

# School of Engineering

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# Annual Report

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# University of Connecticut School of Engineering Annual Report 1998-1999

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# School of Engineering Annual Report Summary 1998-1999

The 1998-99 fiscal year was characterized by dynamic change and growth in the School of Engineering. During the last reporting period, Professor Amir Faghri, former head of the Mechanical Engineering Department, had assumed the position of Dean and begun to institute new, clear objectives intended to enhance enrollment and the reputation for the entire School of Engineering. Significant progress was made toward achievement of these objectives.

## **STRUCTURE**

The Dean's office was restructured to provide effective leadership in areas of critical importance to the School of Engineering. This involved implementing major changes in leadership at all levels, including the new Associate Deans, six department heads and center/institute directors. The appointments were as follows:

### Associate Deans

Associate Dean for Academic Affairs – Tom Anderson  
Associate Dean for Research and Outreach – Kazem Kazerounian  
Associate Dean for Undergraduate Education – Erling Murtha-Smith

### Department Heads & Center Directors

Acting Head, Chemical Engineering – Jim Fenton  
Head, Civil & Environmental Engineering – Domenico Grasso  
Head, Computer Science & Engineering – Reda Ammar  
Interim Head, Electrical & Systems Engineering – Dave Jordan  
Head, Mechanical Engineering – Theodore Bergman  
Head, Metallurgy & Materials Engineering – John Morral  
Booth Research Center – Peter Luh  
Precision Manufacturing Institute – T.C. Ting  
Transportation Institute – Christian Davis  
Environmental Engineering Program – Nikolaos Nikolaidis

## **NEW DEGREE PROGRAMS**

Perhaps the most vital measure involved curricular development for four new undergraduate programs to increase undergraduate enrollment and further distinguish our engineering program as the most comprehensive public program in New England. These new degree programs — in the areas of Computer Engineering, Computer Science, Environmental Engineering and Metallurgy & Materials Engineering — were approved at all levels, including the Connecticut Department of Higher Education, during the year and will debut in the fall. The School already offered master's and Ph.D. degrees in each of these areas. UConn is the only public-university School of Engineering in New England to offer undergraduate degree programs in the areas of environmental engineering and metallurgy & materials engineering.

## **MASTER OF ENGINEERING**

In addition to ongoing collaborations, exchanges and consulting work with industry, we developed a new Master of Engineering degree program for a select number of corporations. This strategy reflects our commitment to promoting University/industry relations as well as increasing the potential pool of quality graduate students. The Master of Engineering program involves coursework offered at industry sites or other convenient locations where a pool of potential students exists.

## **NEW FACULTY**

The School of Engineering hired eight new faculty members, as follows:

**Chemical Engineering**

Patrick Mather (Ph.D. U. of California-Santa Barbara, 1994) - Assistant Professor

**Civil & Environmental Engineering**

Emmanouil Anagnostou (Ph.D. U. of Iowa, 1997) – Assistant Professor

Allison Mackay (Ph.D. MIT, 1998) - Assistant Professor

**Computer Science & Engineering**

Alexander Russell (Ph.D. MIT, 1996) - Assistant Professor

Marios Mavronicolas (Ph.D. Harvard University, 1992) - Assistant Professor

**Electrical & Systems Engineering**

Mansour Keramat (Ph.D. U. of Paris, 1998) - Assistant Professor

**Mechanical Engineering**

Wilson Chiu (Ph.D. Rutgers University, 1999) - Assistant Professor

**Metallurgy & Material Sciences**

Mark Aindow (Ph.D. U. of Liverpool, 1989) - Associate Professor

**STRATEGIC PRIORITIES**

Last year, the School identified four priorities of strategic importance to the growth and future reputation of the UConn School of Engineering. These included development, outreach, undergraduate enrollment, renovation and faculty recognition.

Development

While UConn 2000 has infused significant support into the infrastructure of the University, it does not address the direct challenges the school faces. Our growth as a flagship teaching and research school is dependent upon outside investment. Thus, we embarked on an aggressive development campaign last year.

Our efforts produced generous contributions from Northeast Utilities and Southern New England Telephone which æ when paired with UConn 2000 endowment-matching funds æ allowed us to establish our first two endowed professorships this year. These are the **SNET Endowed Professorship in Information Technology** and the **NU Foundation Endowed Chair in Environmental Engineering**.

The total School of Engineering endowment increased significantly in the last year, from \$3,375,128 on April 1, 1998 to \$5,144,610 on April 1, 1999. This 52 percent increase is even more impressive in light of the fact that the April 1998 figure reflects the total accumulated endowment over a *10-year period*.

The School also conducted a nationwide search to hire a Development Officer. The search culminated in the hiring of Ms. Helen Charov on February 1, 1999. Ms. Charov earned her B.S. in biology from New York University and completed coursework toward an MBA.

Outreach

Higher visibility is essential to improving the School's undergraduate enrollments, nurturing diversity, and enhancing our reputation. For the first time, we embarked on an aggressive multi-faceted outreach initiative to enhance awareness – among primary and secondary school students – of the range of career choices and socio-economic impacts available to engineers. During the year, our activities included:

Expanding our Engineering 2000 summer engineering camp and internships for promising high school students to allow 40 participants, room-and-board free;

Hosting and co-sponsorship of the Connecticut Invention Convention (March 27, 1999) which attracted nearly 2,000 participants including 650 students from CT schools.

Hiring two professional writer/editors, Art Sorrentino and Nan R. Cooper, in January to produce high-quality promotion-

al, recruiting, and development materials æ including the School of Engineering Web page, brochures and newsletters æ for the School and its six departments. Mr. Sorrentino earned his B.S. degree in English from the University of Connecticut, completed coursework toward a master's degree in English, and has over 14 years' industrial experience as a writer, designer and editor. Ms. Cooper earned a B.S. in news-editorial journalism and an MBA from the University of Colorado; she has 17 years' experience as a writer and editor.

### Undergraduate Enrollment

Recruiting of outstanding students æ at both the graduate and undergraduate levels æ continues to be paramount. The School substantially upgraded its recruiting activities. In addition to the outreach efforts described above, the School of Engineering launched several key initiatives aimed toward improving undergraduate enrollment:

All departments and programs developed new, high-quality undergraduate recruiting brochures and pamphlets. Many incorporated full color; all were carefully designed and produced. The School developed a full-color brochure designed to appeal to an undergraduate audience as well as parents and others. Packages of these brochures were sent in response to requests for information, and mailed to all Connecticut high school science and math departments.

The School also centralized and redesigned its series of three Open Houses to attract a greater number of prospective students and their parents. Attendees were tracked to correlate the number of "paid deposits" with attendance.

In addition, the School of Engineering expanded its support to undergraduate students this year to offer 80 scholarships totaling \$150,000. The goal of this effort was to enable a broader diversity of students to enter and succeed in our engineering programs.

