NEWSLETTER FOR ALUMNI, FRIENDS & STUDENTS

FALL 1997

THE STREAMLINE

AEROSPACE ENGINEERING, MECHANICS & ENGINEERING SCIENCE

AeMES HOSTED MICRO-AERIAL-VEHICLE COMPETITION

Imagine that you are the leader of a law enforcement group, and you're faced with a terrorist situation where innocent hostages have been taken. The terrorists have occupied a large office building but their exact positions and numbers are unknown. From a safe distance, you open a suitcase-size container, then activate and release several hundred pre-programmed flying vehicles, each one no larger than your thumbnail. The flyers converge on the terrorist building, seek open portals such as ventilation stacks, windows and so on, and enter the building. Once inside, they disperse throughout the building. Using their sensitive chemical sniffers, they locate any human beings by smell and then land on a nearby convenient surface establishing a network of listening and visual observation posts in critical areas. Back at the launch site, your monitoring equipment allows you to quickly map out locations of the hostages and of the terrorists, and to determine the identities, the armaments, the weaknesses, etc. of these terrorists. You then quickly develop a plan of action to bring the crisis to a swift resolution with no harm to the innocent hostages.

Sounds like some outrageous technology-ridden action movie, right? Well, these types of autonomous *Micro Aerial Vehicles* (mAV) are being considered as very real possibilities for the not too distant future. DARPA, the research arm of the DOD, is expected to begin funding research in several areas of "flight enabling technologies" for the first generation of such vehicles to the tune of about $30 million dollars. These vehicles are in the range 6 - 20 cm in size, a size which puts them on the threshold of extreme aerodynamic difficulty. With current technology, vehicles on the order of 40 cm are feasible. The ever increasing miniaturization of payloads such as video cameras and sensors have made theses small vehicles a distinct possibility. With miniaturization vehicle costs will also be reduced making them expendable, unlike the very costly Unmanned Aerial Vehicles (UAV) of today.

Almost two years ago the AeMES Department initiated a research program to study mAVs after Prof. R. Haftka informed the department about exciting new activities in the field. mAV research is currently one of the major focus areas of the AeMES department involving many faculty including **Drs. R. Haftka, D. Jenkins, W. Shyy, E. Walsh, B. Carroll, N. Fitzcoy, and R. Fearn**. In addition, **Assoc. Prof. T. Nishida**, a micro-device expert from the Electrical Engineering Department is involved in the development of micro-actuators for aerodynamic control. The research effort has matured from an initial dissimulation of the state-of-the-art to a multi-disciplinary focus group to study all aspects of mAVs including aerodynamics, structures, propulsion, and control. The AeMES Department has established themselves as a world leader in the area of mAV research, and has taken the initiative to host the first competition.

On 5 Apr '97, the AeMES department hosted the first ever fly-off competition for mission-capable mAVs at the Flying Gators Model Airplane Club (FGMAC) facility just outside Archer Florida. The event was sponsored by the International Society for Structural and Multi-disciplinary Optimization (ISSMO), with support from the AeMES department, the U.S. Naval Research Laboratory, and FGMAC. The goals of the event were to demonstrate the latest advancements for inexpensive mAVs, establish performance baselines, identify technical shortfalls and establish an annual competition to motivate mAV research in the university setting. Six teams from as far way as California competed for a $1250 first prize.

The objective of the competition, established by Dr. Haftka, was to employ multi-disciplinary design optimization (MDO) to design and build the smallest mAV that could perform the following mission.

Mr. B. Massenberg, UF-team, launched the AeMES mAV with an internal combustion engine.

HIGHLIGHTS

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G.I. Taylor Memorial Lecture in Spring '98 by Prof. T. Kane, Stanford University (see page 4).

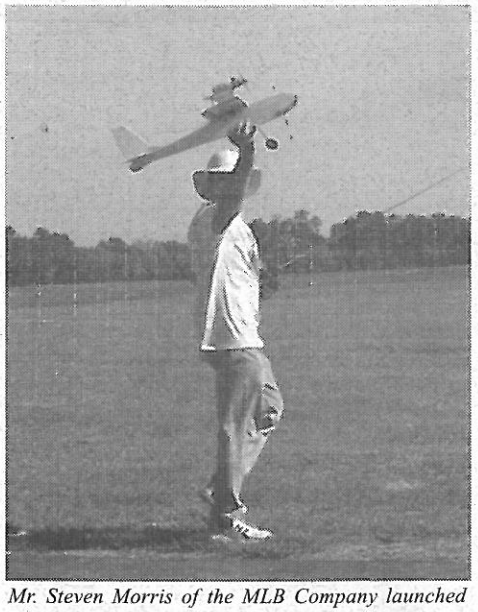
UNIVERSITY OF FLORIDA

- Fly to, and photograph, a 1.5 meter symbol on the ground located 600 meters from the launch site. The symbol was surrounded by a 1.5 meter high curtain type fence so that it could not be seen from the launch site.
- Provide a legible image of the symbol to the judges at the launch site.
- Additional requirements included: Limitations on mission time, the requirement to remain airborne until the image was delivered and some minor technicalities that insured the spirit of the competition was upheld.

Radio-controlled aircraft of the size in the competition can be seen and conventionally controlled from distances as far away as 150 meters. Since the target symbol was 600 meters from the launch site this meant that the mAVs had to carry video cameras on board to provide visual feedback for control and imaging of the target symbol. Flying the mAVs is like playing a flight simulator video game.

Five teams entered the competition including: University of California at Santa Barbara (UCSB), MLB Company represented by its president Steve Morris, Mississippi State University (MSU), and two UF teams, one with an internal-combustion (IC) engine and one with an electric motor. By measuring the largest dimension on each aircraft the sizes ranged from about 26 inches for UF-team IC and MSU mAVs, to 48 inches for UCSB-team mAV. Since AeMES hosted the competition, we voluntarily excluded ourselves from the prizes. After a full day of flight attempts, only two teams managed to perform the mission: MLB-team and UF-team (IC mAV). Although AeMES's mAV was the smaller of the two, the prize went to **Mr. Steve Morris** of MLB.

The UCSB-team with their mAV.

