NEWSLETTER FOR ALUMNI, FRIENDS & STUDENTS

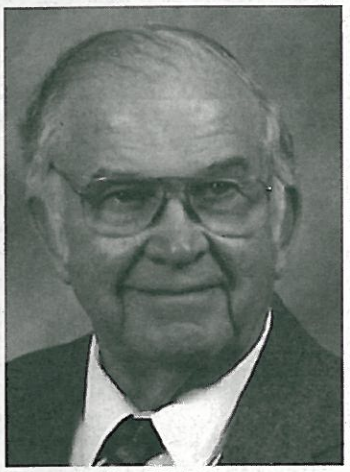
FALL-WINTER 2000

THE STREAMLINE

AEROSPACE ENGINSEERING, MECHANICS & ENGINEERING SCIENCE

Experimental Mechanics C. E. Taylor Award

On June 8, 2000 at the Society for Experimental Mechanics (SEM) International Congress, held in Orlando Florida, the Society bestowed upon AeMES **Emer. Prof. Charles E. Taylor** a prestigious honor, the First C.E. Taylor Award. The award was established to honor technical excellence in optical stress analysis and good citizenship within SEM. Charles (Chuck) E Taylor has had a remarkable history in both the field of optical stress analysis and the betterment of the Society for Experimental Mechanics as well as the field of experimental mechanics in general. The award was a complete surprise to Chuck and was the highlight of the awards ceremony and conference banquet.



Dr. C.E. Taylor

Charles E. Taylor, a very active and loyal 53-year SEM Member, has been the Society's President (66-67) an Honorary Member since 1983, a Fellow of the Society since 1976, and recipient of these SEM awards throughout his membership: F.G. Tatnall Award in 1983 for "Long and Distinguished Service to the Society;" M.M. Frocht Award in 1969 for "Educator of the Year;" the high honor of presenting the W.M. Murray Lecture in 1974; and the M. Hetenyi Award in 1969 and 1972 for "Best Research Paper in Experimental Mechanics." He is currently the Society Historian. He is also active in a number of related associations, from which he has received recognition as well.

Taylor received his M.S. in Engineering Mechanics from Purdue University and his Ph.D. in Theoretical and Applied Mechanics from University of Illinois, Urbana-Champaign. His career as an academic began at Purdue, continued at University of Illinois, where he progressed from Assistant Professor of Theoretical and Applied Mechanics, to Professor, Assistant Dean of Engineering and on to Professor Emeritus from 1948 to the present. Within this time, he was also a Structural Research Engineer at the David Taylor Model Basin from 1952-1954. After a full career at the University of Illinois, he became Professor of Engineering Sciences at the University of Florida, where he is currently Professor Emeritus.

Dr. Taylor's professional activities involved consulting and various positions in industry and academia, namely with The Boeing Company, visiting professorships and corporate consulting. He is coauthor on the book, Mechanical Behavior of Solids, with C. E. Kesler, H. T. Corten and H. R. Wetenkamp, Stipes Publishing Company, Champaign, 1959, and has published approximately 50 technical papers.

For more information about the award as well as SEM, the reader is referred to *www.sem.org*.

Update on ASME Drucker Award

In Nov 1999, the ASME Drucker Award, named after **AeMES Grad. Res. Prof. Emer. Dan Drucker**, was conferred to MIT Prof. Emer. Ascher Shapiro, a renowned authority on fluid mechanics, a leader in engineering education, and one of the founders of biomedical engineering. The Daniel C. Drucker medal was established in 1997, and is conferred in recognition of *distinguished contributions to the field of applied mechanics and mechanical engineering through research, teaching and service to the community over a substantial period of time*. Dr. Drucker received the first Drucker Award in 1998 at the 13th US National Congress on Theoretical and Applied Mechanics, organized by the AeMES department at UF in Gainesville. For more info, see the web site *http://www.asme.org/honors*.

ASME Drucker Award Medal

Highlights

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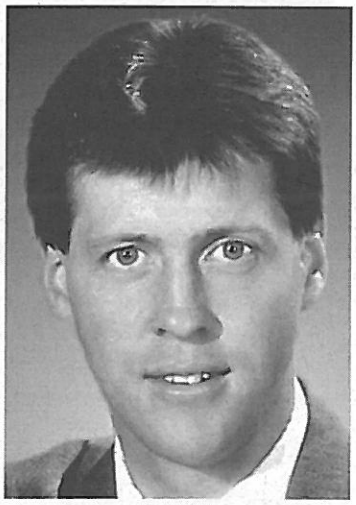
Millsaps-Taylor Memorial Lecture by Prof. Stephen C. Cowin, City College of New York, Spring 2001

UNIVERSITY OF FLORIDA

UF Dominates the 2000 International MAV Competition

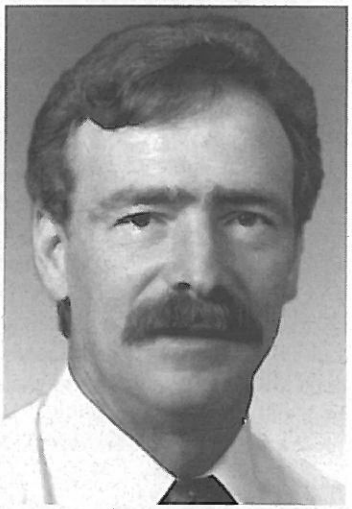


Dr. P. Ifju

Our Micro Aerial Vehicle (MAV) Team, once again, dominated the International MAV Competition. The event was hosted by Arizona State University and held at Fort Huachuca in Sierra Vista, AZ, which is situated one mile above sea level. The competition had two disciplines, a surveillance mission that required the competitors to video tape a target 600 meters from the launch area, and a payload competition in which the MAV is required to carry a 2-ounce metal block for 2 minutes. In each event, the smallest airplane (maximum linear dimension) that could perform the task was declared the winner.

