and for best practices in the design of Fly-by-Wire (FBW) technology in rotorcraft.

In addition, we have numerous rocket engineering design/build/test projects at both undergraduate and graduate levels and recently an agreement between Embry-Riddle and Volusia County was solidified for use of the county landfill as a site for ground testing rocket engines. Also in the rockets area, we have work funded by the FAA, aimed at test flying Automatic Direction Surveillance – Broadcast (ADS-B) units on rocket vehicles, and computational simulation of rocket plume electric fields, for lightning strike risk mitigation; a DARPA project for the design, development and implementation of intelligent bi-inspired technologies for health management of manned and unmanned aircraft systems under upset conditions; and a NASA Kennedy Space Center - funded project to support the design and implementation of guidance, navigation and control algorithms for an extreme access lunar robotic system.

Furthermore, the government of Florida has funded us, along with the top three research universities in the state, to lead the Florida Center for Advanced Aero-Propulsion (FCAAP). The National Science

Foundation and the Air Force Office Scientific Research (AFOSR) have recognized our capabilities by funding our research on silent Micro-Air Vehicles and industries, like United Launch Alliances, are working with us in developing techniques for improving rockets lift-off.

A nanosatellite with a rendezvous and proximity operations mission, sponsored by AFOSR, is currently in the preliminary design phase at the Embry-Riddle Spacecraft Development Lab. A proposal for the development of a testbed for proximity operations to support the AFOSR project has been awarded a grant from the NASA Florida Space Grant Consortium. Additionally team of industry researchers and Embry-Riddle Computer Science and Aerospace Engineering faculty was recently awarded a Phase I STTR by the AFOSR under a Security in Cyber-Physical Networked Systems broad agency announcement (BAA), in which methods will be developed to prevent and detect unauthorized commanding of the nanosat undergoing development.

We continue our partnership with Dassault for the Dassault Design Institute and we are in the process of signing a new memorandum of understanding to expand and deepen our collaboration. We have very close ties with Gulfstream: a master's program and design courses, with Embry-Riddle students undertaking research for Gulfstream as part of their master's theses.

Finally, the Gas Turbine Lab focuses on applied propulsion research that includes a unique relationship with the Boeing Propulsion group since 2008. Research includes advanced engine testing, concept and tool development, advanced component design and analysis, pulsed detonation, and advanced engine cycle studies. These are just few of the many efforts going on in our department.

We are also creating new programs, including a Ph.D. in Aerospace Engineering and a multidisciplinary M.S. program in unmanned and autonomous system engineering. Both of these programs started this semester (Fall 2013).

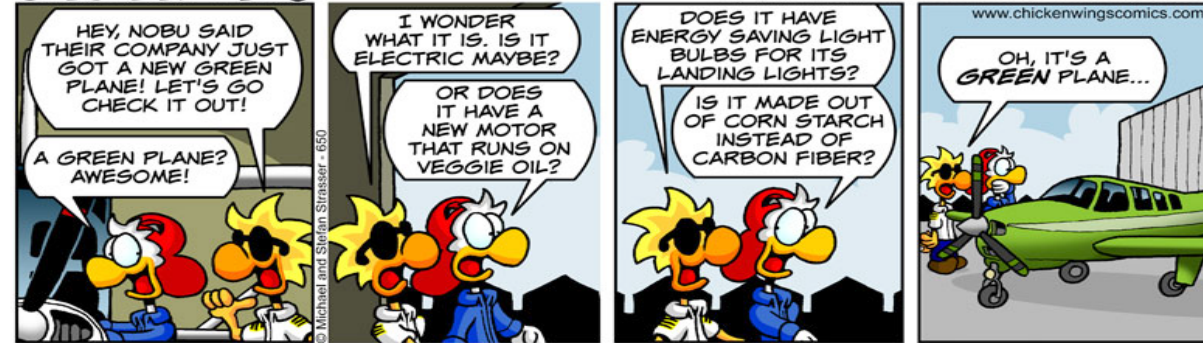
Best regards,

*A. Lyrintzis*

Dr. Anastasios (Tasos) Lyrintzis  
Distinguished Professor, Department Chair

Originally Published August 9th, 2013; Republished with permission:

### CHICKEN WINGS



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## Where Are They Now?

### Service to America Medal Finalist

By The Partnership for Public Service, The Washington Post  
Originally Published May 24, 2013



**Manan Vyas** ('07, '09, DB), has become a medal finalist. On behalf of the Partnership for Public Service, a nonprofit, nonpartisan organization based in Washington, D.C. that works to revitalize our federal government by inspiring a new generation to serve and by transforming the way government works. Each year, the Partnership pays tribute to America's dedicated federal workforce through our Samuel J. Heyman Service to America Medals program. In early May, we announced our 31 2013 finalists, and we are pleased to share with you that Mr. Manan Vyas, a NASA research engineer and Embry-Riddle Aeronautical University alumnus, is one of these finalists. Mr. Vyas is being recognized for his efforts to advance "hypersonic flight" technology by helping to create more realistic and effective flight simulations.

In addition, Mr. Vyas was recently featured in *The Washington Post's* Federal Players series, which profiles little-known federal workers who have left a great impact in their field.

### C87A LIBERATOR Concept Aircraft—An Embry-Riddle Alumni dream since 99



**Javier Quintana** ('99, DB), is the owner & chief engineer of Aerospace Designworks, an interior engineering firm established in Dallas, Texas in 2007. As noted in *Lift*, the alumni magazine for Embry-Riddle, he led his team of engineers in the development of a new aircraft concept, the C87A Liberator. *Business Jet Interiors International* magazine, features the interior concept in its September 2012 issue (pgs 20, 21, 85).

Javier stated that Aerospace Designworks is engaging universities to develop the Computational Fluid Mechanics Analysis for the C87A LIBERATOR. The initial conceptual design is expected to be finalized by the end of 2013. The plan for 2014 is to develop the refinement of the concept design with the collaboration of universities and a target to finalize this phase by December 31, 2014.

