

ENGINEERING NEWS

FEBRUARY 2005



Message From The Dean

change allowed greater collaboration among departments, creating a college with curriculum strengths in all degrees related to aerospace industry.

As an example, the College structure has a First-Year Engineering program that focuses on the improving the transition of students to college life and teaching courses common to all engineering degrees during their first year on campus.

Faculty from all the degrees in the College collaborated to create an Introduction to Engineering course that is designed to capture the interest of students and focus them on their goal of becoming an engineer. More on this course and the First-Year program are inside.

Embry-Riddle's undergraduate engineering degrees include Aerospace Engineering, Civil Engineering,

Computer Engineering, Electrical Engineering, Mechanical Engineering, and Software Engineering.

Two of our newest degrees are EE and ME, with a curriculum that gives students the breadth of knowledge in the degree while provide focal areas in Satellites, Telecommunication and Control (EE) and Robotics and High-Performance vehicles (ME).

The Daytona Campus also offers masters degrees in Aerospace Engineering and Software Engineering. Embry-Riddle boasts the largest Aerospace program in the country and the College of Engineering has over 1500 students this academic year with continued increases in new students.

As the College continues to mature, as the degrees grow and as research expands I look forward to highlighting faculty, students, degrees, research, and news from the College. ■

This is the first newsletter from the College of Engineering, in which we introduce some of the faculty, facilities, activities, and news from our faculty and students. The newsletter is the first of many to link the College with students, alumni, industry, and academic colleagues throughout the country.

The College of Engineering was formed in August 2002 with the vision of being a leader in undergraduate education and a provider of high quality graduate education and research. This

First-Year Engineering Program

November 2004 - two ERAU alumni and now NASA Astronauts, Nicole Stott and Ron Garan, came to talk to the entering freshmen engineering class about the future of space and space programs at NASA. The students asked many questions in one of the five core concept forums held for Freshman engineering students:

- Professional Organizations
- COOP and Careers
- Industry Professionals
- Multi-Disciplinary Engineering and Introduction to Multi-Disciplinary Projects.

The First Year Engineering program was implemented at ERAU in 2004 with a common first year course schedule for all engineering students. Providing a common curriculum with a multi-disciplinary focus exposes first year engineering students to alternative engineering programs and provides the flexibility to switch engineering majors easily.

Additionally, the University has set up a First Year Programs Office for students to adjust to life on campus. Specialized freshman counselors provide advising to all first-year students, monitor attendance and grades, and assist with course



Professor Lehr
with Visiting Astronauts

scheduling. This program is a proactive approach to keeping an eye on first-year students. The combined efforts between a common first year and the counseling services start Embry-Riddle Engineering students off on the right track. ■

ENGINEERING NEWS

Lean Academy Workshop

The Instructor Training version of the MIT Lean Academy was held on campus the week of January 3-7 and was very successful. Only a couple of the 20 participants had ever seen ERAU and all were very favorably impressed by their week on campus. The Lean Academy is a 5-day workshop designed and trademarked by MIT to teach new employees the fundamentals of Lean Engineering, Lean Manufacturing, and Lean processes throughout an entire corporation. It is an extension of the Lean Aerospace Initiative, a 12-year old industry/government consortium



funded primarily by the Air Force and managed by MIT. The LAI consortium is in itself an outgrowth of MIT's study of the Toyota Production System.

"Lean" is widely embraced throughout the aerospace industry and Lean Academies are typically delivered on site at a corporation. Application of the concept is expanding rapidly and the need for more instructors led MIT to ask the Aerospace Engineering Department to host the recent event.



The 20 participants included 4 from MIT, 2 from Boeing, 2 from the Air Force Institute of Technology, 2 from the University of New Orleans, 2 from the University of Alabama, and one each from Rolls Royce,

the Defense Acquisition University, the University of Louisiana, Purdue, Regis University, the University of Warwick (UK), as well as our own Dr. Magdy Attia as an instructor-in-training and Chuck Eastlake as an instructor.



Looking to the future, ERAU is now recognized as a contributing member of the Lean Manufacturing/Lean Engineering movement within the aerospace industry. ERAU is also now a member of the recently created Educational Network of LAI. Watch for incorporation of this emerging area of both instruction and research into various portions of our engineering programs. ■

Student Programs

The College of Engineering supports and encourages student involvement in professional organizations and engineering activities. All students are introduced to professional organizations: AIAA, SAE, ACM, IEEE, SWE, ASCE in their first year by the leaders of the organizations.



Leaders provide an introduction to the club and the current years planned activities.

In addition to professional organizations ERAU sponsors clubs for activities like Eagle Eye Satellite Project, where students are designing and building a satellite to be placed on the Space Shuttle hitch hiker program.

January 7, 2005, the Embry-Riddle FUNSAT team was selected as a finalist in the Florida University Satellite competition (FUNSAT). The project which includes mostly AE and avionics students, is headed



by Dr. Tony Hagar and Dr. Albert

Helfrick. The team recently delivered a presentation at a workshop at the Kennedy Space Center and is now building an engineering model for the satellite and its lightning detection and gathering system. ■

ENGINEERING NEWS

Research Facilities at ERAU

Discipline-specific labs are used as part of the course curriculum and aid hands-on learning directly applicable to the course study. All the labs use the latest technology to give the student a functional learning environment. The following is a short list of labs, with highlights on others coming in later newsletters.