This year the University of Florida won both categories. We completed the surveillance mission with a 10-inch maximum dimension MAV (bettering the previous record by 2 inches also established by UF). In the payload competition UF won with an 11 inch MAV. Again, this was also a record improving upon our record last year of 14 inches. Once again the UF MAVs incorporated the flexible wing concept.

The University of Florida had the greatest number of participants (10) and the most airplanes (9). The team also demonstrated a 6 inch MAV with 4 or 5 flights of over one minute performing loops and barrel roles. Representatives from NASA Langley, DARPA, and Lockheed Sanders were among the spectators.



Dr. D. Jenkins

Other Universities that participated include: Arizona State University (host), Notre Dame, Virginia Tech (second place Payload with a 13.5 inch MAV), Brigham Young, and Kon Kuk University of Korea. California Polytechnic, University of Maryland and University of Missouri Rolla withdrew prior to the competition. The surveillance mission has proven to be extremely difficult. In the past four years, UF has been the only university team to complete the mission (3 out of the past four years).

The UF team was represented by Scott Ettinger (team leader, and everything else), Mujahid Abulrahim (pilot, construction), Ethan Sherman (video, engines), Donald Myers (construction, antenna), Luis Martinez (construction), Tyrone Lee (construction, spotter), Jason Jakowski (airfoil specialist, construction), Otavio Pascarelli (spotter). The Faculty Advisors included Dr. Peter Ifju and Dr. David Jenkins

Next year, the competition will be hosted by UF at the Flying Gator Archer Field Location on April 7th, with April 8th as a rain date. More information about the event can be found at *http://aeroweb.aero.ufl.edu/microav/Main.htm.*

Knox Millsaps Memorial Endowment Fund: Update

The late Dr. Knox Millsaps

The Knox Millsaps Memorial Endowment Fund was established over ten years ago by family, friends, and colleagues of Knox Millsaps. Its purpose is to provide support, encouragement, and rewards for excellent performance by undergraduate and graduate students and to enhance the intellectual environment of our Department.

For those of you who do not know Knox Millsaps, he was a Research Professor in the Department of Aerospace Engineering, Mechanics & Engineering Science at the University of Florida from 1963 to 1968. From 1968 to 1973 he was Head of the Mechanical Engineering Department at Colorado State University. He returned to the University of Florida in 1973 as Chairman of the Department, and served in that capacity until 1986. He continued to teach until his death on 18 Dec 1989. For those of you who did know Knox, this short biography does not do justice to the breadth of his interests and accomplishments.

This past year, **Kil-Soo Mok** and **Neal Andrew "Andy" Winslow** shared the honors as the *Outstanding Graduate Student Teaching Assistants* for 1999-2000. In addition, **Andrew Sinclair** won the award for the *Outstanding Technical Paper - Undergraduate* for his paper entitled "Dynamics and Controls Issues of a Mars Microlander Prototype". Andrew was advised by Dr. Norman Fitz-Coy on this project. The Fund also makes awards to outstanding students in EGM 2511 Engineering Mechanics - Statics.

Another way that the Fund fulfills its purpose is to help bring outstanding individuals to visit our Department. In that capacity, the Fund helped bring **Dr. Siavouche Nemat-Nasser**, John Dove Isaacs Chair in Natural Philosophy and Professor of Applied Mechanics and Engineering Science at the University of California at San Diego here last February to deliver the Taylor-Millsaps Lecture.

We remind the reader that in Spring 2001, the Taylor-Millsaps lecturer will be **Dr. Stephen C. Cowin**, City College of New York Distinguished Professor of Mechanical Engineering. The theme of his talk will be biomechanics. For more details on Dr. Cowin, we refer the readers to the Spring 2000 issue of *The Streamline*, which can be accessed from the Department's home page *www.aero.ufl.edu.*

The Fund continues to grow, and had a balance of over $165,000 as of 26 Sep 2000.

Honors and Awards

Dr. Oana Cazacu, a postdoctoral researcher working with Dr. N. Cristescu, has been awarded in Mar 2000 a research grant from Alcoa, Inc., to develop new invariant, coordinate-free formulations of anisotropic yield criteria for aluminum alloys.

Prof. M.A. Eisenberg has accepted an appointment to the *International Scientific Advisory Committee* of SECTAM XXI, the 21st South-Eastern Conference on Theoretical and Applied Mechanics. SECTAM XXI, will be held at the University of Central Florida in Orlando, FL., 19-21 May 2002, on the 40th anniversary year of the first SECTAM conference.

Dr. A. Kurdila has been promoted to the rank of professor with tenure, and **Dr. P. Ifju** has been promoted to the rank of associate professor, effective 11 Aug 2000. He also received the Discovery Channel's top 10 Innovation of the Year Award in May 2000, for the development of the flexible wing Micro Air Vehicle

Aft compartment of Space Shuttle at KSC

Teaching Activities

Integrated Product and Process Design, 2000-2001

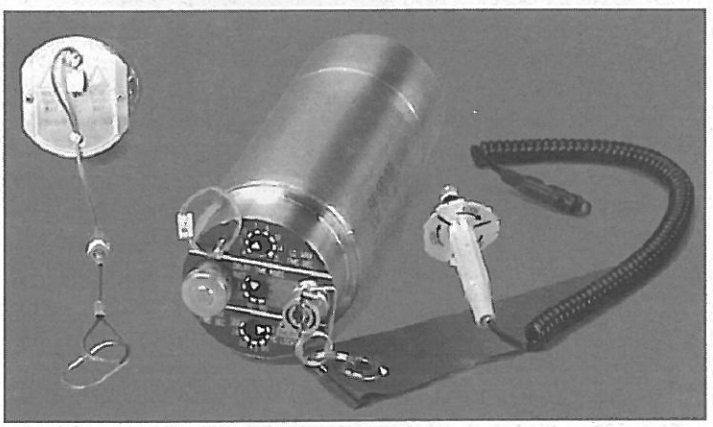
For the academic year 2000-2001, there are 12 AeMES undergraduate students participating in 9 of the 31 Integrated Product and Process Design (IPPD) projects that are funded by industry, and that cover 5 main areas: Aerospace/mechanical science, chemical engineering, electrical engineering, software engineering, and biomechanics. About 180 undergraduate students from most engineering departments and from the Decision and Information Science department of the College of business participate in this year's IPPD program. Three of these thirty-one projects are coached by three AeMES faculty.