In parallel, "we are working with the Media/Marketing team to develop a microsite for the project and all the marketing assets to possibly launch the project publicly to raise funds for the following phases at the 2014 NBAA."

## NEW Aerospace Engineering, Ph.D. Program

By: Dr. Yi Zhao, Professor, Associate Chair, & Graduate Program Coordinator

After years of planning, the Ph.D. in Aerospace Engineering (Ph.D. AE) officially launched in the fall of 2013.

The Ph.D. AE program provides an opportunity for highly qualified students to complete a rigorous advanced study and engage in research centered on developing new knowledge in aerospace engineering related fields.

The targeted student clientele will initially be individuals who have demonstrated academic success at both bachelor's and master's levels and who keenly desire advancing their knowledge through scientific research and knowledge discovery.

The current pool of students in graduate engineering programs in the Aerospace Engineering Department and the College of Engineering represent a viable market, while the interest from outside of Embry-Riddle has already been voiced, indicating strong interest in this program.

The degree of Doctor of Philosophy is conferred in recognition of creative accomplishment and ability to investigate scientific or engineering

problems independently, in addition to the completion of a certain number of advanced courses that help students build a solid foundation for Ph.D. level research. The admission requirements for the Ph.D. AE include:

- Have completed a master's degree in aerospace engineering or closely related engineering discipline and have adequate preparation in areas of science and mathematics fundamental to their field of study.
- Have superior academic records with a minimum cumulative grade point average of 3.5.
- Have taken the Graduate Record Examination and have an acceptable score on both quantitative and verbal sections.
- Have submitted a complete application package before the deadline specified in the University catalog.
- International applicants whose primary language is not English, must also achieve the minimum score requirement of TOEFL or IELTS as required by the University.

The curriculum requirement of the Ph.D. AE consists of a minimum total of 42 units, includ-

ing 18 units of graduate level coursework and 24 units of dissertation research hours beyond a master's degree.

In addition, a student in the Ph.D. program is expected to:

1. Complete an approved plan of study during the first semester.
2. Pass the qualifying examinations to achieve degree candidacy.
3. Pass the preliminary examination (i.e., present a dissertation proposal acceptable to the dissertation committee).
4. Complete a program of significant original research.
5. Prepare and defend a dissertation concerning the research work.

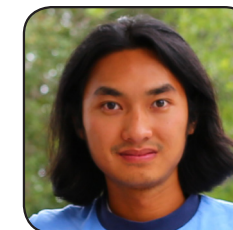
Currently, there are two areas of concentration in the Aerospace Engineering Master's Degree Program: Aerodynamics/Propulsion and Structures. A third concentration, Dynamics and Control, will be added in the Fall of 2014.

While the initial size of our Ph.D. AE program is relatively small, our long-term vision is to build a world-class doctoral program in aerospace engineering.

## Welcome! Our First Five Ph.D. A.E. Students



Shibani Bhatt  
Fall 2013  
Computational Fluid Dynamics



Lap Nguyen  
Fall 2013  
Aerodynamics and Propulsion



Andrés Pérez-Rocha  
Fall 2013  
Dynamics and Control



Alfonso Noriega  
Spring 2014  
Dynamics and Control



Barrett Guenthoer  
Spring 2014  
Aero-Propulsion

**Green Fleet-Alternative 100LL Fuel**

The Green Fleet initiative is focused on the development, certification and use of an unleaded replacement for 100LL Aviation Gas used in reciprocating engine airplanes. Embry-Riddle is now the lead in an approved certification plan with the Atlanta ACO for approval of a non-leaded fuel, GAMI G100UL, in a Cessna.



Pictured left to right: Dr. Anderson, Scott Martin, Tome Horne (Test Pilot Consultant)

**NASA UNMANNED SYSTEMS AIRSPACE OPERATIONS CHALLENGE (UAS AOC) NASA CENTENNIAL CHALLENGE**

- To show the total system safety of allowing the use of UAVs in the National Airspace
- A systems competition
- Need to avoid other airplanes both compliant and non-compliant
- Using a C-182 as a UAV surrogate

This Next Centennial Challenge Project is a student driven project that is supported by the industry, both by funding and equipment.

**LIGHT SPORT AIRCRAFT (LSA) ASTM COMPLIANCE AUDITS**

Light Sport Aircraft is a new category of aircraft that are approved through industry consensus standards at American Society for Testing and Materials. These new airplanes are small and have several limitations such as maximum speed and weight. Since inception, in 2004, there have been over 100 models approved as S-LSA or Special-Light Sport Aircraft. This represents a fast growing segment of General Aviation. Examples include the Cessna Skycatcher. Embry-Riddle has partnered with the Light Aircraft Manufacturers Association and the FAA to conduct audits of the emerging market of small aircraft, which are approved by industry consensus. Embry-Riddle will be providing audits to improve safety, promote the industry, and ensure compliance.

**THE NEW ELECTRIC AIRPLANE**

Mike Deschene is pictured below with a YASA 100HP electric motor that has been mounted onto a test stand. Testing has been performed on the motor, propeller, and the battery system while on the stand before it is installed in a motor-glider. The idea is to use an HK-36 Dimona motor-glider as a testing platform for the all-electric system. An electric airplane will add more data to the limited electric airplane field and help with development of regulations. Understanding electric airplane propulsion systems will benefit the future of 'green' aviation.



**GRENZEBACH SIMULATOR**

The Grenzebach simulator combines a DA 42 type aircraft cockpit with a KUKA industrial robot Level D flight simulator. The Research Center has partnered with Grenzebach and Diamond to perform parameter identification using flight test data from a DA-42NG, create a model of the aircraft, and validate the model.



From Left to Right, Holger Schmidt, Kashif Ali (Embry-Riddle student), Mr. Giaquinta, Mr. Wilbert and Mr. Wickborn (Grenzebach/Diamond reps.)