Finally, the intensive recruitment efforts of the past year are bearing fruit. As of this date last year, applications are up 18.9% compared with the University increase of 13.5%. Offers of admission were up 15.7% compared with the University-wide increase of 11.1%. Paid deposits were up 11.7% compared with last year.

The number of freshman applications is up an estimated 20 percent for the fall '99 term versus fall '98 æ a reflection on the past year's rigorous outreach and recruiting efforts. Note that all these increases were accompanied by an increasing quality of student based on high school rank and SAT scores.

### Faculty Recognition & Awards

The School initiated new recognition/incentive awards to honor outstanding faculty contributions. The awards included the following:

Distinguished Engineering Professor Award for outstanding achievements in research, teaching and service. Entailed \$10,000/year for three years toward professional development. Awardees: Jeff Koberstein, Chemical Engineering; and Yaakov Bar-Shalom, Electrical & Systems Engineering.

Outstanding Teaching Faculty Award for superior achievements in teaching. Entailed a \$2,000 honorarium plus \$5,000 for professional development. Awardee: Douglas Cooper, Chemical Engineering.

Outstanding Junior Faculty Award given to an assistant or associate professor for scholarly achievements in research, teaching, and service with the promise of sustained future professional growth. Entailed a \$2,000 cash award and \$5,000 for professional development. Awardees: Nitin Padture, Metallurgy & Materials Engineering; and Ranga Pitchumani, Mechanical Engineering.

Outstanding alumni, friends and students were recognized during the School of Engineering annual Alumni Awards Banquet at the South Campus banquet facility April 27<sup>th</sup>. The event drew 450 School of Engineering students, faculty and alumni, and corporate executives from many Connecticut companies. The keynote address was delivered by former Secretary of the U.S. Air Force and current MIT professor, Dr. Sheila Widnall. Distinguished alumni and service awards were presented along with 80 scholarships to deserving undergraduate students.

## **RENOVATIONS & OTHER SUPPORT**

During the year, the School supported a significant amount of building renovation to improve the quality, functionality and appearance of offices, laboratories and accessways. Improvements were made in the Eng II and UTEB buildings, including installation of new carpeting and flooring; painting of walls and hallway; and purchase of new faculty office furniture, computers and printers.

For the first time, the School also provided travel support to faculty and graduate students, over and above the travel support available from the University, the Graduate School and AAUP. This assistance ensures faculty are no longer forced to spend significant personal resources on professional travel – a deterrent and drawback to professional travel in the past.

# Chemical Engineering Department Annual Report Summary 1998-1999

This has been an exciting year of change for the Department of Chemical Engineering as the department moves forward in its quest for excellence in teaching and research. Former Department Head Tom Anderson moved into an administrative position as Associate Dean of Engineering for Academic Affairs. Professor Jim Fenton served as interim Head throughout the year. Suzy Fenton was nominated by the faculty to serve as Assistant Department Head and made great progress in getting the department and our curriculum ready for ABET (Accreditation Board for Engineering and Technology) Engineering Criteria 2000. Susan Soucy was promoted to a position commensurate with her duties as head of the office staff. Joyce Dudgeon, a key half-time support staff member in our office, retired and a search is underway to replace her with a full-time employee expected to start in September who will help out with our growing development and student recruitment activities.

Two new faculty members joined the Chemical Engineering Department. Associate Professor Thomas Wood started in September 1998, and Assistant Professor Patrick Mather was recruited with a September 1999 start date. A national search was conducted for a permanent Department Head; however, the search was unsuccessful. However, several internal candidates expressed interest in the position. A search will be launched immediately for two additional faculty.

The chemical engineering office is currently undergoing renovation. The new facelift should be complete by September 1999: a ribbon-cutting ceremony will commemorate completion of the renovations. The laboratory in Engineering II room 205 was significantly upgraded to accommodate our increased research activity in biochemical engineering. Construction of a graduate student office to house all our teaching assistants for easy access by the undergraduate students is underway and will also be complete by the start of the next academic year. Additional computers with Internet access are being added to the chemical engineering Undergraduate Lounge.

The Department developed an array of promotional materials and other image-building items to assist in undergraduate recruitment and development. These included an overhaul of the chemical engineering web page, (<http://www.engr.uconn.edu/cheg/>), a new graduate recruitment brochure, and fliers on our four research areas. In addition, considerable time was invested toward development of a new undergraduate brochure.

## UNDERGRADUATE PROGRAM

The objective of our undergraduate program is to ensure that our students acquire the fundamental knowledge and problem-solving skills that will enable them to deal with rapidly evolving changes in the chemical and related industries. This is achieved through a curriculum that stresses basic science, mathematics, engineering science and design. ABET Engineering Criteria 2000 empowers us to be more responsive to the changing needs of the students and industry. A strong feature of our program is that it provides students with flexibility in their course selection. This enables them to pursue individual careers in both traditional fields of chemical and material manufacturing and processing, energy technology, etc., as well as nontraditional fields of biochemical and biomedical technology, pollution prevention and waste minimization, semi-conductor processing, and pharmaceuticals.

Changes in our curriculum will be tested beginning September 1999. The proposed changes will permit students more flexibility in their career paths and increased opportunities through independent research, industrial coops or industrial internships. The following curriculum changes will be tested:

**Design Restructuring.** A specific plan to introduce aspects of design into sophomore and junior level classes (specific problems, in what courses they will be introduced, etc.).

**Lab Integration.** Determine the feasibility of integrating several of the existing lab experiments into appropriate lecture courses with the objective of eliminating one semester of lab.

**Independent Research Evaluation.** Evaluate the pros and cons of turning CHEG 299 into a required course and the logistics associated with such a change.

**Curriculum "Evolution" and New Course Development.** Modifications of existing courses and new courses that prepare students for future careers in chemical engineering. Courses that may provide service to the rest of the School of Engineering and the Physical Sciences are also under development.



Appropriate ABET materials documenting "objectives," "process," "outcomes and assessment," "feedback," and "process modifications" will be done with each of these changes.

Enrollment in the undergraduate program in the Department was down from last year and now stands at 106 (127 last year) undergraduate students. Our graduating class consisted of 30 students (compared with 38 last year and 25 the year before), including August and December '98 and May '99 graduates. Increases in freshman and sophomore class sizes have occurred as result of heightened recruitment activities. Based on the expected incoming class, the total number of chemical engineering undergraduates will increase slightly. The Department can expect to see class sizes of 25-35 students and graduating classes of 30.

Chemical engineering continues to attract exceptional students. Overall, we continue to attract the highest percentage of honors students, and our freshman class continues to have the highest average SAT scores for entering students with a designated major. Ten of the entering freshmen, or 39 percent, are honors students, compared with 17 percent for all of engineering. Sixty-two percent of the entering freshman chemical engineers have some type of University Scholarship. One of the four Honors Scholars recognized at the May Commencement was a chemical engineer (she was also a University Scholar), and at the spring awards banquet, 20 chemical engineering students received significant scholarship awards. One of last year's graduates received a prestigious NSF Scholarship to attend Graduate School in Chemical Engineering.