Aviation Noise Lab

This laboratory is devoted to experimental studies of the sources of aircraft noise and the means of reducing the intensity of sound radiated by propellers, engine exhaust, etc.



Airport Design Lab

Undergraduate classroom and lab for the Civil Engineering program with facilities for design, modeling, and simulation of transportation and structural projects.

Structures Lab

The equipment in this room is used to test structures and components typical of those found in aircraft and spacecraft. This laboratory is used in a variety of courses to investigate structural behavior under static and dynamic loading and for graduate research projects and contracts with industry.



Propulsion and Aerodynamics Computational Laboratory

The lab is equipped with several Windows, Linux and Unix parallel computer clusters for research and education. Faculty and student research efforts are focused on numerical analysis and design of complex aircraft and space systems. The lab also hosts an Applied CFD group of research faculty.

Stereolithography Lab

Stereolithography (STL for short) means three-dimensional printing.

The STL machine uses a rapidly moving wax printer to form a 3-D model by laying down one layer of wax at a time until the model is completed. The facilities are used in a variety of courses, for student projects, and by local industry.



Civil Materials Lab

Teaching and research space dedicated to the study and testing of materials used in Civil Engineering. Lab also houses surveying equipment.

Manufacturing Lab

This facility is used in all Aerospace Engineering design courses to incorporate design for manufacturing, for student and graduate research projects and for contracted work with outside industry.

Please view list of all research facilities at: www.erau.edu/research ■

Beowulf Computer Cluster to Boost Research at Embry-Riddle and Bethune-Cookman

In March 2005, Embry-Riddle Aeronautical University will take delivery of a high-performance computer cluster dubbed Beowulf. The system was acquired through a \$757, 825 grant from the National Science Foundation to Embry-Riddle and Bethune-Cookman College.



The computer cluster has 131 dual-processor nodes and 262 processors, each of which is a 64-bit, 3.2 GHz Intel Xeon. Each node has a minimum of four gigabytes of RAM and the connection among them is facilitated using Myrinet. Via an Internet-2 link the cluster will be shared with Bethune-Cookman, Embry-Riddle's Prescott, Arizona campus, and Extended Campus Network of teaching centers throughout the world.

The new computing cluster will be a valuable facility to the research



team: Michael Hickey, associate professor of physics, Magdy Attia, assistant professor of engineering, Chris Herbster, associate professor of meteorology at Embry-Riddle and Dennis Clayton, professor of mathematics and computer science at Bethune-Cookman.

For more information:
Dr. Attia, magdy.attia@erau.edu ■

ENGINEERING NEWS

In 2004, the College of Engineering (COE) established a series of colloquiums during the Spring-Fall semesters. The purposes of the colloquiums were: to introduce students into some real world applications, and to permit faculty to interact with speakers and stimulate research activities.



Towards the end of the 2004 Fall semester, the COE had Dr. Chris Tam as a speaker.

Dr. Tam is the Robert O. Lawton Distinguished Professor

in the department of mathematics at Florida State University (FSU). He received his Ph.D from Caltech in 1966, and is recognized world wide in Computational Sciences.

Research Colloquia

Dr. Tam gave a talk on Computational Fluid Dynamics (CFD) for Fan Noise of a Turbo-fan Engine. The colloquium was well attended, and many interesting questions were asked by some of our faculty members.

In order to continue with that early success, a series of recognized speakers have been invited for this 2005 Spring semester:

1. Dr. Brian Thompson. University of Ottawa, Department of Engineering. Topic: "The Shedding Wake of a Divergent Trailing Edge" Date: 01/21/05

2. Dr. Joseph T. C. Liu. Brown University, Department of Engineering. Topic: "Heat Transfer Enhancement by Nonlinear Steady and Unsteady

Longitudinal Vortices in Boundary Layer Flow "

Date: 01/27/05

3. Dr. Ramesh Agarwal. Washington University, Saint Louis. Department of Mechanical and Aerospace Engineering Topic: "Flow Control Applications with Synthetic and Pulsed Jets." Date: 02/25/05

4. Dr. Rimas Vaicaitis. Columbia University, Civil Engineering Department. Professor of Civil Engineering and Director of the Guggenheim Air Flight Structures Institute Topic: "Panel Flutter and Sonic Fatigue." Date: 04/12/05

5. Dr. Awatef Hamed. Cincinnati University, Aerospace Engineering Department. Department Head. Bradley Jones Professor of Aerospace Engineering & Engineering Mechanics Topic: TBA. Date: TBA ■

Internal Research Awards for COE

1. Hamilton Hagar "Analytical Methodology for Predicting Satellite Tracking Resources"



Eric Perrell

2. Eric Perrell "Computational Analysis of a Combined Cycle Rocket/Scramjet Vehicle"



Sathya Gangadharan

3. Dan Macchiarella/Sathya Gangadharan "Proposal for Establishing a Reality-X Simulation Lab"

4. David Sypeck and Yi Zhao "Lightweight Materials for Impact and Blast Protection"



David Sypeck



Yi Zhao

an Inexpensive Sounding Rocket for Space Research Payloads" ■



Eric Hill

Undegraduate Research Awards

Hany Nakhla and Magdy Attia "Design Improvements of the Miss Ta Fire Jet Dragster"

Eric Hill "Project Icarus: Developing



College of Engineering
Dean, Dr. Ray Mankbadi
600 S. Clyde Morris Blvd.
Daytona Beach, FL
32114-3900
Web: www.db.erau.edu
E-mail: engineer@erau.edu ■