**AEROSONIC STANDBY-BY PFD CERTIFICATION**

- Non-Academic industry project
- Certify a back-up Primary Flight Display using Approved Model List STC method
  - Performing the flight testing
  - Human factors evaluations
  - Installation manuals
  - Continued airworthiness instruction
  - Test plans written in-house using DERs in Flight testing and structures

**TETHERED BALLOON RESEARCH**

This concept evaluation is of an Aerial Sky Box (tethered balloon) which could be used as a camera platform or as aerial seats for sporting events. Embry-Riddle will perform initial sizing calculations and review applicable certification requirements.

**DEDICATED EXPERIMENTAL AIRPLANE**

A Cessna 182 (pictured below) will be used for pop-up and Research and Development projects.

- Aerosonic Avionics Certification
- NASA Challenge UAV surrogate



**Pat Anderson Named 2012 Florida Professor of the Year**  
Carnegie Foundation Honors Aerospace Engineering Professor for Excellence in Undergraduate Teaching and Mentoring

By Deborah Circelli  
Originally Published November 15, 2012; Republished with permission from the Daytona Beach News-Journal

The Carnegie Foundation for the Advancement of Teaching today named Aerospace Engineering professor, Dr. Richard "Pat" Anderson of Embry-Riddle Aeronautical University the 2012 Florida Professor of the Year.

The U.S. Professors of the Year awards program, administered for the Carnegie Foundation by the Council for Advancement and Support of Education, acknowledges the most outstanding undergraduate instructors in the nation, those who excel as teachers and influence the lives and careers of their students. It is recognized as one of the most prestigious awards honoring undergraduate teaching.

His dedication has earned him the top honor in the state as the 2012 Florida Professor of the year. "It's a great honor," said Anderson, who started at Embry-Riddle as a flight instructor in 1996 and then became a part-time professor in 1997. "I don't so my job thinking of (awards), but it's great that this has happened."

This year nearly 300 top professors nominated by colleges and universities across the country were evaluated. Four national winners were chosen; the remainder of the nominees were considered for state honors. Anderson was chosen as the state winner from Florida, one of only 27 states with a candidate who met the judging criteria.

Anderson was nominated by Dr. Maj Mirmirani, dean of the College of Engineering at Embry-Riddle's Daytona Beach Campus. "Professor Anderson is a selfless, dedicated teacher who has touched the lives of hundreds of students during his 15-year tenure at Embry-Riddle, starting as a flight instructor and working his way up to a professor of aerospace engineering," said Mirmirani.

**Professors Who Put Students First**

By Alexandra Burns, COE Representative, Embry-Riddle Student Government  
Originally Published November 27, 2012; Reprinted with permission from the Avion

The Student Government Association has chosen to recognize two professors for the very first Students First award. This award is given to Embry-Riddle faculty and staff who are nominated by student's and chosen by the SGA's Academic Committee.

This award recognizes faculty or staff who put "Student's First" by doing more than what is required of

them to see students succeed. These nominees are people whom students recognize as an extremely important part of their education and overall success at Embry-Riddle.

The outstanding faculty members recognized this month were chosen from several student nominations. Dr. Magdy Attia, is the only aerospace engineering professor who was chosen. Magdy Attia, is known as a "full-hearted mentor" who puts every bit of his efforts into teaching and advising students.



In the classroom, he has pioneered methods of synchronous distance teaching that bring Daytona Beach students together with students at industry locations in a seamless classroom setting.

Dr. Anderson is able to share firsthand his aviation experience as a pilot and an aerospace engineering professor. He has seven planes at his home and also flies aerobatic planes in competitions and gliders as well as experimental airplanes for the university. He is the founder and past president of the Eagles Sports Aviation Club.

In 2006 Anderson was the recipient of both the Researcher of the Year Award and the Faculty Advisor of the Year Award at the Daytona Beach Campus. He is certified as an airline transport pilot, flight instructor and aircraft mechanic.

Anderson, who started flying when he was 17 through a Civil Air Patrol scholarship, said he found "one of the few jobs on the planet" where

he could combine his love of flying and engineering. Anderson stated "I would be disappointed if I could only do engineering and not fly and the opposite is true. "I enjoy teaching and research. I like to figure out new things and how to make an airplane work better and I like to pass it on to the next generation. I like to see the students light up when they get excited about this stuff."

Current and former students said that Anderson's award is well deserved. Aerospace Engineering senior Samir Kasliwala 22, of Hartford, Conn., said "he knows what he's talking about and he sits down with us and helps us work through it." Senior Nathan Rich, 29, of Gloucester, Mass, said, "Dr. Anderson's passion for aviation comes through in the classroom."

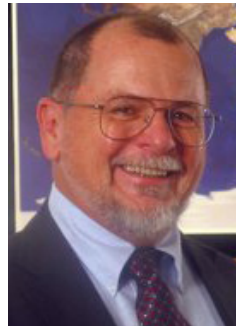
Christoffer Laulund, 24, a senior from Norway, said Anderson's piloting and engineering experience helps him "bring the best of two worlds to the classroom." Mikhael Ponso, 32, a former student who has worked as associate director of the research center, said Anderson keeps students "up to speed" on current information. "He's very practical and very good at explaining things with words," Ponso said.

Anderson also stated, "The hope is to provide some incentive if the individual is enthusiastic about doing this, they will stay focused and stay in school. I'd like to see them go down the right path and fulfill whatever dream they have in life."

The winners of the Carnegie Foundation's U.S. Professors of the Year program are gathered in Washington, D.C., today, Nov. 15, 2012, to attend an awards luncheon at the National Press Club and an evening reception at the Folger Shakespeare Library. The winners will be listed at [www.usprofessorsoftheyear.org](http://www.usprofessorsoftheyear.org).

About the Carnegie Foundation for the Advancement of Teaching [www.carnegiefoundation.org](http://www.carnegiefoundation.org).

About the Council for Advancement and Support of Education [www.case.org](http://www.case.org).