IPPD is a highly successful college-wide two-semester course sequence that can be used to replace the traditional capstone design courses for the satisfaction of the BS degree in engineering. In the words of Dr. Alexander Nauda, Manager, Research & Advanced Technology, Raytheon E-Systems Communications Division, the IPPD program at UF is *"a true industry/university partnership, and is an excellent model to improve the quality of undergraduate education"*. In each project, a group of (5 to 7) multidisciplinary students work under the guidance of a faculty coach and a liaison engineer from the sponsoring industry to design and build an authentic industry product for the sponsoring company (customer). In this fifth year of its history, the IPPD program has received the highest number industrial projects, and the highest number of participating undergraduate students.

The IPPD program provides both classroom and laboratory experience that show:

- How fundamental engineering science is relevant to effective product and process design

- That design involves not just product function, but also producibility, cost, schedule, reliability, quality, customer preferences, and life-cycle issues



Ammunition fuse initiator

- How to complete projects on time and within budget

- That engineering is a multidisciplinary effort

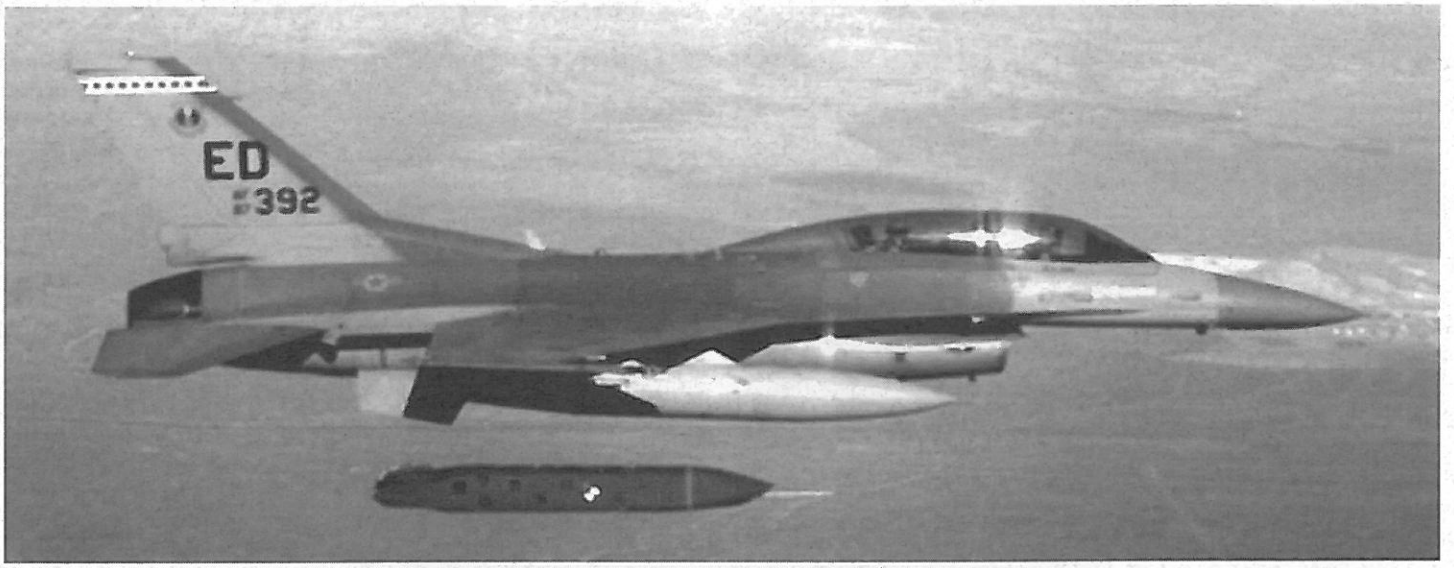
Working in small multidisciplinary project teams, students get important practical experience in teamwork and communication and in developing their leadership, management and people skills. The advantages of IPPD are well recognized by industry. Concurrent design of products and processes improves product costs and quality and reduces time-to-market. Students who have worked on real-life projects, and know how to work in teams are more valuable as employees. They also recognize the importance of communication among different engineering and business disciplines.

On the other hand, sponsoring industry participants also benefit from the IPPD program at UF. These companies not only have the opportunity to influence the education of future engineers, they also have our students design important projects for them at a highly competitive cost. They can also interact with UF faculty coaches with the knowledge and expertise in the technical areas of their interest. These companies will gain visibility with UF students, and will be able to identify and recruit the best UF students. This year, a panoply of 27 large to small companies, and US government agencies, participate in the IPPD program: Boeing, Cordis Neurovascular, Dow Chemical, Harris Corp., IBM, Lockheed-Martin, Motorola, Siemens, Texas Instruments, US Air Force, US Special Operation Command, etc.

The UF IPPD program has received excellent praises from industry and participating students. Mr. Paul H. Floyd, Vice President of Engineering, Network Access Products, Pardyne, once said *"Students participating in the IPPD program did an outstanding job on a very difficult project. I was impressed with how well the program lived up to its early plans. An excellent educational experience"*. Mr. Arnry Mijon, a graduate from the Industrial and System Engineering department, commented: *"The IPPD program was the most worthwhile experience of my engineering education. The real world and team aspect of the program helped me to develop invaluable skills and tools in project management and implementation"*.