Our undergraduate student body is one of the most diverse of any department in the School. The undergraduate class is 34 percent female and the number of U.S. minorities is 21 percent, up from the previous year. We continue to show growth in the number of non-traditional students, including older students (many with children) and those seeking a second career.

Employment prospects for the 1999 class are even better than last year, reflecting the improving economic climate in the Northeast. Based on exit surveys by our graduating seniors, more than 85 percent will attend graduate school or have accepted chemical engineering jobs. Starting salaries for chemical engineers remain at the top of all engineering disciplines at an average of \$45,800 for our students, (which is higher than the national average of \$45,200 for chemical engineering students).

## **STUDENT INVOLVEMENT**

Both chemical engineering student organizations, AIChE and Omega Chi Epsilon, and SWE (over 60 percent female chemical engineers) had very productive years. The AIChE student chapter, advised by Assistant Professor Can Erkey, sponsored a number of seminars on a variety of topics, took several plant trips, and helped with the School of Engineering Open Houses and recruitment activities. They attended the national meeting and several regional meetings. New projects included service activities such as a Food Drive for the Willimantic Soup Kitchen and volunteer work at the Connecticut Special Olympics Winter Games. The AIChE student members now have their own web page at [www.engr.uconn.edu/aiche](http://www.engr.uconn.edu/aiche), and they started a new tradition of twice-monthly brown bag lunches with the faculty. The chemical engineering honor society, Omega Chi Epsilon, initiated a total of eight new members in fall and spring. One of their key activities is to conduct faculty and course evaluations, independent from the Office of Institutional Research, and provide this information to the Department Head. Jennifer York will be competing as the New England Regional Paper Competition Winner at the National SWE convention this June.

## **GRADUATE PROGRAM**

Both classroom education and research experience make up the graduate program. The performance and publication of outstanding chemical engineering research is indispensable to excellence in graduate and undergraduate education and further contributes to the reputation of the Department and the University.

Graduate enrollment increased, with a total of 67 graduate students versus 54 the previous year. Of these, 41 are Ph.D. students in either chemical engineering or polymer science, whose major advisor was a chemical engineering faculty. Thirty-six of these students are U.S. citizens. The number of supported, full time students is 52. Over the past year, four Ph.D. and 10 M.S. degrees were conferred in chemical engineering or polymer science, where the major advisor was a chemical engineering faculty member. These numbers reflect the current outstanding job market and the increasing difficulty in recruiting domestic students. Recruitment of new graduate students has focused on increasing both the quality and quantity of the students. Twelve new chemical engineering graduate students will be joining the department this fall.

Research in the Department is broad based, but can be grouped into four general categories. The first, polymer science, includes research on rheology, liquid crystals, polymer blends and immiscibility, and films and smart membranes. A second activity is in waste minimization and pollution prevention. Research under this category includes development of alternative processing, application of membrane technology, catalytic destruction of hazardous materials, innovative bio-remediation, ambient air pollution, green chemistry, homogenous catalysis, materials recycling and fuel cell technologies. A third area is in process design, optimization and control. The final area is in biotechnology; several topics include fermentation studies, separation of fermentation products, design of "smart" membranes, and immobilization of enzymes.

Research continues vigorously in the categories outlined above. Total research funding was over \$3.2 million/yr (on an annualized basis) from a total of 63 active grants. Funding sources include national and local industry, federal agencies, and state and private agencies. Faculty submitted over 82 new grant proposals. Results of this high level of research include 51 new refereed journal articles, 29 published conference proceedings, 51 additional conference presentations (abstracts), three books edited, one chapter in a book or monograph, four patents and two software packages upgraded or introduced. Invited lectures at conferences, academic departments, and industrial/government laboratories exceeded 22.

#### **FACULTY ACTIVITIES AND ACHIEVEMENTS**

A talented and motivated faculty is the key to the success of the Department. While the faculty have made many professional, educational and research contributions, only a few of the more significant accomplishments are summarized below.

Doug Cooper was promoted to full professor and received the School of Engineering Outstanding Faculty Teaching Award. Bob Coughlin started a cooperative Research and Development program with the University of Cairo under support from USAID. Students of Bob Fisher received awards for presentation of their papers at an IEEE Bioengineering Conference. Jeff Koberstein received a School of Engineering Distinguished Professorship and obtained a collaborative NIH research grant with faculty from the UConn Health Center to start up the University's Biomaterials Design Initiative. Monty Shaw continues as Associate Editor of the IEEE "Transactions of Dielectrics and Electrical Insulations" and as Treasurer of the Society of Rheology, and he received the International Research Award from the Society of Plastics Engineers. Bob Weiss is in the second year of his A.T. DiBenedetto Distinguished Faculty Appointment and was elected Fellow by the American Physical Society and the Society of Plastics Engineers.

Tom Wood assembled his molecular-based biotechnology laboratory (Bioremediation and Applied Biotechnology Laboratory) within eight months and has more than five students and post-docs working at full speed. Joe Helble received tenure, presented a plenary lecture and was instrumental in bringing in a large high-quality class of new graduate students. Jim Bell was appointed Patrick Fellow of the Adhesion Society and he is continuing as Associate Director of IMS where he is heavily involved in a capital equipment campaign. Jim Fenton as Acting Department Head helped move the Department forward while still maintaining a strong joint research program with Russ Kunz in fuel cells.

Can Erkey was selected by the graduating class for the Rogers Award for Outstanding Teaching and continues to provide strong mentorship for the students of the AIChE Student Chapter. Suzy Fenton was active in undergraduate and graduate recruitment via production of brochures, publications, development of hand-on demonstrations and participation in recruiting events. She is also heading up the curriculum improvement and ABET activities. Mike Cutlip serves the University as Director of the University Honors Programs and although this is a full-time commitment, Mike still provides much-needed input to the Department. Luke Achenie enjoyed his half-year sabbatical while still maintaining his high-level of research and activity with the national AIChE.

#### **OTHER SIGNIFICANT ACTIVITIES**

The Uniroyal Chemical Company again sponsored the departmental seminar series. Thanks to their generous support, 18 distinguished seminar speakers were hosted during the year. The speakers were from 13 different Universities (UMass, CCNY, Clark, Brown, Harvard, MIT, RPI, Carnegie Mellon, PIT, Texas A&M, Maine, etc.) and four different companies (DuPont, Pfizer, Merck, and Molecular Knowledge Systems). Topics included recycling, supercritical fluids, molecular magnets, combustion, tissue engineering, aerogels, enzyme catalysts, biocatalysis in polymer synthesis, micelles and green synthesis and processing.

In the fall, the Department hosted an all-day Industrial Advisory Meeting. Nine Advisory Board members were able to attend and provided significant input on a number of aspects of our program. They will be working and guiding us in the future on our development and recruitment activities.

# Chemical Engineering Department

## Journal Publications

### 1998-1999

#### LUKE E. K. ACHENIE

“Data Reconciliation-Based Traffic Count Analysis System,” (with M. Zhao and N. W. Garrick), *Transportation Research Record*, Vol. 1625, pp. 12-17, 1998.