**Dr. Jim Ladesic, Associate Dean of Industry Relations and Outreach**

Dr. Jim Ladesic, Associate Dean, Industry Relations and Outreach, has been affiliated with Embry Riddle since 1965. He earned both the Associates and Bachelors of Aeronautical Engineering in 1967 from ERAI. He received the 1993 ERAU Research Achievement Award, was recognized a finalist in Boeing's national 1999 Outstanding Educator Award, won the 2001 ERAU Daytona Beach Campus Outstanding Teacher Award and the 2009 J.E. Lewis Outstanding Service Award.

He was presented an award in recognition of exemplary service rendered to Embry-Riddle Aeronautical University. In particular, it recognizes your forward-looking vision leading to and the development of a unique model for University-Industry collaborative education and research. It further recognizes the successful application of this model to create the unique Multidisciplinary Masters of Systems Engineering degree program and the resulting collaborative research between Embry-Riddle and Gulfstream-Savannah, GA.

**Professor Receiving Kudos**

By Fatima Hussein

Originally Published July 29, 2013; Republished with permission from the Daytona Beach News-Journal

The UCF Business Incubator at Daytona Beach International Airport will honor Magdy Attia, president of AbM Engineering LLC, as its "Entrepreneur of the Year" today, July 29th, 2013.

The award presentation will be at an open house event celebrating the second anniversary of the Volusia County-funded program to help first-and-second-stage businesses with strong growth potential.

"First-stage companies are companies that are gearing up to sell products or services. Second-stage companies are those that are already selling, but want to grow and may need help," said Connie Bernal, the Daytona Beach incubator's site manager.

AbM is an engineering consulting firm that is marketing a modified gearbox for wind turbines that he and business partner Marko Ivankovic invented.

Attia who teaches aerospace engineering at Embry-Riddle Aeronautical University in Daytona Beach, became one of the incubator's first clients in 2011.

"We're honored by this award," Attia told The News-Journal. "It affirms that everything we're working for is on the right path."

Attia teamed up with Ivankovic, a former student of his at Embry-Riddle, to develop the gearbox, which is patented as a speed-reduction mechanism for wind turbines. The two men met in a "Jets and Rockets" class Attia was teaching at Embry-Riddle.



Photo by: Steven Notaras/News-Journal

Attia also employs, two full-time engineers pictured, Vlad Shulman, (center) and Miraj Desai (right), who are former students of Attia's and both set to receive their master's degrees in engineering from Embry-Riddle.

The yet-to-be named gearbox that Ivankovic and Attia developed "is smaller, more energy

efficient and will last longer than the traditional design currently used in wind turbines," Attia said. "It is intended to replace the traditional planetary design currently used by much of the wind turbine industry."

Attia said that the gearbox invention is a side project that AbM is marketing on behalf of himself and Ivankovic. "Our box will last five to seven times longer than the traditional design," said Attia. A traditional gearbox costs upward of \$200,000 per wind turbine but only lasts two to three years.

Bernal said Attia was chosen to receive the award "because of his dedication, coach ability and the amazing patent he has developed with this team. It could change the wind turbine industry around the world." Also, Attia's openness to improve his company made him a perfect fit for the award.

"If a person is not open to advice we provide, we cannot help our clients," Bernal said. "He has been very disciplined with all of his suggestions. He does so with enthusiasm and with open communication."

Attia said of his business, "I wish there were more hours in the day to get everything done."

**Embry-Riddle Targets Space Debris in Nanosatellite Competition**

By Mary Van Buren, Embry-Riddle Assistant Director, University Internal Communications  
January 7, 2013

Embry-Riddle Aeronautical University is one of 10 U.S. universities selected to design and build small satellites in a competition sponsored by the Air Force Office of Scientific Research and the Space Vehicles Directorate of the Air Force Research Laboratory. The Embry-Riddle project will receive \$110,000 over the next two years from the Air Force's University Nanosat Program for the design phase of the competition. The winner, to be announced in January 2015, will be awarded additional funding for the construction and launch of their satellite.

Dr. Bogdan Udrea, associate professor of aerospace engineering at Embry-Riddle, along with colleagues and students will develop a nanosatellite named Arapaima



to conduct three-dimensional, visible and infrared imaging and surveillance of resident space objects (RSOs). "Space debris and hundreds of satellites are cluttering low-Earth orbit and threatening future space missions," Dr. Udrea said. "Our project, if successful, will validate a range of low-cost, low-risk nanosat technologies that can be used for efficient RSO removal."

Dr. Udrea, the principal investigator, will coordinate the venture with co-investigators

Dr. Adam Huang, associate professor of mechanical engineering at the University of Arkansas, and Lt. Michael Nayak, an Embry-Riddle graduate employed as a satellite flight test engineer with the Space Development & Test Directorate at Kirtland Air Force Base in New Mexico.

The project includes the contributions of numerous current and former students enrolled in Dr. Udrea's spacecraft design courses at Embry-Riddle.

Dr. William Barrot, Embry-Riddle associate professor of electrical engineering, and his students will build a telecommunications subsystem for the satellite, and other faculty and students across Embry-Riddle departments will assist in the multidisciplinary effort.



**AIAA Honors Aerospace Engineering Professor Dr. Tej Gupta**

By Mary Van Buren, Embry-Riddle Assistant Director, University Internal Communications - March 19, 2013

Dr. Tej Gupta, an aerospace engineering professor at Embry-Riddle's Daytona Beach Campus, recently received the AIAA Cape Canaveral Section 2012 Outstanding Member Award.

He was presented with the award at the 2013 Engineers Week Awards Banquet sponsored by the Canaveral Council of Technical Societies and the American Institute of Aeronautics & Astronautics (AIAA). It honors him as the section member who demonstrated the highest achievement in the past year in the field of aerospace relating to AIAA's technical committee areas.