Dr. N. Fitz-Coy

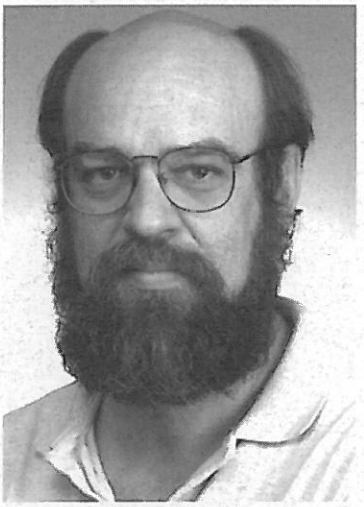
AeMES undergraduates **Ms. Lauren Gleason** and **Mr. Andrew Tatsch** are working on a Boeing sponsored project titled *Smart Quick Disconnect for Lauch Vehicles*, coached by AeMES **Assoc. Prof. N. Fitz-Coy**. Also included in this team are one Computer and Information Science (CISE) student, one Electrical and Computer Engineering (ECE) student, one Decision and Information Science (DIS) student one Mechanical Engineering (ME) student. Integrated Vehicle Health Management (IVHM) will play a significant role in the modernization of the current space transportation fleet (Shuttle) and also in the next generation of reusable launch vehicles (RLVs). IVHM refers to both the instrumentation (sensors, data recorders, power supplies, etc.) and the data processing activities that provide useful information (rather than data) to the user. This technology has the potential to significantly reduce the ground processing time of the vehicle, to enhance the vehicle performance and safety, to schedule vehicle maintenance through trend analysis, and to streamline trouble shooting efforts. Dr. Fitz-Coy's team is charged with the design of a smart, multi-function, quick disconnect (QD) assembly for the detection of hazardous gas in the aft compartment of the Space Shuttle (see inset photo). The QD to be designed should be able to automously perform leak check of the fluid



F16 fighter launching an advance cruise missile

connection(s) and continuity checks of the electrical/data connections. This team will test their prototype at the Kennedy Space Center. All participants in this project are required to be US citizens.

Mr. David Grau and **Mr. Stuart Hoelle** are members of the team working on the US Air-Force sponsored project titled *FZU Envelope Expansion*, coached by **Assoc. Prof. D. Mikolaitis**. Also working with this team are two ECE students, one ISE student, and one ME student. Fuze initiators supply the power to arm munitions and those used by the USAF derive their energy from the environment, that is the air stream surrounding the munition. The goal of this project is an improved fuze initiator that is capable of functioning at higher altitudes than current designs, work in the subsonic, transonic, and low supersonic regimes, and integrate with a wide range of existing munitions. At the same time all the safety and environmental operating conditions of the existing product must be maintained.



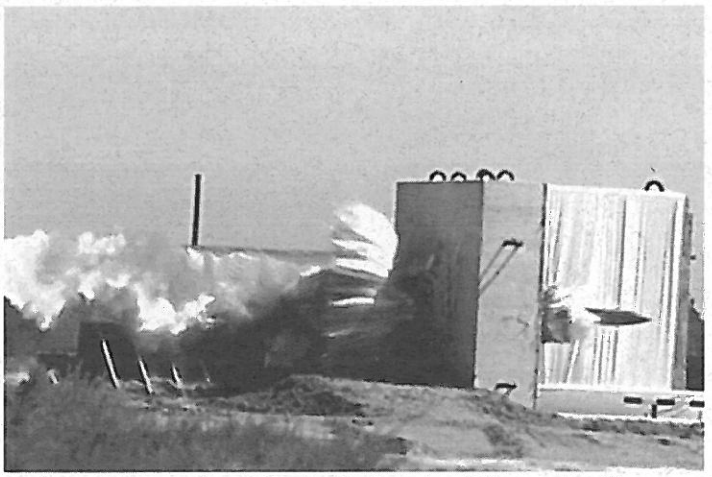
Dr.D. Mikolaitis

Mr. Ryan Parry is working on a project titled *Cruise-Missile Powerpack for Flight Termination System*, coached by **Prof. L. Vu-Quoc**, sponsored by the Lockheed-Martin Missiles and Fire Control—Orlando. Working with Ryan on this project are two ECE students, one ISE student, one Material Science and Engineering student, and one ME student. LMMFC-O is manufacturing a precision advanced cruise missile capable of launch outside area defenses to kill hard, medium-hardened, soft/soft-distributed, fixed or relocatable targets. After launch, the cruise missile will fly autonomously over a low-level circuitous route to the area of a target, where an autonomous terminal guidance system will guide the missile in for a direct hit. LMMFC-O has also teamed with a small business to develop advanced power storage devices called ultracapacitors, based on nano-materials, to solve high-power pulse requirements. An opportunity for technical infusion of this device into defense products has presented itself in the Flight Termination System of the above mentioned advanced cruise missile. The current power source is an expensive pack of cadmium batteries. LMMFC-O is interested in developing an alternative powerpack comprised of lithium ion batteries and an ultracapacitor that may hold many advantages in performance, cost, and "environmental friendliness" over the cadmium batteries. The goal of the project is to design and fabricate a prototype of such powerpack. The powerpack casing will be constructed from composites or durable plastics and will house several lithium ion batteries coupled with an ultracapacitor. The device must meet environmental requirements, volumetric/weight requirements, electrical requirements, and a lowest-cost objective.