“Deterministic Methods of Flexibility Analysis,” (with G. M. Ostrovsky and Y. Wang), *Computers & Chemical Engineering Supplement*, Vol. 23, pp. 387-390, 1999.

#### JAMES P. BELL

“Electropolymerization of 2-Methacryloyloxy (ethyl) acetoacetate on Aluminum Using a Novel Initiation Method,” (with R. Agarwal), *Journal of Applied Polymer Science*, Vol. 71, pp. 1665-1675, 1999.

“Fourier Transform Infrared Analysis of Polycarbonate/Epoxy Mixtures Cured with an Aromatic Amine,” (with T.M. Don), *Journal of Applied Polymer Science*, Vol. 69, p. 2395, 1998.

“Synthesis of Protective Coatings on Steel by Surface Spontaneous Polymerization: 2. Studies of the Chain Propagation Mechanism,” (with X. Zhang), *Materials Science and Engineering*, Vol. A 257, pp. 273-280, 1998.

“Synthesis of Protective Coatings on Steel by Surface Spontaneous Polymerization: 3. Process Development and Coating Property Studies,” (with X. Zhang), *Polymer Engineering and Science*, Vol. 37, pp. 119-127, 1999.

“Quinone-Amine Polyurethanes: Novel Corrosion-Inhibiting Coupling Agents for Bonding Epoxy to Steel,” (with K. Vaideeswaran and D. E. Nikles), *Journal of Adhesion Science & Technology*, Vol. 13, No. 4, pp. 477-499, 1999.

#### DOUGLAS J. COOPER

“A Tuning Strategy for Unconstrained Multivariable Model Predictive Controllers,” (with R. Shridhar), *Industrial & Engineering Chemistry Research*, Vol. 37, pp. 4003, 1998.

“A Novel Tuning Strategy for Multivariable Model Predictive Control,” (with R. Shridhar), *ISA Transactions*, Vol. 36, pp. 273, 1998.

#### ROBERT W. COUGHLIN

“Effects of Stratification in a Fluidized Bed Bioreactor During Treatment of Metalworking Wastewater,” (with H. Brett Schreyer), *Biotechnology and Bioengineering* 1999, Vol. 63, pp. 129-140, 1999.

#### MICHAEL B. CUTLIP

“A Collection of Representative Problems in Chemical Engineering Education for Solution by Numerical Methods,” (J.J. Hwalek, H.E. Nuttall, M. Shacham, E.M. Rosen, *et. al.*), *Computer Applications in Engineering Education*, Vol. 6, No. 3, pp. 169-189, 1998.

“Study of Blend Membranes Consisting of Nafion and Vinylidene Fluoride-Hexafluoropropylene Copolymer,” (with J. Chen, M. Ouyang, J.M. Fenton, H.R. Kunz and J.T. Koberstein), *Journal of Applied Polymer Science*, Vol. 70, No. 1, pp. 121-127, 1998.

#### CAN ERKEY

“Homogeneous Hydroformylation of 1-Octene in Supercritical Carbon Dioxide with [RhH(CO)(P(p-CF<sub>3</sub>C<sub>6</sub>H<sub>4</sub>)<sub>3</sub>)]<sub>3</sub>,” (with D.R. Palo), *Industrial and Engineering Chemistry Research*, Vol. 38, p. 163, 1999.

“Homogeneous Catalytic Hydroformylation of 1-Octene in Supercritical Carbon Dioxide Using a Novel Rhodium Catalyst with Fluorinated Arylphosphine Ligands,” (with D.R. Palo), *Industrial and Engineering Chemistry Research*, Vol. 37, pp.

4203, 1998.

#### **JAMES M. FENTON**

“Study of Blend Membranes Consisting of Nafion and Vinylidene Fluoride-Hexafluoropropylene Copolymer,” (with J.C. Lin, M. Ouyang, H.R. Kunz, J.T. Koberstein and M.B. Cutlip), *Journal of Applied Polymer Science*, Vol. 70, No. 1, pp. 121, 1998.

“Platinum-macrocycle co-catalysts for the electrochemical oxidation of methanol,” (with J.S. Bett, H.R. Kunz, A.J. Aldykiewicz, Jr., W.F. Bailey and D.V. McGrath), *Electrochimica Acta.*, Vol. 43, No. 24, pp. 3645, 1998.

“The Green Square Manufacturing Game; Demonstrating Environmentally Sound Manufacturing Principles,” (with S. Fenton), *Chemical Engineering Education*, Vol. 33, No. 2, pp. 166, 1999.

“Continuous Electrodeionization: Production of High-Purity Water without Regeneration Chemicals,” (with F. DiMascio, and J. Wood), *The Electrochemical Society Interface*, Vol. 7, No. 3, pp. 26, 1998.

#### **SUZANNE S. FENTON**

“The Green Square Manufacturing Game; Demonstrating Environmentally Sound Manufacturing Principles,” (with J. Fenton), *Chemical Engineering Education*, Vol. 33, No. 2, pp. 166, 1999.

#### **ROBERT J. FISHER**

“Visual Observation of Development of Sharkskin Melt Fracture in Polybutadiene Extrusion,” (with Y-W. Inn and M.T. Shaw), *Rheological Acta.*, Vol. 37, No. 6, pp. 573-582, 1998.

#### **JEFFREY T. KOBERSTEIN**

“Study of Blend Membranes Consisting of Nafion and Vinylidene Fluoride-Hexafluoropropylene Copolymer,” (with J.C. Lin, M. Ouyang, J.M. Fenton, H.R. Kunz and M.B. Cutlip), *Journal of Applied Polymer Science*, Vol. 70, pp. 121-127, 1998.

“Creating Smart Polymer Surfaces with Selective Adhesion Properties,” (with D.E. Duch, W. Hu, T.J. Lenk, R. Bhatia, H.R. Brown, J-P. Lingelser and Y. Gallot), *Journal of Adhesion*, Vol. 66, pp. 229-149, 1998.

“The Effects of Low Energy End Groups on the Dewetting Dynamics of Poly(styrene) Films on Poly(methyl methacrylate) Substrates,” (with C. Yuan and M. Ouyang), *Macromolecules*, Vol. 32, pp. 2329-2333, 1999.

#### **H. RUSSELL KUNZ**

“Study of Blend Membranes Consisting of Nafion and Vinylidene Fluoride-Hexafluoropropylene Copolymer,” (with J.C. Lin, M. Ouyang, J.M. Fenton, J.T. Koberstein and M.B. Cutlip), *Journal of Applied Polymer Science*, Vol. 70, No. 1, pp. 121, 1998.

“Platinum-macrocycle co-catalysts for the electrochemical oxidation of methanol,” (with J. S. Bett, J. M. Fenton, A.J. Aldykiewicz, Jr., W.F. Bailey and D.V. McGrath), *Electrochimica Acta.*, Vol. 43, No. 24, pp. 3645, 1998.