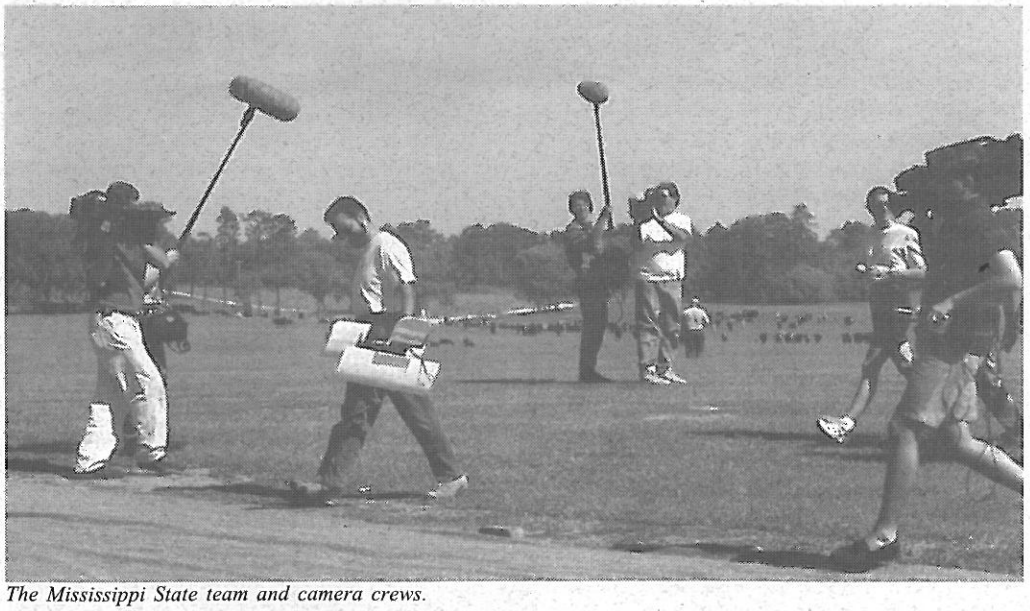


Mr. Steven Morris of the MLB Company launched his winning mAV.

The competition was judged by representatives from the Office of Naval Research and NASA Langley Research Center. The event was covered by news crews from the Discovery Channel, the Learning Channel, Local ABC News, Reuters and numerous local news papers.

A second mAV competition was held at FGMAC Archer field on 6 Sep '97. Here, the objective was to fly the smallest possible vehicle, carrying a four ounce weight, for two minutes under radio control. Although only one out of the four competitors managed to fly for the entire two minutes (**Mr. Ed Smith** with an airplane of 23.75 inch maximum dimension), two other smaller vehicles managed to keep their airplanes airborne, for a shorter duration. These included **Mr. Gabriel Torres**, an AeMES student, who flew for 1 minute and 3 seconds with a vehicle whose maximum dimension was 15.85 inches, and **Mr. Lyman Slack** who flew a 13.75 inch airplane for 25 seconds. Mr. Smith was awarded $250, Mr. Torres $150 and Mr. Slack $90 for first, second, and third place, respectively.

These competitions have served as a proving ground for conceptual mAV designs. In addition to building and flying mAVs, the AeMES department has other mAV research projects. Drs. Carroll, Fitzcoy, and Nishida have recently acquired sponsorship from the Air Force Office of Scientific Research to develop micro-actuators for control of flow separation on the surface of small wings. Dr. Haftka and his students are performing optimization for AeMES mAV entry for next year's competition. Drs. Shyy and Jenkins have been modeling and performing wind-tunnel tests on flexible membrane wings. Edward Walsh is guiding students in his aero design course through the application of conventional design strategies as applied to mAVs. Judging by the enthusiasm of participating faculty and students, mAV research has a bright future in the AeMES Department.



The Mississippi State team and camera crews.

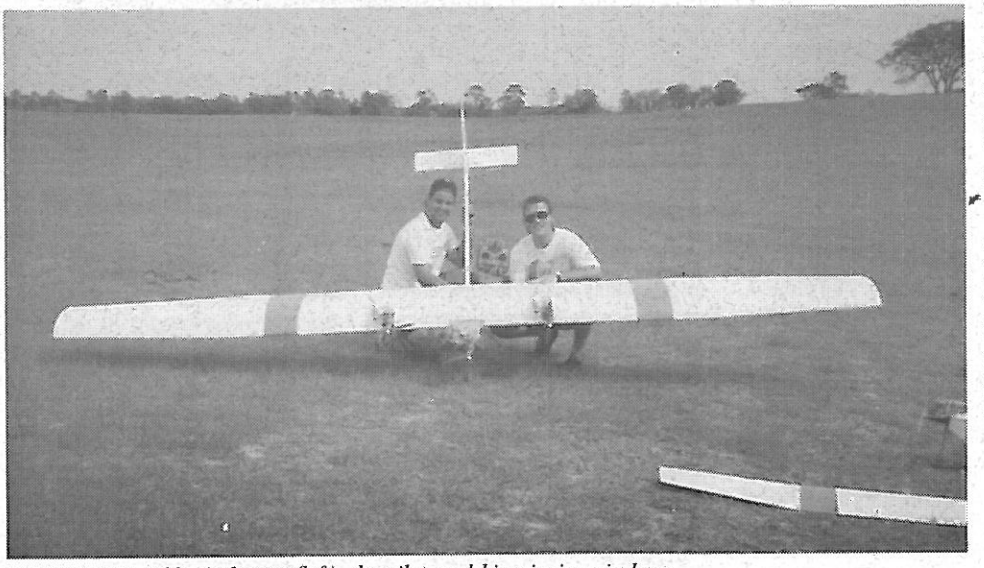
AeMES student won SAE Aero Design Competition

Mr. Eddy Rios Anderson, an AeMES undergraduate, won the Best Design Award at the *1997 SAE Aero Design Heavy-Lift Competition* with a performance close to a new world record. The competition took place on 26-28 Apr '97 at Daytona Beach, FL. Assist. Prof. C. Segal, Eddy's advisor, said that it was the first time that a UF student scored so high in this challenging competition that brought together teams of students from over 50 universities every year.