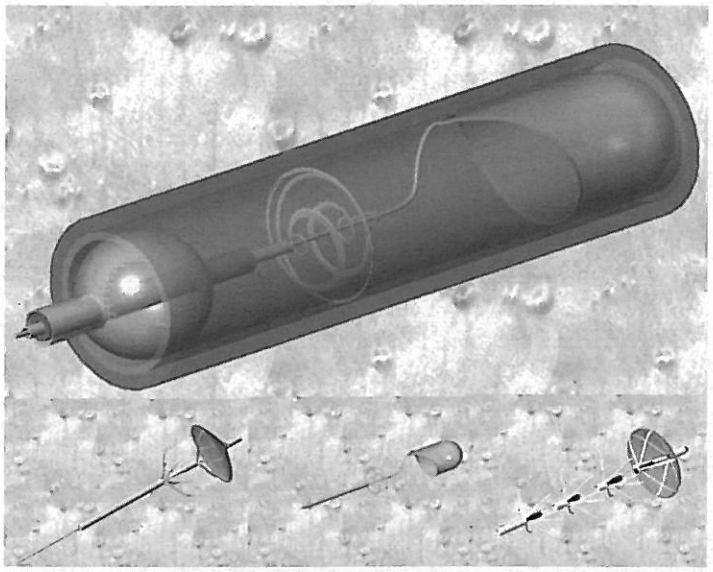
Dr. L. Vu-Quoc

Ms. Aliza Kapnek is working with a team coached by Chemical Engineering (CHE) Prof. R. Narayanan on a project titled *Water Meter Noise Reduction*, sponsored by ABB Co. The goal is to characterize the noise created by water hammer in an oscillating-piston water meter.

Ms. Stephanie Buskirk and **Mr. James Mellman** are working with a team coached by ME Prof. J. Chung on a biomechanics project titled



Advance cruise missile piercing through a thick concrete wall



A micro-endovascular device

Mechanical Clot Retrieval Device, sponsored by Cordis Neurovascular. The goal of this project is to develop a micro-endovascular device for the treatment of ischemic stroke that involves disruption and retrieval of these blockages. Brain attacks (or stroke) are usually preceded by signs that come and go quickly; these signs are called transient ischemic attack (TIA), which is caused by blood flow that is blocked for only a few minutes. (*Ischemia* is a localized tissue anemia due to an obstruction of inflow of arterial blood.) A patient with TIA may suffer from brain attack within the next year, if not sooner. It is therefore important to treat TIA to prevent a subsequent brain attack.

Ms. Regina Richards is working with a team coached by ME Assoc. Prof. W. Lear on a project titled *Electric Fuel Pump*, sponsored by Pratt & Whitney Space Propulsion. The pump is used for aerospace applications, and the work involves modeling, optimizing, and prototyping the fuel delivery system.

Mr. Daniel O'Donnell is working with a team coached by ISE faculty Dr. Keith Stanfill on a software engineering project titled *System Engineering Tool*, sponsored by RedSea Works, Co. The goal is to develop a prototype software application to automate protions of a manual, proprietary, mechanical systems engineering process.

Ms. Priya Prasad is working with a team coached by MSE Prof. J. Ambrose on another biomechanics project titled *Demineralization Process Chamber*, sponsored by Regeneration Technologies. The goal of this project is to design, build, and test an automated reactor for the demineralization and leaching of particulate or bulk allograft bones.

Mr. Donald Myers is working with a team coached by CHE Prof. S. Svoronos on a project titled *Advanced Water Strainer*, sponsored by the US Special Operations Command. Engines of boats are cooled by raw water. Boat engines may ingest sand, shells, seaweed, and mud, which may clog the raw water strainer, and ultimately lead to engine over heating. The goal of this project is to design a new approach based on creating a vortex to combat this problem.

For more info on the IPPD program, the reader is referred to the web site *http://www.ippd.ufl.edu/*.

Research Activities

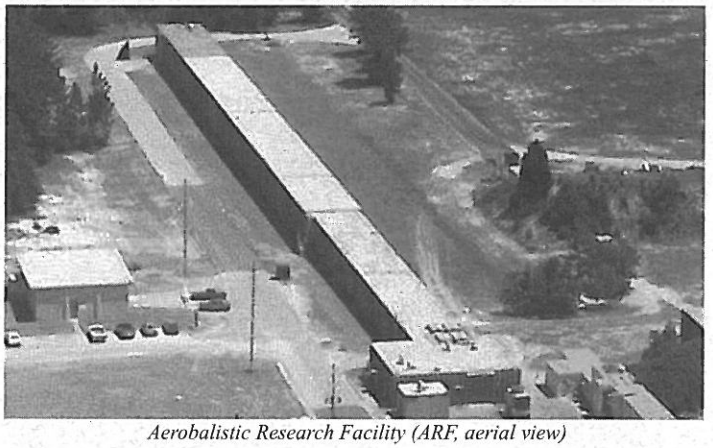
Aeroballistic Research Facility for AeMES

Access to New Research Facilities for AeMES: The University of Florida (UF) has a continuing need for test facilities and equipment to enhance its program of education, research, and academic growth. The unique Joint Use Agreement between Eglin AFB and UF's Graduate Engineering & Research Center (GERC) already provides one means for sharing the use of a broad range of laboratory and test facilities. Another approach is the Cooperative Research and Development Agreement (CRDA), a non-contractual vehicle that provides for joint development of a particular research and development project between the federal government and other organizations. **Prof. Pat Sforza**, Director of the GERC and a member of the AeMES faculty, reports that a CRDA between the GERC and the Air Force Research Laboratory Munitions Directorate (AFRL/MN), aimed at the enhancement of the latter's Aeroballistic Research Facility (ARF), was signed in June 2000.