#### **MONTGOMERY T. SHAW**

“Effect of Shear Flow on the Morphology and Phase Behavior of a Near-Critical SAN/PMMA Blend,” (with Z. Hong and R.A. Weiss), *Macromolecules*, Vol. 31, pp. 6211-6216, 1998.

“Visual Observation of Development of Sharkskin Melt Fracture in Polybutadiene Extrusion,” (with Y.W. Inn), *Rheological Acta*, Vol. 37, No. 6, pp. 573-582, 1998.

#### **ROBERT A. WEISS**

“Control of Polystyrene Film Dewetting Through Sulfonation and Metal Complexation,” (with Y. Feng, A. Karim and C.C. Han), *Macromolecules*, Vol. 31, pp. 484-493, 1998.

“Characterization of Ionomer Solutions. 1. Phase Behavior and Gelation of Sulfonated Polystyrene Ionomers in Decalin,” (with K. Chakrabarty), *Macromolecules*, Vol. 31, pp. 7385-7389, 1998.

“Characterization of Ionomer Solutions. 2. Dynamic Light Scattering Studies on Sulfonated Polystyrene Ionomers in Non-polar Solvent,” (with K. Chakrabarty, A. Sehgal and T.A. Seery), *Macromolecules*, Vol. 31, pp. 7390-7397, 1998.

“Spinodal Dewetting of Thin Polymer Films,” (with R. Xie, A. Karim, J.F. Douglas and C.C. Han), *Physical Review Letters*, Vol. 81, pp. 1251-1254, 1998.

“Effect of Shear Flow on the Morphology and Phase Behavior of a Near-Critical SAN/PMMA Blend,” (with Z. Hong and M.T. Shaw), *Macromolecules*, Vol. 31, pp. 6211-6216, 1998.

“Microstructure of Ionomers Based on Sulfonated Block Copolymers of Polystyrene and Poly(ethylene-*alt*-propylene),” (with S. Mani, C.E. Williams and S.F. Hahn), *Macromolecules*, Vol. 32, pp. 3663-3670, 1999.

## **THOMAS K. WOOD**

“Oxidation of Trichloroethylene, 1,1-Dichloroethylene, and Chloroform by Toluene/o-Xylene-Monooxygenase from *Pseudomonas stutzeri* OX1,” (with S. Chauhan and P. Barbieri), *Applied & Environmental Microbiology*, Vol. 64, pp. 3023-3024, 1998.

“Degradation of Perchloroethylene and Dichlorophenol by Pulsed-Electric Discharge and Bioremediation,” (with D.C. Yee, S. Chauhan, E. Yankelevich and V. Bystritskii), *Biotechnology and Bioengineering*, Vol. 59, pp. 438-444, 1998.

“Modeling Trichloroethylene Degradation by a Recombinant Pseudomonad in a Fixed-Film Biofilter,” (with A.K. Sun and J. Hong), *Biotechnology and Bioengineering*, Vol. 59, pp. 40-51, 1998.

“Characterization of Axenic *P. fragi* and *E. coli* Biofilms for Corrosion Inhibition of SAW 1018 Steel,” (with A. Jayaraman, and A.K. Sun), *Journal of Applied Microbiology*, Vol. 84, pp. 485-492, 1998.

“Electroporation of Pink-Pigmented Methylotrophic Bacteria,” (with C. Kim), *Applied Biochemistry & Biotechnology*, Vol. 73, No. 2/3, pp. 81-88, 1998.

“Inhibiting Sulfate-Reducing Bacteria in Biofilms by Expressing the Antimicrobial Peptides Indolicidin and Bactenecin,” (with A. Jayaraman and F.B. Mansfeld), *Journal of Industrial Microbiology & Biotechnology*, Vol. 22, pp. 167-175, 1999.

# Chemical Engineering Department

## Books, Book Chapters, Book Sections & Edited Volumes

### 1998-1999

#### BOOK/VOLUME CHAPTERS & SECTIONS

##### JAMES P. BELL

“Metal Coating,” (with R. Agarwal and X. Zhang), *1999 Yearbook of Science & Technology*, McGraw-Hill, p. 203-, 1999.

##### MICHAEL B. CUTLIP

“Problem Solving in Chemical Engineering with Numerical Methods,” (with Mordechai Shacham), Prentice Hall International Series in the Physical and Chemical Engineering Sciences, Prentice Hall, Upper Saddle River, NJ, 1998 (with CD-ROM and Instructor’s Solutions Disk).

##### MONTGOMERY T. SHAW

“Rheometry of Electrorheological Fluids,” (with R. C. Kanu), *Advances in Non-Newtonian Flows and Rheology*, (D.A. Siginer, D. DeKee and R.P. Chhabra, Eds.) Elsevier, Amsterdam, pp. 775-795, 1999.

#### WORKBOOKS

##### DOUGLAS J. COOPER

“Practical Process Control,” 2nd Edition. Distributed to the 100+ users of Control Station Software package published by Control Station Technologies.

“Control Station User Guide” was completely updated for version 2 release published by Control Station Technologies.

“Hands on Workshop Series,” a 30-page series of self-paced study exercises for students using the control station software package published by Control Station Technologies.

# Chemical Engineering Department Conference Publications 1998-1999

## LUKE E. K. ACHENIE

“Computer Aided Solvent Design for Lithographic Blanket Wash System,” (with M. Sinha), *Proceedings of the AIChE, Topical Conference on Pollution Prevention & Risk Reduction, Process Design for Pollution Prevention II*, November 1998.

“A New Approach to Flexibility Analysis,” (with G.M. Ostrovsky and V. Gomelsky), *Proceedings of the PRES'99 2nd Conference on Process Integration, Modelling and Optimisation for Energy Saving and Pollution Reduction*, pp. 517-521, May 31-June 2, 1999.

## JAMES P. BELL

“Epoxy-Episulfide Resins for Electronic Applications,” (with K. Tsuchida), *Proceedings of the 22nd Annual Meeting of the Adhesion Society*, ISSN 1086-9506, p. 1, 1999.

“Spontaneous Polymerization on Aluminum by a Painting Process,” (with N. Baker), *Proceedings of the 22nd Annual Meeting of the Adhesion Society*, ISSN 1086-9506, p. 238, 1999.

“The Evaluation of Beta Diketone Coupling Agents for Enhancing the Adhesion of Epoxy to Aluminum,” (with S.L. Nesbitt and J. Emerson), *Proceedings of the 22nd Annual Meeting of the Adhesion Society*, ISSN 1086-9506, p. 351, 1999.

“Cyclic Corrosion Testing of Spontaneous Polymerized Coatings Using an *In-Situ* Corrosion Sensor,” (with G. Davis, L. Krebs, C. Dacres and C.Y. Wu), *Proceedings of the 22nd Annual Meeting of the Adhesion Society*, ISSN 1086-9506, p. 354, 1999.