The competition was conceived for engineering students to design, fabricate and test an original aircraft. Such aircraft was to take off, made a 360 deg. turn, and landed safely while carrying the maximum possible load. The competition had two classes. The regular class imposed certain restrictions on the designers: The engine to be used was dictated by the organizers, while the wing area was limited to 7750 cm^2. The open class had only a few restrictions, thus giving the designers a more challenging problem and allowing more creative solutions. In both classes, the attention was placed on the presentation of an original design, documented through a written report and oral presentation prior to the flight demonstration. The report and the oral presentations were evaluated by the competition judges, with points added to the final score. A strong emphasis was placed on the ability of the designers to demonstrate the accuracy of their calculations in predicting the maximum payload their airplane can lift. Points were deducted for over- or underpredicting the maximum weight-lift capability of the airplane.

Traditionally, airplanes were designed starting from statistical data of previous configurations manufactured for a similar mission. This method stemmed from the usually justified assumption that previous designers and airplane builders had gone through long processes of research, development and design analyses, as well as post fabrication evaluations and testing. Occasionally, unusual missions were prescribed, and the result was a surge of innovative ideas that, when analyzed careful, may result in new and attractive configurations. The purpose of the SAE Heavy-Lift competition was to stimulate these ideas.

This format of creative thinking led Eddy to present his original entry in the open class in the 1997 competition, and won the Best Design Award for his airplane. Eddy and his pilot, the only members of the UF team, are shown in the accompanying photo with their award winning airplane. His 15 feet span, high aspect ratio wing with significant camber provided large lift and a light structure. With it, Eddy performed a mission close to the world record during his first participation in this class, defeating larger teams from other universities that had several years of competition experience and substantially larger budgets. Several factors can be attributed to Eddy's success: A clear understanding of the mission requirement, a thorough analysis and performance prediction, the combination of a conventional airplane design configuration with a modern, highly cambered airfoil and, of great importance, dedication and desire to produce a record capable airplane. According to Dr. Segal, the concept, the design analysis and the manufacturing of the airplane were entirely the product of Eddy's effort, with virtually no advisement. Most of the financing of the project was secured by Eddy, as well, with partial support from the AeMES department.



The UF team: ***Eddy Anderson** (left), the pilot, and his winning airplane.*

Highlights of Department Seminars

Second Knox Millsaps Memorial Lecture

Dr. J. Sobieski

On 5 Dec '97, **Prof. Jaroslaw Sobieski** gave the second Knox Millsaps Memorial Lecture titled *Optimization in Engineering Design and Its Synergy with High Performance Computing* at UF.

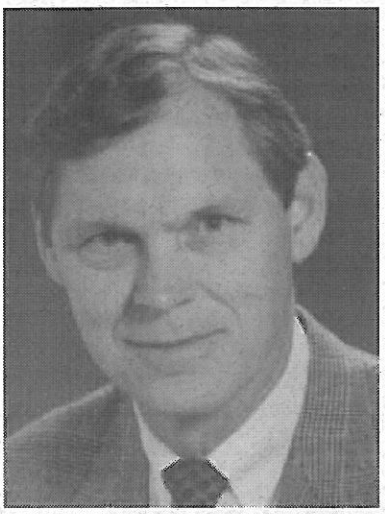
Dr. Sobieski is associated with the University of NASA Langley Research Center in Hampton, VA, where he has been on the technical staff since 1971. He received his Ph.D. from the Technical University of Warsaw (TUW) in Poland. He then held a series faculty positions, first at TUW (1955-1966), then at St. Louis University (1966-1971), and George Washington University (1972-1991) before joining the University of Virginia. He is currently the Multidisciplinary Research Coordinator and Associate Manager of the Center of Computational AeroSciences.

He has received numerous honors that include the NASA Medal for Exceptional Engineering Achievement, and the AIAA MDO National Award in 1996. He is an AIAA Fellow and the Founding Chairman of the AIAA Technical Committee for Multidisciplinary Design Optimization.

In his seminar, Dr. Sobieski discussed the use of advanced computing technology to optimization. The design of complex engineering systems, e.g., an aircraft, a car, a ship, or an electric power plant, is a product of human intellect supported by a numerical process capable of resolving the dilemma that "everything affects everything". Two basic elements in that process are: (1) An emerging discipline of Multi-Disciplinary Optimization (MDO) that offers formal means to search the design space for feasible and optimal designs; (2) A computing power sufficient to process huge amounts of data and to extract information in a form that can be absorbed by designers, and that can be put to use within the time schedule and budget of the project at hand.

Starting with the fundamentals, Dr. Sobieski outlined the MDO state of the art capabilities and limitations, with illustrations by examples from aerospace. He showed how the computing technology trend toward massively concurrent processing may enable a quantum jump in the MDO state of the art, provided that new paradigms in analysis and optimization be invented.

AIAA T. von Karman Lecture by J. Junkins, Texas A&M



Dr. J. Junkins

On 1 Apr '97, **Dr. John L. Junkins**, George Eppright Professor of Aerospace Engineering at Texas A&M University, visited the University of Florida as the *1997 AIAA Theodore von Karman Lecturer*. A member of both the National Academy of Engineering and the International Academy of Astronautics, Dr. Junkins received his BAE degree from Auburn University, and his MS and Ph.D. degrees from the University of California at Los Angeles, where he studied under Dr. Sam Herrick, an early pioneer in Astronautics. (Dr. Herrick not only did research in Astronautics long before it became fashionable, but he was also technical advisor to the science fiction classic *The Day The Earth Stood Still.* It was Dr. Herrick who prepared the professor's blackboard in the movie.)

At 19, the young Junkins joined NASA at Huntsville, AL, in 1962, to work on the dynamic analysis of the Saturn rockets. In 1970, Dr. Junkins joined the University of Virginia as an assistant professor, and was promoted after four years to associate professor. In 1978, He joined the Virginia Polytechnic Institute as a full professor, and in 1985 accepted the TEES Distinguished Chair at Texas A&M University. Dr. Junkins, director of the Center for Mechanics and Control at Texas A&M, is one of the foremost researchers in Astronautics. He authored three books, over 100 refereed papers, and edited three monographs. Dr. Junkins's early work was on launch vehicle design and satellite photogrammetry. He generated one of the first lunar maps. He also developed the first finite element model for Earth's gravity field. His recent works have been focused on maneuvers and vibration control laws for flexible spacecraft, together with laser sensing technology.