Dr. P. Sforza

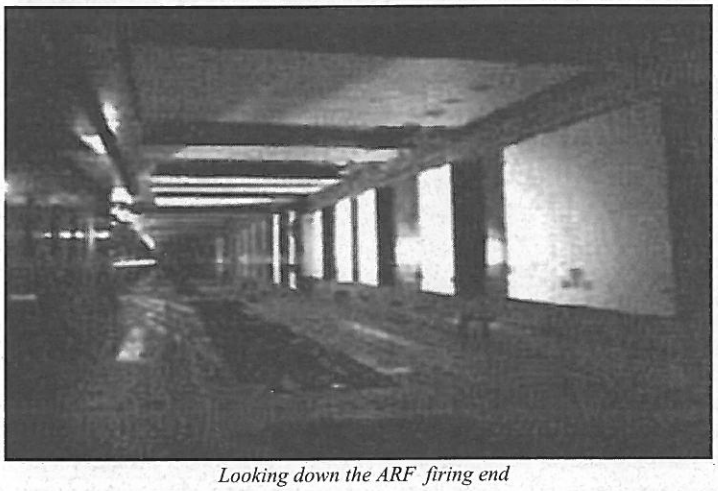
Aeromechanics research and testing in the ARF: The ARF is an enclosed indoor firing range used to examine the exterior aerodynamics and ballistics of various projectiles in free flight. This laboratory test facility is used to advance basic aerodynamic knowledge and define aerodynamic performance, stability and control parameters for hypervelocity missiles, advanced ammunition, high fineness ratio penetrators, sub-munitions, and many other types of flight vehicles. The ARF has the capability to launch projectiles using powder guns, compressed gas launchers, two-stage light gas guns, and a high performance single-stage gun. Bore diameters range from 7.62mm to 76mm, and velocities up to 3200 meters per second have been achieved. The instrumented section of the ARF is 207 meters long with a square cross section, 3.66 meters on a side for the first 69 meters and 4.88 meters on a side for the remaining length. There are 131 locations available for instrumentation sites, each having a longitudinal separation of 1.52 meters. Currently 50 such sites are being used, each to housing a pair of orthogonal shadowgraph imaging stations.

Using the ARF for GERC Research: The ARF, which is now jointly operated by GERC and AFRL/MN, provides an opportunity for the GERC to carry out research on a collaborative basis for the faculty and students of UF and other universities, Eglin organizations, and commercial companies. The CRDA alternative provides a period for developing a long-range approach and strategy for the future use of the facility. The details of such a project are worked out during the long-term transition period of the CRDA, thus providing an opportunity for UF and any partners to determine the viability of chosen development and implementation plan. A key element of the CRDA alternative is the establishment of a partnership of UF with several collaborating entities. In the case of the ARF one might envisage



Aerobalistic Research Facility (ARF, aerial view)

the GERC partnering with sensor, optics, and test companies, not only to enhance UF's academic capabilities, but also to increase utilization of the facility by Eglin AFB. Of course, the goal for the University of Florida in these activities is not business development but the growth of its academic and research capabilities. Details of the ARF appear on GERC's website: *www.gerc.eng.ufl.edu*.



Looking down the ARF firing end

Service to profession

Prof. L. Vu-Quoc is organizing the symposium on *Computational Methods for Adaptive Structures and MEMS*, to be held at the *6th US National Congress on Computational Mechanics*, Dearborn, MI, 1-4 Aug 2001. A goal of the symposium is to bring together researchers working in the interdisciplinary fields of adaptive structures, micro-electro-mechanical systems (MEMS) and allied fields to discuss novel computational methods recently developed for applications in these fields, and/or novel applications of existing computational methods. The symposium also serves as a venue to promote collaboration among experienced researchers already working in computational simulations of adaptive structures and MEMS, and to invite experts in other fundamental areas of computational and applied mechanics to contribute directly to these fields.

The topics for possible contributions to this symposium as listed below are not intended to be inclusive; any other topics related to the main theme of this symposium are also welcome.

- General trends on computatinal methods and research on adaptive structures and MEMS
- New computational methods for linear, nonlinear, static, dynamic analyses
- New materials for micro sensor and actuator applications
- New active material modeling and computational implementation
- New designs (based on computational, experimental, theoretical) of MEMS using existing materials (piezoelectric, shape memory, etc.)
- Adaptive beams, plates, and shells: Statics and dynamics
- General applications (e.g., inflatable space structures, aircraft structures, etc.)
- Vibrations and control: Novel computational methods
- Variable geometry structures
- Composite structures with embedded active material layers
- New structural health monitoring algorithms
- Active structural acoustics and noise control
- Fluid flow interaction with adaptive structures: Analysis and control

The co-organizers for this symposium are Dr. D. Lagoudas (Ford Professor of Aerospace Engineering at Texas A&M), Dr. N. Aluru (Assistant Professor at University of Illinois at Urbana-Champaign), and Dr. J. Boyd (Associate Professor at Texas A&M).

For more details on the symposium, please visit the web site *www.aero.ufl.edu/~vql*.

Student Society Acticities

BMES Attends National Convention in Seattle

The AeMES department and the College of Engineering sponsored eight Engineering Science students to represent UF at the national meeting of the Biomedical Engineering Society (BMES) in Seattle, Washington on October 12th -14th.

The Engineering Science students, all undergraduate members of UF's local chapter of BMES, are shown on the picture below taken at the conference.

Dr. Tran-Son-Tay and BMES students
Front Row: Dr. Roger Tran-Son-Tay (BMES faculty advisor), Suzanne Alameda, Tracy Perrotti, Cecile Perrault, James Mellman. Back Row: Nicolas Browne, Michael Pizzato, Amanda Jordan, Christine Vandry

Zonta International Amelia Earhart Fellowship Award for the academic year 2000-2001

Ms. Marianne Francois

Congratulations to **Ms. Marianne Francois**, an AeMES graduate student, for being the well-deserved recipient of the 2000-2001 Amelia Earhart Fellowship, which was established to memorialize the aviation pionneer and a Zontian (i.e., member of the service club *Zonta International*) Amelia Earhart, who disappeared in the Pacific in 1937 in her attempt to be the first woman to fly solo around the world. Zonta International established this fellowship, given annually to about 35 female students, to encourage and to support women to expand their horizons by pursuing aerospace-related sciences and aerospace engineering.