“Beta-Kiketone Functionalized Polymers: Novel Coupling Agents for Enhancing the Adhesion of Steel to Epoxy,” (with K. Vaideeswaran), *Proceedings of the 2nd International Symposium on “Silanes and Other Coupling Agents”*, Newark Airport, N.J., October 21-22, 1998.

“Adhesive Coatings by Spontaneous Polymerization on Metals,” *Proceedings of the First World Congress on Adhesion and Related Phenomena*, Garmisch-Partenkirchen, Sept. 6-11, 1998.

## DOUGLAS J. COOPER

“Control Education Crossing Departmental Boundaries,” (with D. Fina), *Proceedings of the 1999 American Control Conference*, IEEE Publications, IO36-WM17-6, 1999.

## ROBERT W. COUGHLIN

“Use of Sugar Processing Waste for Air Pollution Control,” (with J.F. Shen), *VVIIIth Interamerican Congress of Chemical Engineering*, San Juan, Puerto Rico, December 1998.

## MICHAEL B. CUTLIP

“Selecting the Appropriate Numerical Software for a Chemical Engineering Course,” (with M. Shacham), *ESCAPE-9 Meeting*, Budapest, Hungary, May 31-June 2, 1999.

“Preparation of High Temperature Composite Membranes for Hydrogen Proton Exchange Membrane Fuel Cells,” (with J.C. Lin, H.R. Kunz and J.M. Fenton), *31st Mid-Atlantic Industrial and Hazardous Waste Conference*, University of Connecticut, Storrs, June 20-23, 1999.

## CAN ERKEY

“Homogeneous Catalytic Hydroformylation of Olefins in Supercritical Carbon Dioxide,” *Annual Green Chemistry and*

*Engineering Conference*, Washington, D.C., June 1999.

“Thermodynamics of Distribution of Organic Compounds between Inorganic Matrices and Supercritical Fluids,” *ACS - Northeast Regional Meeting Symposium*, New York, June 1999.

“Synthesis and Manufacture of Conductive Polymers using Supercritical Fluids,” (with I. Kaya and R.A. Weiss), *AIChE Annual Meeting*, Miami Beach, November 1998.

“Kinetics of Homogeneous Hydroformylation in Supercritical Carbon Dioxide,” (with D. Palo), *AIChE Annual Meeting*, Miami Beach, November 1998.

“Homogeneous Catalysis in Supercritical Carbon Dioxide by Fluorinated Transition Metal Complexes,” (with D. Palo), *ACS National Meeting*, Boston, August 1998.

#### **JAMES M. FENTON**

“Recycling of Post Consumer Tin Cans Using Electrochemical Methods,” (with J.C. Lin, C. He, R. Venkataraman, A.J. Aldykiewicz, Jr., J.E. Dresty and P.J. Sweetser), *Proceedings of the Symposia on Environmental Issues in the Electronics/Semiconductor Industries and Electrochemical/Photochemical Methods for Pollution Abatement*, (Eds. C.R. Simpson, L. Mendicino, K. Rajeshwar and J.M. Fenton, The Electrochemical Society, Vol. 98, No. 5, pp. 264, 1998.

#### **ROBERT J. FISHER**

“A Close Look at the Sharkskin Melt Fracture of Polybutadiene,” (with Y-W. Inn, M. G. Daly and M. T. Shaw), *Proceedings of the 5th European Rheology Conference*, (I. Emri and R. Cvelbar, Eds.), Springer Steinkopff Verlag, Darmstadt, pp. 394-395, 1998.

“Studies of Sharkskin Melt Fracture Using a Model Polymer,” (with Y-W. Inn and M. T. Shaw), *SPE ANTEC Proceedings*, Vol. 45, pp. 1280-1282.

“Evaluating the Role of Interfacial Transport in SLM Biomimetic Systems,” (with M.M. LaFond), *Northeast Biomedical Engineering Conference, IEEE Transactions*, Vol. 86, No. 9, pp. 48-51, 1999.

“Assessment of Liquid-Cell Membrane Mass Transfer Resistance on Growth Kinetics in Cell Culture Analog Bioreactors,” (with D.E. Taylor), *Northeast Biomedical Engineering Conference, IEEE Transactions*, Vol. 86, No. 9, pp. 43-46, 1999.

“Use of Biomimetic Systems in the Continuous Production of Pharmaceutical Agents,” (with S. Gunasekaran and C.A. Magliocco), *Transactions on IEEE/EMBS*, Vol. 25, No. 4, pp. 3-6, 1999.

“Computational Fluid Dynamics in Biomedical Engineering: Predicting Surface and Interfacial Phenomena,” (with M.F. Hagan), *Transactions on IEEE/EMBS*, Vol. 25, No. 4, pp. A17-22, 1999.

“Novel Biomimetic Hollow Fiber Configurations Applicable to Blood Oxygenation,” (with Y. Zhang and C.A. Magliocco), *Transactions on IEEE/EMBS*, Vol. 25, No. 4, pp. A11-16, 1999.

#### **JOSEPH J. HELBLE**

“Transformation and Wet Deposition of Atmospheric Mercury: Results of a Regional Scale Simulation Study,” (with X. Xu, X. Yang, and D.R. Miller), *Proceedings of the American Meteorological Society Annual Meeting*, January, 1999.

“A Modeling Study of Regional Scale Atmospheric Transport and Transformation of Mercury,” (with X. Xu, X. Yang and D. R. Miller), *Proceedings of the 13th Conference on Biometeorology and Aerobiology*, November 1998.

“The Effect of Chemical Composition on the Structure of Coagulating Aggregates,” (with B. B. Liu), *Proceedings of the Symposium on Advanced Technologies for Particle Production*, AIChE National Meeting 1998.

#### **MONTGOMERY T. SHAW**

“Investigation of Stress-Induced Effects on SAN/PMMA and SAN/PCL Blends Using Small-Angle Light Scattering,” (with Z. Hong and R.A. Weiss), *ACS PMSE Proceedings 79*, pp. 391-392, 1998.

“A Close Look at the Sharkskin Melt Fracture of Polybutadiene,” (with Y-W. Inn, M.G. Daly and R.J. Fisher), *Proceedings of the 5th European Rheology Conference*, (I. Emri and R. Cvelbar, Eds.), Springer Steinkopff Verlag, Darmstadt, pp. 394-



395, 1998.

“Cure Monitoring of Phenolic Resins Using Dynamic Rotational Rheometry,” (with J.L. Rose), *SPE ANTEC Proceedings*, Vol. 45, pp. 961-965, 1999.

“Studies of Sharkskin Melt Fracture Using a Model Polymer,” (with Y-W. Inn and R.J. Fisher), *SPE ANTEC Proceedings*, Vol. 45, pp. 1280-1282, 1999.

“Reusing XLPE from Electrical Cable Waste: Cable Separation, Processing and Blend Properties,” (with C. C. White and J. Wagenblast), *SPE ANTEC Proceedings*, Vol. 45, pp. 3193-3198, 1999.