In his seminar titled *Adventures in Dynamics and Control,* he shared with the audience many insights that he obtained during his thirty-year career in this field. In particular, Dr. Junkins stressed on a unified analysis methodology for mechanics and control for work in the area of spacecraft dynamics, stability and control. "Controllers for dynamical systems are best designed, on the average, by analysis whose expertise encompasses both modeling of the class of systems under discussion, and methodology for designing controllers," said Dr. Junkins. Good decisions on issues such as selection of coordinates, modeling approximations, selection/design/location of sensors and actuators, and definition of meaningful performance measures require expertise beyond algebraic/computational methods for control design. As evidence of the saying that "there is nothing more practical than a good theory," Dr. Junkins gave various application examples spanning orbital dynamics, spacecraft attitude dynamics and control, nonlinear multibody dynamics, etc.

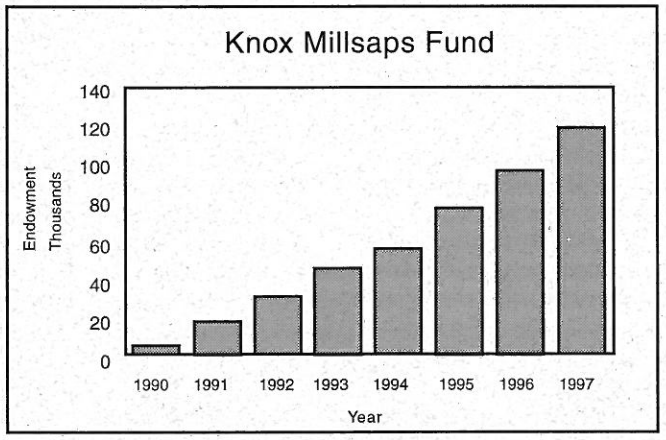
Knox Millsaps Memorial Endowment Fund: Update

The Knox Millsaps Memorial Fund was established in Dec '89 by family, friends and colleagues to support some of the intellectual activities nurtured by Dr. Millsaps during his career as Professor and Chairman of the AeMES Department. The two primary purposes of the Fund are to encourage and reward excellence in performance by our students, and to enhance the intellectual environment for students and faculty by supporting visits from distinguished colleagues. General descriptions of the activities and administration of the Fund were featured in the Spring 1996 issue of Streamline, and specific activities supported by the Fund are described elsewhere in this issue. This article is a brief financial report to alumni, friends and students.

During the past year, the endowment principal grew 24% through gifts and investment earnings to $120,000 in addition to transferring $4,300 to an account from which awards were made. The budget for the current academic year is:

Awards to Undergraduate Students	$1,700
Awards to Graduate Students	$1,100
Honoraria for Named Lecture Series	$2,200
Total	$5,000

Our thanks to the donors who have enabled us to establish this collection of student awards and lecture series. Our goal for next year is to increase the amounts of existing awards to more meaningful levels rather than to establish new ones. If you have suggestions, or would like more information about the Fund, please contact Prof. R. Fearn.



Knox Millsaps Fund

23rd G.I. Taylor Memorial Lecture

Dr. Thomas Kane, Professor Emeritus of Applied Mechanics at Stanford University, will deliver the 23rd G.I. Taylor Memorial Lecture titled *Computerized Symbol Manipulation in Mechanics* in Spring '98. The date of his lecture will be announced later.

The author of nearly 200 publications and five books, Professor Kane has had a distingished career for more than forty years of providing fundamental results in mechanics and in spacecraft dynamics and control. His early contributions to mechanics were on the propagation of elastic waves in solids. Prof. Kane is most known in the field of multibody dynamics, and in particular spacecraft dynamics, where he made seminal contributions over the last thirty years. Together with his former students, he developed AUTOLEV, a computer code for symbolic formulation and numerical solution of multibody systems.

Prof. Kane received his education at Columbia University, after an interruption due to World War II, when he served as a combat photographer in the Pacific theater of the war. He graduated with degrees in Civil Engineering and a Ph.D. in Applied Mechanics. He taught at the University of Pennsylvania, before joining Stanford University as professor in Applied Mechanics in 1961.

Department News

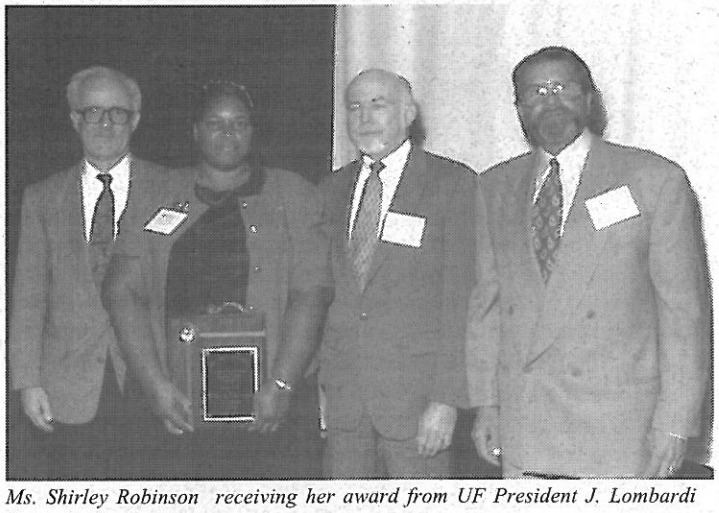
Honors and Awards

Grad. Res. Prof. N.D. Cristescu has been elected as a member of the Engineering Section of the Academia Europaea (European Academy). The Academy is an international, non-governmental association of individual scientists and scholars, aiming to promote learning, education, and research. It currently has 1650 members from 34 countries. The Academy's membership covers a wide range of disciplines, including the physical sciences and technology, the biological sciences and medicine, mathematics, the humanities, the social and cognitive sciences, economics and law.