**Embry-Riddle Programs Get International Attention**

By Deborah Circelli

Originally Published December 1, 2012;

Republished with permission from the Daytona Beach News-Journal

Making small unmanned aerial vehicles more durable for military surveillance and other missions in war zones is just one of the ongoing projects by a team of Embry-Riddle Aeronautical University professors and students.

The research, featured recently in an international publication for a story on "Trailblazers of North American Research," looks at improving the "control, stability and propulsion" of micro air vehicles, which are miniature drones, according to Vladimir Golubev, Embry-Riddle aerospace engineering professor.

The small planes are used for military missions and can carry sensors to detect biological, nuclear or chemical threats. The devices can also be used by police or fire departments to inspect unsafe or collapsed buildings to search for survivors or in disasters such as earthquakes, hurricanes or collapsed mines, Golubev said.

Golubev, who is also director of the Propulsion and Aerodynamics Computational Laboratory, and a small group of close to 10 students have been studying better ways to maneuver and control the unmanned aircraft "to keep (them) stable during the flight."

The team is also looking at ways for the drones to move more quickly and with less turbulence in windy and confined urban areas and how to keep them in the air for longer periods of time, he said.

Unmanned aircraft can be controlled remotely by a pilot on the ground or autonomously by being preprogrammed.

One of the grants was funded from the National Science Foundation and work continues and more grants are sought to develop prototypes and other research.

The Embry-Riddle team (pictured right) has also been working with the U.S. Air Force Research Labs at Eglin Air Force Base in Florida and Wright-Patterson Air Force Base in Ohio.

Other Embry-Riddle professors are also involved, including Reda Mankbadi, who is an Embry-Riddle distinguished professor of aerospace engineering; William MacKunis, an engineering physics assistant professor; and Yan Tang, a mechanical engineering assistant professor. Hany Nakhla from North Carolina A&T State University is also a collaborator.

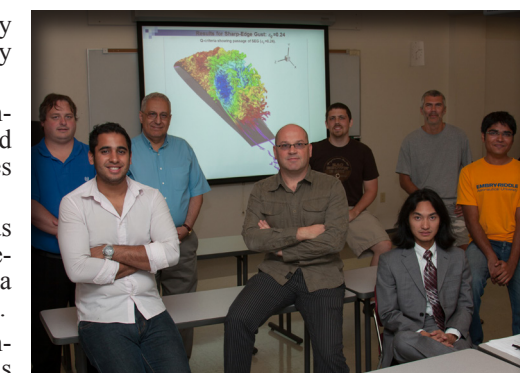
Golubev and students are also working on research through a grant with the U.S. Air Force

Office of Scientific Research and other partners and universities. The research could lead to not only improving unmanned aircraft but be used on full-size aircraft to reduce noise generated from air flow.

Lap Nguyen, 27, who received his master's degree in August in aerospace engineering from Embry-Riddle and will be in a new doctorate program there next fall, is working on the research while also teaching part time at the university. He's been working on simulations on the computer that show how wind gusts can impact such micro air vehicles.

"The small aircraft are important because rather than sending a soldier into a room, you can fly in one of these vehicles." "It's very exciting. We learn new things every day and ways to make the aircraft better," Nguyen said.

Shibani Bhatt, 24, who will receive her master's degree in May from Embry-Riddle, has helped to develop a model device that eventually would be mounted to planes to control the flow of wind. "Even if you look at weather in Daytona Beach, it can get pretty windy," Bhatt said. "Anything can just set off the micro air vehicle and it can lose control." She said the research being conducted and the devices could be used in many ways, including on larger aircraft to help prevent ice from forming. "The research is very satisfying. It can be used in a lot of different ways," she said.



Front left to right: graduate student Miraj Desai; Vladimir Golubev, AE Professor; PhD student Lap Nguyen; undergraduate student Ravi Gondaliya. Back, left to right: Jonathan Dudley, research collaborator from Air Force Research Laboratory branch at Eglin Air Force Base; Reda Mankbadi, AE distinguished professor & research collaborator; graduate student Jacob Brodnick; Bogdan Udrea, AE associate professor.

**Dr. Vladimir Golubev Researches Control of Micro Air Vehicles**

By: Mary Van Buren, Embry-Riddle Assistant Director, University Internal Communications  
November 28, 2012

Dr. Vladimir Golubev, an Aerospace Engineering professor in the College of Engineering at Embry-Riddle's Daytona Beach Campus, is leading a team of scientists and students researching the use of smart, synthetic micro-jets for the precise control of micro air vehicles (MAVs) with a wide range of military and civilian applications.



"We're investigating specific methods to improve the control, stability and propulsion of MAVs in windy, confined urban environments," Golubev said. "Micro devices in general have the potential to save billions of dollars for the aerospace industry annually through lift enhancement, drag reduction, noise suppression and icing mitigation."

Funded by a National Science Foundation grant of \$76,000, most of the ongoing research is being conducted in Embry-Riddle's Propulsion and Aerodynamics Computational Laboratory, founded and directed by Golubev, with additional work at the Air Force Research Labs at Eglin Air Force Base in Florida and Wright-Patterson Air Force Base in Ohio.

Dr. Hany Nakhla from North Carolina A&T State University is a major collaborator as well as Dr. Reda Mankbadi, Embry-Riddle Distinguished Professor of Aerospace Engineering and director of the Embry-Riddle branch of the Florida Center for Advanced Aero Propulsion. Also involved in related research are Mechanical Engineering assistant professor Dr. Yan Tang and Engineering Physics assistant professor Dr. William MacKunis.

### Team Places 1st in AIAA Foundation Team Space Transport Design Competition

A senior Spacecraft Design Class team from Embry-Riddle took first place in the 2012-2013 AIAA Foundation Undergraduate Team Space Transport Design Competition. The 2012-2013 competition asked teams to design a reusable launch vehicle with between 10,000 and 20,000 pound low earth orbit payload capability.