#### **ROBERT A. WEISS**

“Neutron Reflectivity of Polymer Blends,” (with R. Braiewa, A. Karim and J. Ankner), *Polymer Materials Sci. Eng.*, Vol. 79, pp. 391-392, 1998.

“Association Behavior of Poly(N-isopropylacrylamide) with Perfluoroalkyl Side Chain,” (with S. S. Bae, K. Chakrabarty and T. A. P. Seery), *Polymer Materials Sci. Eng.*, Vol. 80, pp. 335-336.

“Miscibility of Blends of Thermotropic Liquid Crystalline Polymer and Sulfonated Polystyrene Ionomers,” (with Y. Ghebremeskel and L. F. Charbonneau), *Proceedings of the An. Tech. Conf.*, Society of Plastic Eng., Vol. 65, pp. 1595-1599, 1999.

“Investigation of Stress-Induced Effects on SAN/PMMA and SAN/PCL Blends Using Small-Angle Light Scattering,” (with Z. Hong and M.T. Shaw), *ACS PMSE Proceedings 79*, pp. 391-392, 1998.

# Chemical Engineering Department

## Active Research Grants and Contracts

### 1998-1999

#### LUKE E. K. ACHENIE

“Optimization of Chemical Processes Under Uncertainty,” NSF, April 1, 1998 – March 31, 2001, \$197,532.

“Optimization of Chemical Processes Under Uncertainty,” NSF REU Supplement, January 1999, \$10,000.

“Computer Aided Design Approach to the Design of Environmentally Benign Solvents,” NSF, January 1, 1997 – December 31, 1998, \$60,000.

#### JAMES P. BELL

“Surface Polymerized Coatings Process Development,” Mixed Sources, December 23, 1998 – December 23, 1999, \$185,000 (plus \$30,000 supplement from Elf Atochem).

“Corrosion Protection Using Surface-Polymerized Coatings,” Dacco Sci. Inc., March 5, 1999 – March 4, 2000, \$188,131.

“Corrosion Protection Using Surface Spontaneous Polymerized Coating,” Dacco Sci. Inc., April 10, 1998 – September 30, 1998, \$23,000.

#### DOUGLAS J. COOPER

“UConn’s Process Control Consortium,” Pavilion Technologies, March 1999 – March 2000, \$4,500.

“UConn’s Process Control Consortium,” Laplace Engineering, January 1999 – January 2000, \$4,500.

“UConn’s Process Control Consortium,” AlliedSignal Corporation, September 1997 – September 1999, \$30,000.

“UConn’s Process Control Consortium Training Workshops,” various industries, January 1998 – January 2000, \$21,500.

“UConn’s Process Control Consortium,” PPG Industries, January 1997 – January 2000, \$20,000.

“UConn’s Process Control Consortium,” Westinghouse Savannah River Company, May 1997 – May 1999, \$30,000.

“UConn’s Process Control Consortium,” Cytec Corporation, December 1997 – December 1998, \$4,500.

“UConn’s Process Control Consortium,” Searle Corporation, September 1997 – September 1998, \$12,500.

#### ROBERT W. COUGHLIN

“Methodology for Development of Marketable Biotechnologies,” USAID Linkage Program, September 14, 1997 – December 31, 1999, \$100,000.

#### MICHAEL B. CUTLIP

“High Temperature Composite Membranes for Fuel Cell Applications,” UConn Research Foundation, June 1, 1998 – May 31, 1999, \$8,503.

#### CAN ERKEY

“Synthesis, Characterization and Activity of Homogeneous Catalysts Anchored to Polymers Soluble in Supercritical Carbon Dioxide,” American Chemical Society - Petroleum Research Fund - AC, September 1, 1997 – August 31, 1999, \$50,000.

“Electrically Conductive Elastomer Foams,” (with co-PI: R.A. Weiss), Connecticut Innovations, Inc., January 1, 1998 – December 31, 1999, \$186,476.

“Synthesis of Nanoparticles in Supercritical Carbon Dioxide,” Connecticut Innovations, Inc., January 1, 1999 – December 31,

2000, \$179,931.

“Solid Waste Processing for Long-Term Human Space Exploration Mission,” Hamilton Standard Space Systems International, June 1, 1998 – August 31, 1998, \$1,500.

#### **ROBERT J. FISHER**

“An Experimental and Theoretical Investigation of Sharkskin Melt Fracture,” (with co-PI: M.T. Shaw), NSF, October 1995 – September 1998, \$304,690.

“Formation of BEACON – Biomedical Engineering Alliance of Connecticut,” (with co-PI: J. Bronzino, Trinity College), with Trinity College, University of Hartford, UCHC; Whitaker Foundation, January 1, 1999, \$25,000.

#### **JOSEPH J. HELBLE**

**“REU Supplement,” NSF CAREER Award, June 1999 – December 1999, \$10,000.**

“Combustion Aerosol Synthesis of Nanoscale Ceramics,” NSF CAREER Award, June 1998 – May 2002, \$210,000.

“Synthesis of Uniform Particles for Study of PM 2.5 Health Effects,” U.S. EPA, June 1998 - , \$21,500.

“Air Toxics Emissions from Combustion Systems,” U.S. DOE, March 1998 – March 2001, \$220,000.

“Metastable Zirconia Thermal Barrier Coatings,” U.S. DOE, October 1997 – March 1999, \$50,000.

“Ash Particle Formation,” ABB, January 1998 - , \$11,600.

“Model of the Viscous Coalescence of Multiparticle Aggregates,” U.S. EPA, September 1997 – August 1999, \$11,600 (Project funds provided as part of R. Garabedian EPA STAR Fellowship).

“Submicron Ash Particle Formation,” NASA, May 1996 – May 1999, \$90,000.

#### **JEFFREY T. KOBERSTEIN**

“Environmental Aspects of Polymer Recycling,” (with co-PIs: M.T. Shaw, R.A. Weiss, S. Suib), NSF-GRT: GER-9354903, 9/94 - 9/99, \$537,500.

“Durable Multilayer Coatings: A Modular Approach,” (with co-PIs: T. Seery and P. Klemchuk), Air Force Office of Scientific Research, 4/97 - 3/00, \$889,518.

“Surface Active Additives that Create Smart Biomimetic Surfaces,” ARO-AASERT, 9/97 - 8/00, \$100,000.

“Masters Level Materials Program with Significant Industrial Interaction,” (with co-PIs: E. Kurz and O. Devereux), NSF-DMR, 9/97 - 8/99, \$247,000.

“The Molecular Design of Surface-Active Polymers that Create Functional Surfaces,” NSF-DMR, 8/98 - 7/01, \$310,500.

“Control of Sensor-Tissue Interactions for Extended Lifetime,” (with co-PIs: D. Burgess, F. Papadimitrakopolous, S. Huang, F. Moussy, D. Kreuzer), NIH-NIDR, 9/1/98 - 8/30/98, \$1,482,277.