Congratulations to **Ms. Shirley Robinson**, AeMES Sr. Secretary, for her selection as a 1996-1997 Gabor Employee Recognition Award winner. This university-wide Superior Accomplishment Award recognizes staff members who contribute outstanding and meritorious service to the University of Florida and to the university's efficiency and quality of life. Shirley was one of only four University of Florida employee's to receive the award. UF President J. Lombardi presented the award to Shirley at the award ceremony on 22 May '97.

Prof. B.V. Sankar visited Japan during 19-29 Jul '97 at the invitation of the Japan Society of Mechanical Engineers on the occasion of their centennial celebrations in Tokyo. He delivered a keynote lecture entitled *Translaminar Reinforcements in Laminated Composites* at the Symposium on New Application of Solid Mechanics for Advanced Materials. He also visited Yamagata University at Yonezawa and Akita University, and gave a series of seminars on mechanics of composite materials and structures. The lectures were sponsored, respectively, by the Yamagata University and the International Exchange Foundation of the Mining College at Akita University.

Prof. B. V. Sankar has been appointed to the Editorial Board of the *Journal of Sandwich Structures and Materials*. The journal will be published by Technomic Publishing Company, which also publishes the Journal of Composite Materials as well as various books and proceedings in the field of composite materials and structures.

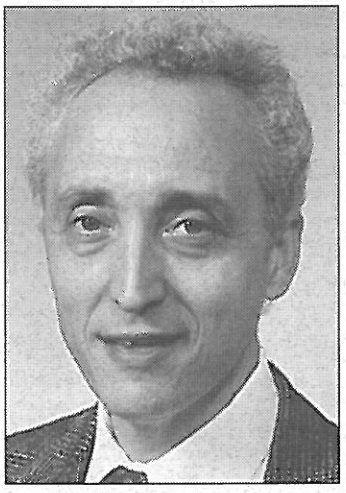


Ms. Shirley Robinson receiving her award from UF President J. Lombardi (far left of photo)

Teaching Activities

Experimental Optimum Engineering Design: A new course

In the past decade, there has been remarkable convergence of two disciplines associated with design. Analytical design optimization employs numerical techniques for seeking an optimum design based on analytical models, such as finite element models. Experimental optimization employs laboratory tests and field experiments to improve products based on test results. The techniques used for analytical optimization tend to be based on derivative information, with the optimization procedure moving through a series of design improvements, considering *one design at a time*. Experimental optimization, on the other hand, usually cannot employ derivatives, because measurement errors and manufacturing variability lead to inaccurate derivative estimation. Furthermore, because of scheduling and facility availability, experimental designer prefer to conduct a *batch* of experiments at the SAME time.



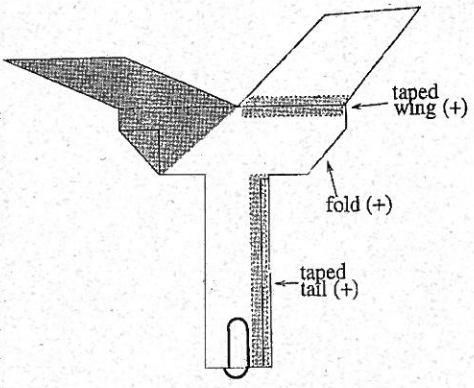
Dr. R. Haftka

However, with numerical simulations becoming ever more complex, they have been acquiring the properties of experiments. Numerical noise, incomplete convergence, and human errors are common with complex numerical models. Also, parallel computation capabilities permit a designer to go home and run several numerical simulation in parallel on the idle workstations in his office. This creates an incentive to run batches of numerical simulations at the same time.

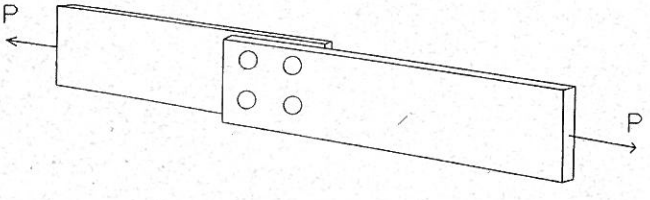
Consequently, designers who use numerical simulations are beginning to adopt the statistical methods known as 'design of experiments' and 'response surface methods' that are commonly used by experimental optimization specialists. A new course, introduced by **Prof. R. Haftka**, has the objective of taking advantage of this convergence and introducing undergraduate and graduate students to both the analytical and experimental aspects of engineering design.

The course introduces students to basic concepts of optimization concepts and response surface methodology. The centerpiece of the course is a design project that requires students to use the techniques they study. The design project begins with analytical formulation of the optimization problem. It continues with numerical solution of the analytical design based on simple analytical models. The students then build the design and continue with improvements based on experimental optimization.

Last year the project used by all students was the design of a lap joint, obtained by riveting two strips of aluminum, with the objective being to maximize the strength of the joint. This year the standard project is a paper helicopter, with the objective to maximize the time the helicopter stays in the air. However, a couple of the students are working on other projects of their own choosing. Besides the exposure to design, the students have to learn to make two presentations of their design concepts and results, and to write a project report, thus improving their communication skills.



Paper helicopter



Topology of a lapjoint

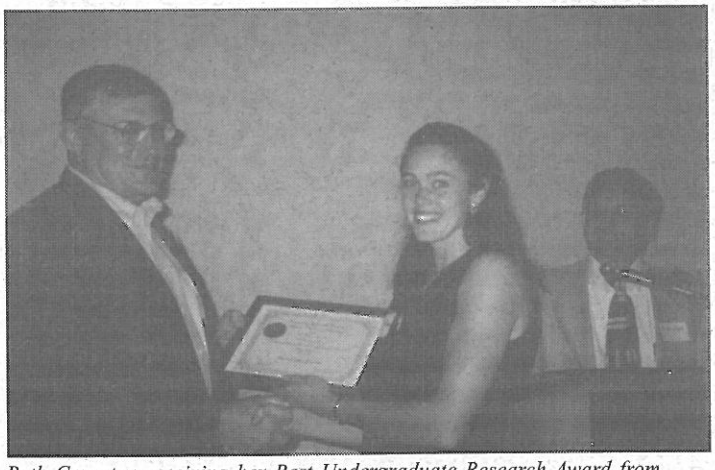
Research Activities

Research to help the disabled

Dr. H. Doddington and **Dr. R. Hirko** have been conducting research on the applications of technology to meet the needs of persons with disabilities. They recently received a new 5-year grant from the National Science Foundation in the area of Biomedical Research to Aid the Disabled. This training grant funds design projects by students on subjects related to assistive technology for individuals or groups of persons with disabilities. It will provide funds to carry ideas beyond design on paper to actually creating hardware and/or software systems to be delivered to persons or agencies who can actually use them and truly test them. Undergraduate or graduate students who are interested should contact the above faculty.