Marianne received her engineer degree from the Ecole Polytechnique Feminine (EPF), France, in June '97. In her last year of study at EPF, she was an exchange student at Embry-Riddle Aeronautical University in Daytona Beach,

Florida. In the following year, she graduated with honors with a MS degree in Aerospace Engineering from Embry-Riddle University. Her MS thesis was on volume of fluid (VOF) method. Marianne is currently doing her PhD under the guidance of Dr. W. Shyy. Her current research interest is in fluid physics in microgravity environment. Research areas in this domain include multiphase flow, heat transfer, interfacial phenomena, drop dynamics and capillarity effects. Oftentimes, such fluid flow and heat transfer problems involve moving and/or free boundaries. Marianne is a private pilot in France and enjoys precision flying competitions, as well as many ground-based sports activities.

Other Activities

Prof. Boris Balmukhanov, Director of the Kazakstan National Biotechnology Center, Almaty, Russia spent few days with us last spring, May 1-12. He received a grant from the International Atomic Energy Agency (IAEA) to visit the laboratory of Cellular Mechanics and Biorheology of **Prof. R. Tran-Son-Tay**, and to promote research between his Center and AeMES.

Dr. Oana Cazacu also presented the paper titled "Compaction and flow of granular materials on chutes", co-authored with Dr. Cristescu, at the 20th International Congress in Theoretical and Applied Mechanics, ICTAM 2000, Chicago, 27 Aug-2 Sep 2000.

Grad. Res. Prof. N.D. Cristescu was invited to participate at the NATO Advanced Research Workshop "Recent Developments in Computer Modeling of Powder Metallurgy" held in Kiev, Ukraine (May 15-18, 2000). There, he presented the paper "Constitutive Models for Powder Compaction" to appear in the Proceedings of the Conference. Dr. Cristescu was also invited to participate at the Forth North American Rock Mechanics Symposium on *Pacific Rocks: Rocks Around the Rim* (Seattle, July 31-August 3, 2000) and to chair a session. There he presented a paper (written with O. Cazacu) "On creep flow of natural slopes", already printed in the Proceedings of the Symposium. He also participated at the Congress GEO-DENVER 2000 (Denver, CO, August 5-8, 2000) where he presented two papers: "Theoretical Approach to Sand Liquefaction" and "A Model of Stability of Slopes", both printed in the Congress Proceedings.

Prof. Soon Jarng from South Korea is visiting and working with **Prof. L. Vu-Quoc** during his sabbatical leave from Chosun University. During Summer '00, two French undergraduate students, **Ms. Laurence Cabrera** and **Ms. Magali Cupif** of the National Institute of Applied Sciences, Toulouse, France, spent a research internship in the Computational Laboratory for Electromagnetics and Solid Mechanics (CLESM) under the guidance of Prof. L. Vu-Quoc. During the same period, two bright high-school students, **Mr. Paul DaRocha** and **Mr. Matthews Stephens** also spent a research internship in CLESM. All four students worked productively with all other students in the lab, in particular **Mr. Kil-Soo Mok** and **Mr. Xiang-Guang Tan**, our graduate students. Laurence and Magali were focused on the use of IDEAS to create industry-like finite-element model for aircraft composite structures. Matt and Paul were helping with the testing of a new shell element.

In Jul '00, **Ms. Nilay Papila** presented a paper titled "Preliminary Design Optimization for a Supersonic Turbine for Rocket Propulsion" in 36th AIAA/ASME/SAE/ASEE Joint Propulsion Conference in Huntsville, Alabama. In Sep '00, she also presented the paper titled "Neural Network and Response Surface Methodology for Rocket Engine Component Optimization", co-authored with **Mr. Rajkumar Vaidyanathan**, at the 8th AIAA/USAF/NASA/ISSMO Symposium on Multidisciplinary Analysis and Optimization (MAO) in Long Beach, CA.

In the same MAO conference mentioned above, **Mr. Melih Papila** presented the paper titled "Response Surface for Optimal Weight of Cracked Composite Panels: Noise and Accuracy", and **Mr. Xueyong Qu** presented a paper titled "Deterministic and Reliability-based Optimization of Composite Laminates for Cryogenic Environments".

Two scientists from the Mathematical Institute of the Romanian Academy, **Prof. E. Soos** and **Dr. I. Molnar** were guests of our department (for a month and two months, respectively) in a cooperative program supported by the National Research Council. They are working with **Prof. N.D. Cristescu** and **Dr. O. Cazacu** to formulate new constitutive equations (mathematical models) for porous materials or particulate materials, and the corresponding numerical algorithms needed for solving specific problems.

Prof. R. Tran-Son-Tay organized a symposium on "Mathematical and Computational Modeling in Cellular Mechanics" at the Annual Biomedical Engineering Society Meeting in Seattle, WA, October 2000. He also presented a paper co-authored with Drs. W. Shyy, H. S. Udaykumar and N. N'Dri titled "A Multi-Scale Model for Cell Adhesion and Deformation".

Obituary: Prof. David T. Williams

Dr. David T. Williams

Dr. David T. Williams passed away September 22, 2000. Dr. Williams was the first faculty member of the Department of Aerospace Engineering at the University of Florida. He did research and published papers in a number of fields, including flame speed, reentry into the earth's atmosphere by meteorites and spacecraft, and gas spectrometry. He invented and patented the Second-Derivative Spectrometer, and founded a company, Spectrometrics of Florida, to exploit it in the measurement of air pollutants. The company was later purchased by Lear-Sigler Corporation. He also served on the faculty Senate and other University of Florida committees, and won awards for excellence in teaching. Dr. Williams retired in 1977.