Members of Embry-Riddle's "Team Ironfly" are: *Theresa Brown, Austin Coffey, Peter Edwards, Timothy Grondin, Ryan May, Michael Mezzetone, Reamonn Norat, Sam Patel, Matthew Perry, and Tyler Roberson.* Faculty advisor: *Dr. Eric Perrell.*



Representatives of the team presented their design on September 10, 2013, at the AIAA SPACE Conference and Exposition at the San Diego Convention Center, San Diego, Calif. The team received an award of \$1,500 from the AIAA Foundation.

### Teams Take 2nd and 3rd in Aircraft Design Competition

By Deborah Circelli  
Originally Published July 15, 2013; Republished with permission from the Daytona Beach News-Journal

Two teams of students from Embry-Riddle Aeronautical University in Daytona Beach placed second and third in an international aircraft-design competition against universities throughout the world.

The contest asked aerospace engineering students to imagine and design the best Personal Light Jet based on a four-seater, twin-engine aircraft equipped with Price Induction DGEN 390 turboprop engines.

The competition by Price Induction, which is headquartered in France and develops turboprops for personal light jets, involved more than 100 students from 23 colleges and universities. First place went to a Brazilian team.

Embry-Riddle's second-place team designed the Aeolus, which competition officials said features a sleek, sweptback wing design capable of carrying the aircraft to altitudes of 25,000 feet and speeds in excess of 200 knots.



This rendering shows a four-seater airplane called the Aeolus, designed by the second place team in the international competition for bringing jet propulsion to smaller, private, recreational aircraft.

The students included team leader Christoffer Laulund, 25, of Norway, who graduated in May with a bachelor's in aerospace engineering. The others included Eduardo Sardi, Nicholas Clark, Kurt Schwarz and Peter Tan.

The third-place Embry-Riddle team, which tied with another team from the United Kingdom, was led by David Kelly, 23, of Needham, Mass., who graduated in May with bachelor's degrees in aerospace engineering.

The other team members were Paula Duque; Kevin McConnell; Mu'az Pawane and Qadir Saheed. The Zephyr Eagle combines simplicity and elegance to culminate into a streamlined efficient vehicle, officials said.

"I am thrilled that two teams from Embry-Riddle, both of which I had the pleasure of guiding, represent two of the three winning designs. I am also grateful that the hard work the students put into their designs paid off in this fashion," according to Snorri Gudmundsson, an Embry-Riddle associate professor who worked with the teams. Both teams received a trophy.



The College of Engineering and the Aerospace Engineering department would like to honor the following students for their handwork and dedication. Awards were Presented during a ceremony on April 19, 2013.

**Chin Gian Hooi**  
Outstanding Student Of The Year  
Aeronautics 2013



**Catherine Miller**  
Academic Achievement  
Astronautics 2013



**Kurt Schwarz**  
Outstanding Service  
Aeronautics 2013



**Benjamin Gayer**  
Outstanding Professional  
Development Propulsion 2013



### PROJECT ICARUS

By: Rosa Criado, Graduate Program Office Assistant

Project Icarus is not about flying "too close to the sun," but is about putting something from Embry-Riddle Aeronautical University, into space. "How?" is the question? The answer is in their teams' Mission Statement:

"It is the goal of the Icarus Program to be the first student designed and built rocket to reach space. We are a small student group at Embry-Riddle that is working to design, fabricate, test, and build all the major systems of a single stage liquid bi-propellant rocket to reach an altitude of 100 kilometers above sea level."

An earlier student team launched the first Icarus rocket from NASA Goddard Spaceflight Center's Wallops Island, Virginia Flight Facility in March 2007 to an altitude of 37.8 miles. The NASA program that supported the original Icarus has since been defunded. Icarus's present charge - to reach space - and its principle support, come from Embry-Riddle President Dr. John Johnson. Additional contributions have been made by the Offices of the Chief Academic Officer and the Vice President for Research, the Embry-Riddle College of Engineering, and the Aerospace Engineering Department.

According to Maxwell Hirsh, Aerospace Engineering Graduate student and Icarus Team Leader, Icarus is a single-stage liquid bi-propellant rocket - a "green rocket" in a sense - burning isopropyl (rubbing) alcohol and liquid oxygen. "It will weigh about 750 pounds, fully loaded. It is about eighteen feet tall and twenty inches in diameter. It will pull about 4g off the launch pad and 10g at the end of the burn," Hirsh said.

Their approach? "Use simplified engineering while obtaining mission objectives - one big rocket, one big engine that will put out three thousand pounds of thrust for thirty seconds, reaching Mach six. It would not be a fun ride,"

said Hirsh.

The rocket has been designed by the team to use commercial-off-the-shelf (COTS) parts insofar as they meet mission needs. However, most vehicle components and the test and launch infrastructures, are original designs that will be fabricated here at Embry-Riddle.



The image above is the bench-test engine, "which is quite heavy and a little overbuilt for safety's sake, but does resemble the flight design," Hirsh said.



Faculty advisor Dr. Eric Perrell explains, "Students approach me frequently asking about joining Project Icarus. I just refer them to the team members. If they can make an appreciable contribution, and commit the time and effort, they fit right in. Most cannot."

There are currently five members of Project Team Icarus, including Max. Each student has a primary role, but they do what needs to be done as a team. Though Max takes on the role as "leader" he says, "the tasks fall

out naturally" and he is an "extra pair of hands" wherever needed.

- Matthew Bennett (BSAE, graduating Fall 2013), is the "Engine/Propulsion Guy." Matthew built the engine from ground up.
- Cutis Scholz (MSAE, graduating Spring 2014) is in charge of parts acquisition and ground test systems.
- Frank 'Trey' Pietras, (BSAE, graduating Spring 2014) and Peter Edwards, (BSAE/MAE, graduating Fall 2013), work together on the propellant feed system, which delivers the fuel/oxidizer mixture to the engine at a rate of fifteen pounds per second. Trey is in charge of Feed System Electronics and Controls and Peter is in charge of the Feed System Hardware and Design.