Congratulations

Warm congratulations to **Ms. Elizabeth Cranston**, undergraduate, who received the *Best ERC Undergraduate Research Award* from the NSF Engineering Research Center (ERC) for Particle Science and Technology at UF. Beth's advisor was Dr. L. Vu-Quoc. Her graduate student mentor was Mr. Lee Lesburg, who was also a former M.S. student of Dr. L. Vu-Quoc and who is now working at Parametric technology Corp. Together with a plaque, Beth also received a monetary award from the ERC. Her paper was among the 16 finalists, culled from 59 eligible undergrads who worked at the ERC. She received the award at a cordial banquet for on 16 Apr '97, at the Radisson Hotel in Gainesville.



Beth Cranston receiving her Best Undergraduate Research Award from Mr. J. Schmedeman, ERC industrial partner representative, with the presence of Dr. B. Moudgil, ERC Director.

K. Millsaps awards for best undergraduate papers

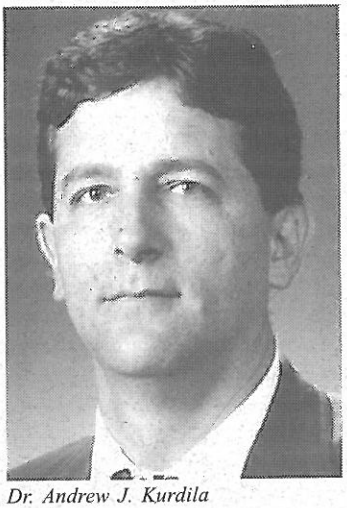
At a banquet on 16 Apr '97, the Knox Millsaps Award for AeMES Outstanding Undergraduate Technical Paper Presentation was presented to **Mr. Troy Livingston** for his work on "Measured Burning Constant Rates of New High-Energy-Density Caged Hydrocarbon Compounds."

Honorable mentions went to **Ms. Dawn Martin** for her work on "Gas Exchange in the Mechanical Lung of a Human Patient Simulator is not Affected by an Imbalance in Flush Flow Rate: a Mathematical Design Study" and to **Mr. Keith Heberlein** for his work on "CFD Solution to High Speed Projectile Base Flow."

These awards recognized the best overall (in terms of quality and originality of work, abstract, and presentation) technical research/project presented by AeMES undergraduate students. The top award consisted of a certificate, a check for $400 and the name of the winner added to a plaque, displayed near the lecture room 303 AERO. Honorable mention awards consisted of a certificate and a check for $200.

Other Activities

New faculty

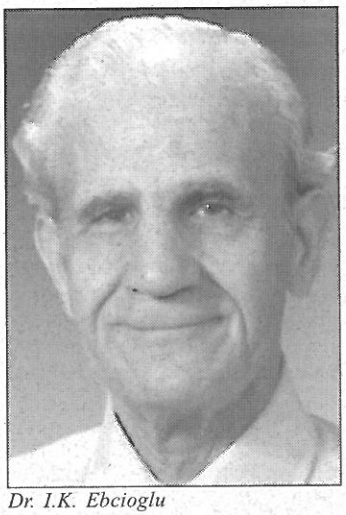


Dr. Andrew J. Kurdila

We welcome **Assoc. Prof. A.J. Kurdila**, the most recent new faculty member in the AeMES department. Dr. Kurdila came to AeMES in Fall '97 from Texas A&M University, where he was an Associate Professor in Aerospace Engineering and in Mathematics. His research interests are in the areas of dynamical systems theory, control theory, and computational mechanics. At Texas A&M, he was recognized as a Select Young Faculty Fellow. Dr. Kurdila received his Ph.D. from Georgia Tech in 1989. We will feature the research program of Dr. Kurdila in a future issue of The Streamline.

Party honoring Profs. Ebcioglu, Lindgren, and Partheniades

In Apr '97, the department organized a retirement party at Dr. Shyy's residence to honor the contributions of **Profs. Emer. I.K. Ebcioglu, R. (Tex) Lindgren, E. Partheniades**. In addition to the AeMES faculty, among the invitees were Dean Philips and colleagues of the above trio from different departments. We refer the readers to the Fall '96 issue of the Streamline for the contributions of Dr. Lindgren. (See also *Alumni news* on Dr. Schonblom).



Dr. I.K. Ebcioglu

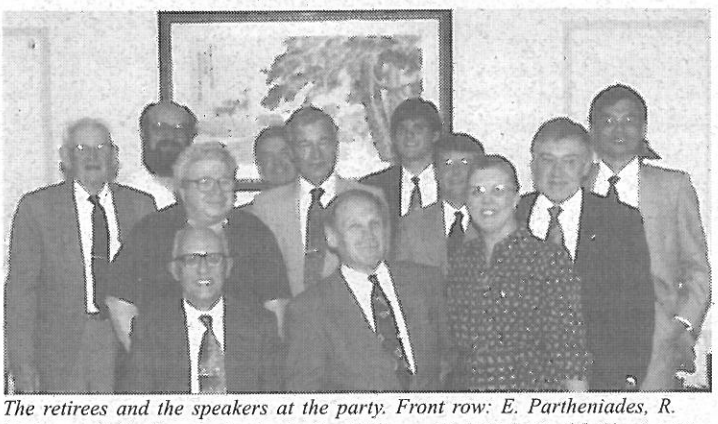
Dr. I.K. Ebcioglu received his M.S. from the Technical University of Istanbul in 1946, and his Ph.D. from the University of Minnesota in 1958, both degrees in Aeronautical Engineering. From 1945 to 1953, he worked at the Turkish Air League Aircraft Factory, first as engineer and then as Chief Engineer. From 1958 to 1960, he was a Research Associate at the Aeronautical Department at Minnesota. Before coming to UF as an Assistant Professor in 1961, he spent a year as Research Engineer at

Dean W. Phillips acknowledged the contributions of the retirees and gave each a UF pin. (Drs. Partheniades and Lindgren are sitting on the left.)

the Wright-Patterson Air Force Base. Dr. Ebcioglu was promoted to the rank of Associate Professor in 1964, and then to Full Professor in 1966. Dr. Ebcioglu research interests have been in the areas of mechanics of continua and layered plates and shells. He continues to be productive in research and in publication in his retirement.

