Professor Raphael T. Haftka

See:
http://www2.mae.ufl.edu/haftka/
http://www.worldcat.org/identities/lccn-n79-41185
http://www.barnesandnoble.com/c/raphael-t-haftka
http://www.amazon.com/Raphael-T.-Haftka/e/B001HCWO4U
http://www.informatik.uni-trier.de/~ley/db/indices/a-tree/h/Haftka:Raphael_T=.html
http://www.researchgate.net/researcher/39304851_Raphael_T_Haftka

Distinguished Professor
Department of Mechanical and Aerospace Engineering
University of Florida, Gainesville

PERSONAL:
Born February 22, l944, Tel-Aviv, Israel; U.S. Citizen; married.

EDUCATION:

Ph.D. 1971, Department of Aerospace and Mechanical Engineering Sciences, University of California at San Diego

B.Sc. 1965, M.Sc. 1968, Aeronautical Engineering, Technion-Israel Institute of Technology.

AREAS OF INTEREST:

Optimization methodology applied in structural design including senstivity calculation and approximation techniques.

The application of design-of-experiment techniques to engineering design optimization.

Multidisciplinary optimization of aerospace vehicles.

Genetic algorithms with special interest to the design of composite panels.

Miniature unmanned aerial vehicles.

PROFESSIONAL RECORD:

Distinguished Professor, Department of Mechanical & Aerospace Engineering, University of Florida, 1999-present, Professor 1995-1999.

Christopher Kraft Professor of Aerospace and Ocean Engineering, Virginia Polytechnic Institute and State University, 1988--1994, Professor, 1981--1988.

Associate Professor at Illinois Institute of Technology - Department of Mechanical Engineering, 1978-1981, Assistant Professor 1975-1978.

Senior Lecturer at Technion-Israel Institute of Technology1973-1975

National Academy of Sciences, Post Doctoral Research Associate at NASA Langley Research Center, 1971-1973.

Staff Scientist at Structures Research Associates (Laguna Beach, California) October 1970-1971.

Aerodynamicist at the Israeli Aircraft Industries, 1965-1968

PROFESSIONAL SOCIETIES:

President, International Society for Structural and Multidisciplinary Optimization (ISSMO)(1995-99); Fellow, AIAA; Member ASEE

HONORS:

Christopher Kraft Professorship, 1988.

Virginia Tech Alumni Award for Excellence in Research, 1992.

AIAA Fellow, 1997

AIAA Multidisciplinary Design Optimization Award, 1998.

Distinguished Professor, 1999

University of Florida Research Professorship, 2001-2003

TEACHING

My major interest in teaching is introducing optimization techniques into the undergraduate curriculum and bringing them to bear on undergraduate design activities. For this purpose I have introduced into the curriculum 3 undergraduate optimization courses - a general optimization course, a course on experimental optimal engineering design and a composite structures and material optimization courses. Additionally, I have initiated and collaborated with colleagues on the introduction of mini-design projects into structures and vibration-and-control courses.

Curriculum Development at the University of Florida

EGM 6365 Structural Optimization: Developed and introduced this course at Virginia Tech and then at the university of Florida. Course seeks to introduce students to modern methods for structural design mostly in the fields of aerospace and civil engineering. Taught first in 1996 as special topics course, and in Fall 1998 as a regular course. See also course web page at http://www.mae.ufl.edu/haftka/stropt .

EGM 4473 Experimental Optimum Engineering Design: Developed and introduced this course in 1996 as a special topics course and then as a regular course in 1997. The course seeks to demonstrate to students how both analytical and experimental techniques are used in the design process. The course is centered around a project. This innovative course has drawn praise from graduate students in industry who took it as a special topic course. One of the students in the 1997 course, Terry Siorek, a specialist in hematology instrumentation, collaborated on a paper describing the project in this year Multidisciplinary Analysis and Optimization conference. The 1996 project, developed with Dr. Jenkins of AeMES, was de-scribed in a paper published in Structural Optimization in February 1998. A set of notes was developed for the course and made available to students on the course web page (http://www.mae.ufl.edu/haftka/eoed/).