A total of 11 team members have worked on Project Icarus, including graduates:

- Matthew Ellengold, (BSAE Spring 2012, now with USAF National Air and Space Intelligence Center) executed the overall vehicle preliminary design and mission performance analysis.
- Tyler Roberson (BSAE Spring 2013, now with Masten Space Systems) designed and fabricated most of the test hardware.
- Matthew Perry (BSAE Spring 2013, now with United Launch Alliance) was the instrument data analyst.

Ellengold and Hirsh were the first two team members. "We are all passionate about this project, and without the current and past members of Team Icarus, we would not be where we are today," said Ellengold.

Their first engine test fire will be later this fall. They will collect test data, iterate design and repeat until complete. The two-year program timeline will culminate in a Summer 2014 launch.

### Congratulations

**Axel Garcia-Burgos (BSAE)** who won Third Place for **Outstanding Engineering Design** as presented at the 2013 ASEE Southeastern Section Annual Conference and Meeting "E4: Efficient and Effective Engineering Education" for **Individual Undergraduate Research** Poster Competition hosted by Tennessee Technology University, March 2013. His poster was also presented at the International Astronautical Congress in Beijing. The poster pertains to the Sun's Coronal Mass Ejections (CMEs) which he has been working on with NASA Goddard for the past two years. **He received the Finalist award in the best poster competition.**

### Congratulations

**Yi Zhang** (M.S. in Aerospace Engineering Spring 2013) won Third Place in Masters Division for **Measuring Attenuation of Polymer Materials Using Drop Ball Test** as presented at the 2013 AIAA Region II Student Conference hosted by North Carolina State University, April 2013. Please visit <https://region2.aiaastudentconference.org/>

## Faculty Listing



**Dr. Richard Anderson**  
*Professor*  
**Specialty:** Real-Time Health Monitoring, Aircraft Parameter Identification, Flight Testing, Fly-by-Wire, and Automatic Flight Controls.



**Dr. Magdy Attia**  
*Professor*  
**Specialty:** Turbomachinery, propulsion component design and analysis, lean engineering, engine and cycle technology.



**Dr. Yechiel Crispin**  
*Professor*  
**Specialty:** Nonlinear Dynamical Systems and Control.



**Dr. Howard Curtis**  
*Professor*  
**Specialty:** Continuum mechanics, structures, dynamics, and orbital mechanics.



**Dr. John Ekaterinaris**  
*Distinguished Professor*  
**Specialty:** Computational methods in aerodynamics, biomechanics aeroelasticity, and multi-scale phenomena such as plasma.



**Dr. Habib Eslami**  
*Professor*  
**Specialty:** Structural dynamics and composites.



**Dr. Vladimir Golubev**  
*Professor*  
**Specialty:** Computational Fluid Dynamics, Computational Aeroacoustics, Unsteady Fluid-Structure Interactions, Flow Control, MAVs.



**Dr. Luis Gonzalez**  
*Assistant Professor*  
**Specialty:** Aircraft Design, Novel Configurations, Green Aviation, Commercial Aviation.



**Glenn R. Greiner**  
*Associate Professor & Undergraduate Program Coordinator*  
**Specialty:** Aircraft stability, control, flight dynamics, control laws, and aeroelasticity.



**Snorri Gudmundsson**  
*Assistant Professor*  
**Specialty:** Aerodynamics and airplane design.



**Dr. Tej R. Gupta**  
*Professor*  
**Specialty:** Boundary layer theory and computational methods.



**Dr. Daewon Kim**  
*Assistant Professor*  
**Specialty:** Smart materials and systems, structural health monitoring, adaptive structures, advanced materials and processes.



**Dr. James G. Ladesic**  
*Professor, Associate Dean of Industry Relations & Outreach*  
**Specialty:** Structural vehicle design and development, technology enhanced education and aerodynamics.



**Dr. Tasos Lyrintzis**  
*Distinguished Professor & Department Chair*  
**Specialty:** Computational Aerodynamics & Aeroacoustics with applications to rotorcraft and jet flows.



**Dr. Reda Mankbadi**  
*Distinguished Professor*  
**Specialty:** Computational fluid dynamics.



**Dr. Lakshmanan L. Narayanaswami**  
*Professor*  
**Specialty:** Airbreathing and rocket propulsion, chaos, combustion, and combustion instability.



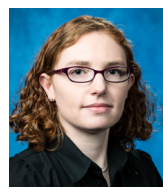
**Dr. Eric Perrell**  
*Professor*  
**Specialty:** Computational fluid dynamics, thermophysics, propulsion, combustion, and hypersonic aerodynamics.



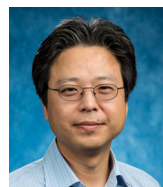
**Dr. Richard Prazenica**  
*Assistant Professor*  
**Specialty:** Guidance, navigation, and control of autonomous vehicles; smart materials for UAV flight control.



**Dr. Frank Radosta**  
*Professor*  
**Specialty:** Structures and measurements.



**Dr. Virginie Rollin**  
*Assistant Professor*  
**Specialty:** Computational materials science.



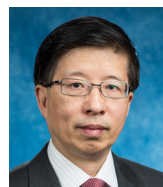
**Dr. Dongeun Seo**  
*Assistant Professor*  
**Specialty:** Nonlinear dynamics, control theory, decentralized systems, satellite formation, stochastic estimation.



**Dr. David Sypeck**  
*Professor*  
**Specialty:** Materials science, design, experimentation.



**Dr. Bogdan Udrea**  
*Associate Professor*  
**Specialty:** Spacecraft attitude dynamics and control; space mission design.



**Dr. Yi Zhao**  
*Professor, Associate Chair, Graduate Program Director*  
**Specialty:** Mechanics of composite materials, including linear and nonlinear vibration response.

## Faculty Listing

### The Department of Aerospace Engineering

welcomes 5 new faculty members to their team this Fall 2013 and Spring 2014!