Dr. E. Partheniades received his Diploma in Civil Engineering from the Technical University of Athens in 1952. After two years of Civil Engineering work in Athens, he pursued his graduate education at the University of California at Berkeley, and received his M.S. in 1954 and his Ph.D. in 1962, under the guidance of Prof. Hans Albert Einstein, the son of the famous physicist Albert Einstein, in the area of sediment dynamics. After one year on the faculty at San Jose State College, Dr. Partheniades joined MIT as an Assistant Professor in 1963, then the State University of New York at Buffalo in 1966 as an Associate Professor. In 1969, be became Professor of Coastal and Oceanographic Engineering. After two years (1973-75) as a chair professor of hydraulic structures at Aristoteles University of Thessaloniki, Greece, he divided his time between Thessaloniki and UF, this time with a joint appointment as a Professor of Engineering Sciences and then of AeMES until 1984. From 1984 until his retirement, he returned to full time teaching at UF.

The above trio taught the core course Statics and Dynamics to generations of undergraduates at UF, in addition to the graduate courses of their respective areas of research. We thank all three professors for their excellent service and contributions to the department and to the university.



The retirees and the speakers at the party. Front row: E. Partheniades, R. Lindgren, J. Rockey. In the back: Dr. Williams, D. Mikolaitis, M. Shuster, M. Sheppard, U. Kurzweg, J. Lindgren, M. Riedy, W. Phillips, W. Shyy.

Internet Conference on Approximations in Engineering Optimization

Researchers benefit from going to conferences, presenting and listening to papers, and interacting with others who share similar interests. Travel to conferences is, however, expensive, time consuming, and tiring. Furthermore, one often discovers that at times no papers match one's interests, and at other times, two interesting papers are presented simultaneously at different sessions. These problems motivated **Prof. R. Haftka**, President of the small International Society of Structural and Multidisciplinary Optimization (ISSMO), to organize an Internet conference on the use of approximation in engineering optimization, 14-27 Jun '98. The conference is cosponsored by NASA and the American Institute of Aeronautics and Astronautics. The conference will also allow participants in the broader (live) conference on Multidisciplinary Analysis and Optimization, to be held in Sep '98, to obtain feedback on papers from people who cannot attend the live conference.

Participants in the conference will put their papers on a web site in a hypertext format, so that a reader can get an overall view of the material in a few minutes, but can also read the entire material if desired. Unlike a live conference, here if you discover that a paper is not what you thought you would be interested in, you can "walk out" without offending the presenter. Papers are arranged into sessions, with each session open for discussion for three days. During that time, comments and replies will be received by email by everybody registered for that session and also recorded in the session web site. The proceedings of the conference, including the papers and the discussion, will be available on CD. For additional details, see the ISSMO web site at http://www.aero.ufl.edu/~issmo.

Visiting Scholars

Welcome to **Dr. Itsuro Kajiwara**, Research Associate at the Tokyo Institute of Technology, who came to the AeMES department in Sep '97 for a ten-month period to work with Prof. R. Haftka and Assoc. Prof. N. Fitz-Coy. Dr. Kajiwara's research areas are on optimization of structures and control systems. At UF, he is working on Micro Aerial Vehicle control optimization.

Books

A new book by **Prof. W. Shyy**, co-authored with Drs. S. Thakur, H. Ouyang, J. Liu and E. Blosch, titled *Computational Techniques For Complex Transport Phenomena* has just been published by the Cambridge University Press. This book describes some newly developed computational techniques and modeling strategies for analyzing complex fluid flow and related transport phenomena. The main focus is on geometric and dynamic complexity. It addresses numerical techniques such as discretization schemes for treating convection and pressure, parallel computing, multigrid methods, and composite, multiblock techniques. It also covers modeling aspects of turbulence and multiphase flows, especially those arising from materials processing, fluid machinery, high speed and chemically reacting flows. His two previous books, *Computational Modeling for Fluid Flow and Interfacial Transport* (W. Shyy) and *Computational Fluid Dynamics with Moving Boundaries* (W. Shyy, H.S. Udaykumar, M.M. Rao and R.W. Smith), have also been reprinted this year. These books have received reviews in several journals, including Applied Mechanics Reviews, AIAA Journal, and The Chemical Engineering Journal.

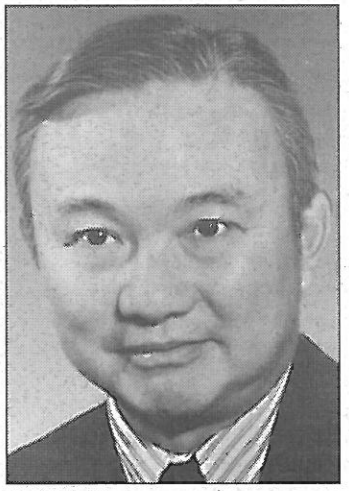
Obituaries

C.S. Yih, 78, eminent fluid dynamicist

Professor C.S. (Gus) Yih passed away in Apr '97, in Tokyo, of heart failure. He was on his way to attend a scientific meeting in Taiwan. Dr. Yih was a Graduate Research Professor on the AeMES faculty from 1987 to 1990. Prior to that, he held the Stephen P. Timoshenko Chair at the University of Michigan.