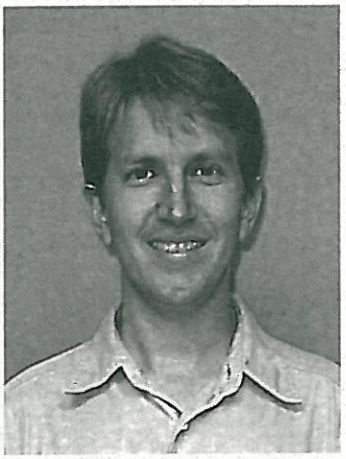
Dr. Williams earned BA and MA degrees at Columbia University and a Ph.D. in Physics at New York University in 1938. Dr. Williams taught at Carleton College and the University of Michigan, and worked for ten years as a research scientist at Battelle Memorial Institute in Columbus, Ohio, before coming to the University of Florida in 1957 as a Professor of Aerospace Engineering. At Battelle Memorial Institute, Dr. Williams made important contributions to the xerography process, which later formed the basis of the Xerox Company's success.

Dr. Williams was born February 24, 1907 in Manila, Philippine Islands, where his father was a missionary and participated in translating the Bible in Ilocano. He was married to Charlotte Rigg in 1934. She predeceased him in 1996. David T. Williams is survived by three sons: David G. Williams and wife Barbara (Groton, CT); James H. Williams and wife Ann (Charlotte, NC); and Christopher R. Williams and wife Betty (Charlotte, NC). And, eight grandchildren: Benjamin and Daniel Williams; Scott Laurel W. Reiss; James M. and Douglas M Williams; and, Jennifer, David and Joanna Williarns. And, three great-grandchildren: Kaliope Barnbauer Williams, Cameron and Catlin Reiss.

Alumni Corner

Joe LaVeigne, BS AeMES '91, started post-bac work in Physics in the summer of 1992, and began Graduate School in Physics in the Fall of 1993. There he worked with Dr. David Tanner's optical property group in the Spring of 1995 on various projects involving Fourier Transform Infrared Spectroscopy (FTIR) for two years. Then in 1997, he began to work

on a collaboration for time-resolved infrared spectroscopy project, between UF and the National Synchrotron Light Source (NSLS) at Brookhaven National Lab.



Dr. J. LaVeigne

Infrared spectroscopy measures the response (amount of reflection or transmission) of a material to infrared light as a function of wavelength. This response can be analyzed to give material properties such as resonant frequencies (phonons), semiconducting or superconductiong gap, etc. Time-resolved spectroscopy measures the spectral response of a material as a function of time, and can be used to study dynamics and interactions of non-equilibrium systems.

Joe's PhD project involved the construction and instrumentation of an IR beamline at the NSLS. This beamline used a laser pump with broad-band synchrotron radiation as the probe to perform pump-probe spectroscopy on the 100 ps to 10 ns time scale. Joe completed his Ph.D. in Aug '99 with a thesis based on his work at the NSLS.

In Feb '00, he began to work at Spectral Technology & Innovative Research (SpecTIR), a company that develops dual-use (commercial and military) specialized electro-optical instruments for remote sensing.

Joe is currently involved in the design and construction of a prototype image-stabilized hyperspectral sensor (imaging spectrometer). He is also working on upgrading and supporting the operation of a scanning polarimeter. (Polarimetry is the measure of the polarization of reflected sunlight. For small particles such as aerosols, polarimetry gives information on both the index of refraction and particle size, allowing better identification than would be possible with spectroscopy.)

For more details about SpecTIR, see *http://www.spectir.com*. In Aug 2000, Joe informed us that Spectir was looking to hire engineers well verse in the mechanical science; interested alumni may want to contact Joe directly, who can can be reached at *jlaveigne@spectir.com*.

Xiaokai Niu, PhD '99, joined the Global Technology Division of the Sonoco Paper Products Company. Sonoco is a South Carolina-based corporation that specializes in packaging products. It has 275 operations in 85 countries on five continents. Xiaokai was hired to take care of Sonoco's Mechanics and Material Science Lab at Hartsville of South Carolina. His current job function is to conduct research on paperboard and spirally wound paper tubes using experimental mechanics approaches. Xiaokai describes the city of Hartsville as a small quiet town, with a population of about 10,000. Popular sports there include hunting, fishing, golf, and tennis. Xiaokai said he was still "crazy" about tennis. His wife transferred to University of South Carolina from UF right after he graduated in Summer '99. Her school is located at Columbia, about 80 miles from Hartsville. He would drive to Columbia on the weekends. Xiaokai's new e-mail address: *Xiaokai.Niu@sonoco.com*.

Dr. H. S. Udaykumar (aka Uday), who received his PhD from AeMES, has moved to the University of Iowa as an Assistant Professor. In what follows, Uday wrote last Fall '99 to share with us some of his activities and info about his institution.

"Last semester (Fall '99), I taught undergraduate thermodynamics. U. Iowa is a smaller school than U.F. The college of engineering is small with about 100 faculty and 1200 students. The University itself is also not very big, about 20,000 students. But it has some advantages due to the small size. It has some very strong programs, like medicine, law, the international writing program etc.

U. Iowa students seem to be good, and the undergraduates have been good fun to teach. They participate well in class. Class sizes are smaller than UF allowing for good contact with students.

Iowa City is very charming with the Iowa river running through it. Iowa is very green with a rolling landscape and plenty of corn. It is not uncommon to have corn growing in the middle of Iowa City on a plot of land. They seem to really have a habit of growing corn in front of gas stations. I don't know what the significance of that is... The weather has been great so far but we are sure winter is lying in wait to atack us with a vengeance. Right now we are enjoying fall colours.

Researchwise, I am continuing to work in the areas of CFD, moving boundaries etc. and trying to develop some new applications of computations in the biomechanics and materials processing areas."

Uday's e-mail address is *ush@engineering.uiowa.edu*.

Editor's note: *All news items and articles that did not appear in the present issue of the newsletter will appear in future issues. We thank you for your support and understanding.*

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