**Dr. Hever Moncayo**  
*Assistant Professor*

Dr. Moncayo earned a Bachelor of Science in Engineering Physics from Universidad Del Cauca (Popayan/Colombia), and a Master of Science in Engineering from Universidad Del Valle (Cali/Colombia). He obtained his Ph.D. in Aerospace Engineering from West Virginia University, where he worked for his dissertation on a project sponsored by NASA Aviation Safety Program.



**Dr. Ali Tamijani**  
*Assistant Professor*

He received his Ph.D. in Engineering Mechanics at Virginia Tech for analysis and design optimization of unitized structures, and Master's in M.E. from Amirkabir University of Technology (Tehran Polytechnic) for computational modeling of multifunctional and smart structures. Prior to joining Embry-Riddle, Dr. Tamijani was an Adjunct Research Faculty in the Aerospace and Ocean Engineering Department at Virginia Tech.



**Dr. Mark Balas**  
*Distinguished Professor*

He was the Guthrie Nicholson Professor of Electrical Engineering and Head of the Electrical and Computer Engineering Department at the University of Wyoming. He has the following technical degrees: PhD in Mathematics, MS Electrical Engineering, MA Mathematics, and BS Electrical Engineering. He has held various positions in industry, academia, and government. Among his careers, he has been a university professor for over 35 years with RPI, MIT, University of Colorado-Boulder, and University of Wyoming, and has mentored 42 doctoral students. He has over 300 publications in archive journals, refereed conference proceedings and technical book chapters. He has been visiting faculty with the Institute for Quantum Information and the Control and Dynamics Division at the California Institute of Technology, the US Air Force Research Laboratory-Kirtland AFB, the NASA-Jet Propulsion Laboratory, the NASA Ames Research Center, and was the Associate Director of the University of Wyoming Wind Energy Research Center and adjunct faculty with the School of Energy Resources. He is a life fellow of the AIAA and a life fellow of the IEEE. Probably he will be most well known for the fact that his daughter Maggie is the prominent Denver drum and bass DJ known as Despire.



**Dr. Ebenezer Gnanamanickam**  
*Assistant Professor*

Dr. Gnanamanickam obtained his Master's and Ph.D. in Aeronautics and Astronautics from Purdue University in December 2003 and May 2010 respectively. Between his M.S. and Ph.D. he worked briefly as a Research and Development Engineer at Piezotechnology Inc. Following his Ph.D. he was a Visiting Assistant Professor at Purdue University from 2010-2012. His research focus is on fluid mechanics/aerodynamics.



**Dr. Mark Ricklick**  
*Assistant Professor*

Dr. Mark Ricklick graduated from the University of Central Florida, with a focus in turbomachinery heat transfer and aerodynamics. He has experience in a variety of aero-thermal experimental and computational investigations. His research interests include improvement of turbine efficiency and durability, the impact of alternative fuels on engine performance, high temperature sensor design, and thermal storage.

## FACULTY BOOKS

### Howard Curtis, Ph.D. *Professor*



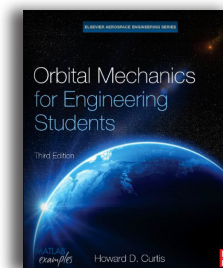
Butterworth-Heinemann has announced the publication in fall 2013 of Professor Curtis popular textbook, *Orbital Mechanics for Engineering Students, Third Edition*.

With this edition, *Orbital Mechanics for Engineering Students* has been brought up to date with new topics, key terms, homework exercises, and fully worked examples. Highly illustrated and fully supported with downloadable MATLAB algorithms for project and practical

work, this book provides all the tools needed to fully understand the subject.

The third edition includes a new chapter on orbital perturbations, new and revised examples and homework problems and increased coverage of attitude dynamics, including new MATLAB algorithms and examples.

According to a review in the AIAA's Journal of Guidance, Control, and Dynamics (Vol 31, No. 2), "This book should be given serious consideration for any undergraduate course in orbital mechanics or spacecraft dynamics." The textbook evolved from Professor Curtis's many years of teaching Space Mechanics at Embry-Riddle.



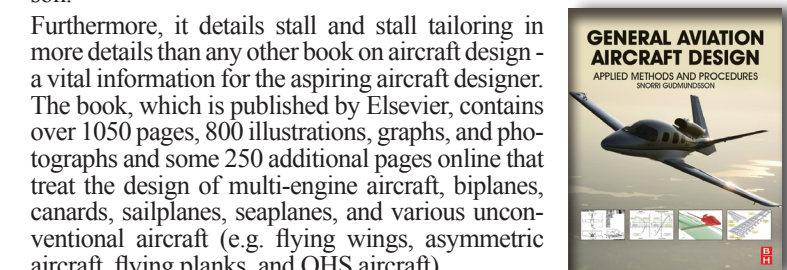
### Snorri Gudmundsson, M.S. *Assistant Professor*



*General Aviation Aircraft Design - Applied Methods and Procedures* is intended as a versatile design reference for practicing engineers and students of aerospace engineering.

Its primary focus is general aviation aircraft. It covers a large variety of topics, ranging from sizing, cost estimation, layout, various optimizations, trade studies, to performance analysis and common faults and fixes in aircraft design. In most cases, numerical examples involve actual aircraft and, thus, allow a direct comparison of experiment and theory. It probably contains the most detailed information on propeller analysis found anywhere in a book of this kind. It also provides a detailed drag performance analysis of actual aircraft, allowing a realistic comparison.

Furthermore, it details stall and stall tailoring in more details than any other book on aircraft design - a vital information for the aspiring aircraft designer. The book, which is published by Elsevier, contains over 1050 pages, 800 illustrations, graphs, and photographs and some 250 additional pages online that treat the design of multi-engine aircraft, biplanes, canards, sailplanes, seaplanes, and various unconventional aircraft (e.g. flying wings, asymmetric aircraft, flying planks, and OHS aircraft).



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