EAS 4240 Aerospace Structural Composites: Introduced an optimization segment into the course as a guest instructor in a two-week segment in order to broaden the design experience of the students. This will be further expanded in Spring 1999, when I will teach the course out of a newly developed textbook (see below).

EAS 4200C and EAS 4210C Aerospace Structures 1,2: Introduced mini-design projects for these two courses, using the remarkable capabilities for optimization now available in commonly available spreadsheet programs (Microsoft Excel, Lotus 1-2-3, Quatro Pro).

See course web pages (http://www.mae.ufl.edu/haftka/course.html)

RESEARCH

My research area is structural and multidisciplinary optimization. In the area of structural optimization, my students and I investigate diverse applications ranging from the development of algorithms to the experimental validation of reliability based optimization. The focus of many of these investigations is the design of structures made from composite materials. The combinatorial nature of the stacking sequence design for composite laminates is particularly challenging, and has motivated my work in the development of genetic algorithms for this application.

In the past few years I have focused much of my interest in optimization methodology into methods that are used for experimental optimization. These methods, commonly known as design-of-experiment techniques, are becoming increasing appropriate because of the growing similarities between computer simulations through complex numerical models and physical experiments.

In the area of multidisciplinary optimization I have focused on combined structure and control optimization of space structures, and on combined aerodynamic and structural optimization of aircraft wings. The first topic has a strong experimental flavor, because I believe that much of the challenge in the area of structural control derives from the discrepancy between theoretical results and what can be achieved in real applications. In the area of combined aerodynamic and structural optimization, I am currently working with three other faculty members and five graduate students in a major effort of developing design methodology for the next generation super-sonic transport. I am also working with a team of colleagues and students at Virginia Tech on the design of a truss braced transport, with the truss brace allowing for a substantial improvements in aspect ration and lift to drag ratios.

Another multidisciplinary program involves the design of miniature unmanned aerial vehicles. The focus in this research is on the smallest size that can be achieved with present day technology. I am working with seven other faculty members in AeMES and one in Electrical and Computer Engineering on various aspects of aerodynamics, control and performance of miniature aircraft.

I like to work with colleagues, and I attempt to share all of my graduate students with other faculty members or NASA researchers. This arrangement benefits the students, and it helps me create interactions with and learn from my colleagues. This interaction results also in joint papers and joint research proposals. Over my 13 years at Virginia Tech, I have written papers with 8 faculty colleagues in my department and 8 in other departments. At the University of Florida I have published papers with 4 faculty members. Since 1991 I have also published papers with 10 NASA researchers and colleagues from other many other countries including, Belgium, Denmark, France, Germany, Israel, Italy, Japan, Poland and Turkey.

PROFESSIONAL ACTIVITIES

I believe that many researchers and industrial practitioners do not have the time to read the large numbers of papers that are published in their field. I have invested much effort in keeping abreast of the latest development in the areas of structural and multidisciplinary optimization and I attempt to use this to provide a service to the engineering community in these fields. I have written a textbook (with Gürdal) which has an extensive list of references, and which we update regularly. I have written several survey papers, and I review about 30--40 papers per year, mostly for the AIAA journals. I have also served as associate editor of the AIAA Journal 1980--1982. In reviewing papers I always attempt to call the authors attention to related work that they might have overlooked. I also organized and chaired many sessions in scientific meetings (mostly AIAA).

Recently I have focused on improving the cooperation between industry and universities in the area of multidisciplinary optimization. In May of 1993 I have organized (together with my colleagues Grossman and Mason) an industry-university workshop on multidisciplinary aircraft design attended by most of the major aircraft manufacturers. The recommendations of the workshop for changes in the way universities, industry and government interact were published in July 1994 in Aerospace America. I have also intensified my own work with industry, and recently I have been working on projects with Boeing, McDonnell Douglas and the Ford Scientific Research Laboratory.

I am the president of the International Society of Structural and Multidisciplinary Optimization (1995--1999). This young society (founded by George Rozvany in 1991) has about 400 members, and is concerned with promoting international research and education in Structural and Multidisciplinary optimization. I am also a member of the AIAA Technical Committee on Multidisciplinary Design Optimization. I continue as a member of the executive committee of ISSMO.

PUBLICATIONS:

An extensive list is provided on the website: http://www2.mae.ufl.edu/haftka/resume/resume.htm