Internationally known for his work in fluid mechanics, Dr. Yih received numerous honors, included a Guggenheim Fellowship (1964), the Alexander von Humboldt Senior Scientist Award (Germany, 1977-78), the Theodore von Karman Medal (American Society of Civil Engineers, 1981), the Stephan S. Attwood Award (University of Michigan, 1984), the Fluid Dynamics Prize (American Physical Society, 1985), and the Otto Laporte Award (APS, 1989). He was elected to the American Physical Society (1958), the National Academy of Engineering (1970), and the Academia Sinica (the Chinese National Academy of Science in Taiwan).

Born at the closing of World War I, in 1918, in Kweiyang, Kweichow Province, China, Dr. Yih received his undergraduate education during the full-scale war between China and Japan, a couple of years before the opening of World War II. His "college years were spent in makeshift classrooms and laboratories classes



Dr. C.S. Yih

at the crack of dawn to avoid air raids, long hours in the dugouts, military training, and an endless stream of exciting or sad news," recalled former classmate and life-long friend, Prof. Emer. Y.C. Fung of UC San Diego. Dr. Yih graduated, in 1942, when WWII raged over many parts of the world.

After a few years at the National Hydraulic Laboratory, the National Bureau of Bridge Design, and the National University of Kweichow, China, Dr. Yih won a scholarship to study in the US during the waning days of WWII. He entered the University of Iowa in 1946 for graduate studies in the department of Mechanics and Hydraulics, earning his M.S. in 1947, and Ph.D. in 1948. Dr. Yih taught at universities in North America and France before coming to the University of Michigan as an

associate professor, in 1956. Two years later, he was promoted to professor of Fluid Mechanics. In 1967, he was named Stephen P. Timoshenko Distinguished Professor at UM.

His published work includes well over 100 scientific papers as well as two books, *Stratified Flows* (1980), and *Fluid Mechanics, A Concise Introduction to the Theory* (1969). In a letter to a friend, Dr. Yih wrote, "For me, the criterion of science is truth, but its motivation resides in a sense of beauty — and in that it is like art." He delighted in the beauty of nature and took a lively interest in the arts, including Chinese and Western literature and painting.

Dr. Yih was an inspiring teacher, whose excitement and enthusiasm were contagious. He is remembered for his quick mind, spontaneity, enthusiasm, and love of life. Prof. W. Shyy reminisced the deep influence of Dr. Yih's research on his own work in Computational Fluid Dynamics at a memorial for Dr. Yih at the University of Michigan in Jul 97. Among the speakers at the memorial were university professors who were his former students.

Dr. Yih is survived by his wife Shirley; sisters Chia-Ju and Chia-Ling; children Yiu-Yo, David, and Katherine; and three grandchildren.

R. Anderson, 62, optics specialist

On 12 May '97, we were sadly informed by Dr. Ed Milton, UF Graduate Engineering Research Center, Eglin Air Force Base, that after a courageous battle against lymphoma, **Dr. Roland Anderson**, AeMES Professor Emeritus, quietly passed away the previous night at the Columbia North Florida Regional Medical Center.

Dr. R. Anderson

His lymphoma flared up again in Feb '97. Since then, he has been receiving increasingly powerful chemotherapy. He fought with courage and determination until the week before we heard the sad news from Dr. Milton, at which time he gradually started slipping into a coma.

Dr. Anderson continued to live a full and productive life during many years after his retirement. Many close associates of Dr. Anderson greatly admired his courage and determination, which should serve as an inspiration when facing problems associated with life.

A memorial service for Dr. Anderson took place on Thu, 15 May '97, in Niceville, FL.

Alumni News

Congratulations to **Major James Greer** who was appointed as Assistant Professor of Engineering Mechanics at the US Air Force Academy (USAFA), Colorado, effective Fall '97. The USAFA offers the B.S. degree, and is the counterpart of West Point for the Army and Annapolis for the Navy as elite academies for the training of future military leaders. Major Greer received his BS in Aerospace from UF in 1983, and his Ph.D. from the Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio, where he was stationed before joining USAFA. His appointment to the Academy was a result of a competitive process similar to the recruitment of a faculty in a civilian university.

Dr. J. (Eric) Schonblom, retired Professor of Engineering, University of Tennessee (UT) at Chattanooga, has been running a Computer Camp at Buckhorn, Kentucky, since 1985, to help initiate kids, age from 7 to 12, from poor families in the rural areas of south-eastern Kentucky, to the use of computers. "The parents of the poorest families see computers as their kids' entry into middle-class America," said Dr. Schonblom. His activity has recently been the focus of an article that appeared in Jun '97 issue of the Sky Magazine of Delta Airline. Dr. Schonblom came to UF in the early '70s, and received his Ph.D. under the guidance of Dr. R. (Tex) Lindgren. He then joined the engineering faculty at UT Chattanooga until his retirement. About 600 kids have attended Dr. Schonblom's Computer Camp. Many of these lucky kids make honor roll. Several went on to colleges and universities.

In Summer '97, **Vinay Srinivas**, Ph.D. '96, now with the Stanford Linear Accelerator Center, co-taught a two-week course on *Computational Methods in Accelerator Physics* at the Massachusetts Institute of Technology. This graduate course, sponsored by the United States Particle Accelerator School (USPAS), was attended by students from MIT, Cornell, Stanford, CERN (Switzerland), and other US universities. Vinay's lectures were on electromagnetics (EM), computational methods, and the design of accelerator structures and cavities, followed by hands-on-training on the use of EM software. The trend towards higher operating frequencies and compact devices has made computational EM an important subject of study at the USPAS.

Congratulation to **Mr. Darryl C. Van Dorn**, BSAE '62, who was named Director of the NASA and Commercial Delta Programs for McDonnell Douglas in Jun '97. His team will provide service to the Delta II launch services for NASA and commercial customers. He brings to this program a wealth of experience in working with commercial, government and military customers. A recognized solid rocket motor specialist, he began his career with the Douglas Aircraft Co. after his graduation from UF as a propulsion engineer, working on the Spartan anti-ballistic missile program. He originated the concept of solid graphite epoxy motors that is extensively used in the Delta II vehicle. Prior to his present position, Mr. Van Dorn served as deputy director of the US Air Force Delta Programs, senior manager for Commercial Delta programs, senior manager for NASA's Medium Expendable Launch Vehicle program.

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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