#### **MONTGOMERY T. SHAW**

“Long-Term Thermal Aging Study...,” Electric Power Research Institute, 3/1/99 - 12/31/03, \$161,000.

“Rheometers for Materials Research,” U.S. Army Research Office, 3/25/99 - 3/24/00, \$381,000.

“Acquisition of Nano-Indenter for Moderately Elevated Temperatures,” (with co-PIs: M. Begley and E. Jordan), National Science Foundation, 6/1/98 - 3/24/00, \$240,000.

“Natural vs. Artificial Aging of Nuclear Plant Components,” Electric Power Research Institute, 8/1/84 - 12/31/00, \$1,358,367.

“Real-time Raman Measurements in a Parallel-Plate Rheometer of a Curing Composite,” Advanced Fuel Research, Inc., 7/14/96 - 7/14/98 + 10/1/98 - 9/30/99, \$165,000.

“Environmental Aspects of Plastics Recycling (Graduate Research Traineeships),” (with co-PIs: R.A. Weiss, J.T. Koberstein and S. Suib), NSF/EPRI, 1/1/94 - 12/31/99, \$537,500.

“Enhanced ER Fluids for Tire Applications,” Pirelli Tire, 7/1/96 - 6/30/99, \$129,000.

“Experimental and Theoretical Investigation of Sharkskin Melt Fracture,” (with co-PI: R. Fisher), National Science Foundation, 10/1/95 - 9/30/99, \$304,690.

“Improved Extrudable Dielectrics for Transmission Cables,” Electric Power Research Institute, 9/1/97 - 4/30/98, \$67,500.

#### **ROBERT A. WEISS**

“Novel Contact Lens Material,” Wesley-Jesson, 1996-2000, \$231,624.

“Ionomer Containing Binary Polymer Blends,” NSF, 1997-2000, \$293,022.

“Neutron Reflectivity and Scattering Studies of Polymer Blends of Rods and Coils,” NIST, 1997 - 1999, \$138,660.

“Liquid Crystalline Polymer Blends,” Hoechst-Celanese, 1997-1998, \$106,600.

“Conductive Elastomers,” (with co-PI: C. Erkey), Connecticut Innovations, Inc., 1998-2000, \$186,476.

“Environmental Aspects of Plastics Recycling (Graduate Research Traineeships),” (with co-PIs: M.T. Shaw, J.T. Koberstein and S. Suib), NSF/EPRI, 1/1/94 - 12/31/99, \$537,500.

#### **THOMAS K. WOOD**

“Corrosion Control Using Protective Biofilms Which Secrete Antimicrobials and Corrosion Inhibitors,” (with co-PI: Florian Mansfield, U. of Southern California), Electric Power Research Institute, 1998-2000, \$389,812.

“Directed Evolution of Monooxygenases for Green Chemistry,” NSF, 1998-2000, \$214,063.

“Novel Antimicrobial and Antiviral Applications of the Hok Killer Peptide,” NSF, 1997-1999, \$15,847.

“Directed Evolution of Monooxygenases for Green Chemistry,” NSF REU, 1998-1999, \$10,000.

“Unrestricted Grant,” DuPont Central Research and Development, 1998-1999, \$20,000.

# Chemical Engineering Department Awards, Honors and Patents 1998-1999

## **JAMES P. BELL**

“Method for Coating Metals by Dip Autopolymerization,” September 15, 1998, US. Patent #5,807,612.

Patrick Fellow, Adhesion Society, February 21, 1999.

## **DOUGLAS J. COOPER**

Outstanding Faculty Teaching Excellence in Engineering Award, University of Connecticut, 1998.

## **MICHAEL B. CUTLIP**

New United States Provisional Patent Application, Cantor Colburn, LLP, Reference # UCT-0004, “Membranes, Membrane Electrode Assemblies and Fuel Cells Employing Same, and Process for Preparing,” with James M. Fenton, H. Russell Kunz and Jung-Chou Lin.

## **CAN ERKEY**

**Rogers Outstanding Teaching Award, 1999.**

Serial No. 09/188/513 allowed 4/16/99, “Conductive Elastomeric Foams by *In-Situ* Vapor Phase Polymerization of Pyrroles,” with Bessette, M., R. A. Weiss, C. P.-P. Gan, C. Erkey and Y. Fu. (Assigned to Rogers Corp.).

## **JAMES M. FENTON**

U.S. Patent Application Serial No. 08/991,029, “Method and Apparatus for Electrochemical Delacquering and Detinning,” with John E. Dresty, Jr., Richard Bodensteiner, Chunzhi He, Jung-Chou Lin, Ramakrishnan Venkataraman and Antonio J. Aldydiewicz, Jr. Formal Notice of Allowance has been issued.

New United States Provisional Patent Application, Cantor Colburn, LLP, Reference # UCT-0004, “Membranes, Membrane Electrode Assemblies and Fuel Cells Employing Same, and Process for Preparing,” with H. Russell Kunz, Michael B. Cutlip and Jung-Chou Lin.

## **JOSEPH J. HELBLE**

**NSF Career Award.**

## **JEFFREY T. KOBERSTEIN**

**School of Engineering Distinguished Engineering Professor, 1999.**

## **ROBERT A. WEISS**

Serial No. 09/188/513 allowed 4/16/99, “Conductive Elastomeric Foams by *In-Situ* Vapor Phase Polymerization of Pyrroles,” with Bessette, M., C. P.-P. Gan, C. Erkey and Y. Fu, (Assigned to Rogers Corp.).

Fellow, American Physical Society.

Fellow, Society of Plastics Engineers.

# Chemical Engineering Department

## Major Professional Activities

### 1998-1999

#### **LUKE E. K. ACHENIE**

Session Chair: Interval Computing: Challenging Problems in Chemical Engineering Optimization, SIAM Optimization Meeting, Atlanta, GA, May 1999.

Session Chair: Advances in the Application of Mathematics and Computation in Chemical Engineering, SIAM Annual Meeting, Atlanta, GA, May 1999.

Session Chair: Potential Benefits of Global Optimization in Industrial Practice, AIChE Spring Meeting, Houston, TX, March 1999.

Session Chair: Process and Product Design, AIChE National Meeting, Miami, FL, November 1998.

AIChE Minority Affairs Committee Member, 11/91 – present.

#### **THOMAS F. ANDERSON**

**Treasurer - University of Connecticut Chapter of Sigma Xi.**

#### **JAMES P. BELL**

Advisory Board, *Polymer Engineering & Science*.

Advisory Board, *Journal of Adhesion Science & Technology*.

Advisory Board, *Journal of Polymer Engineering*.

#### **DOUGLAS J. COOPER**

Co-Chair of "Demonstration of Software for Chemical Engineering Education," AIChE 1998 Annual Meeting, Miami, FL 11/9/98.

#### **MICHAEL B. CUTLIP**

National Program Chairman, Chemical Engineering Division of the American Society of Engineering Education. Major organizer of the Chemical Engineering Program at the Seattle Meeting of the ASEE in June/July 1998.

National Chairman of the Chemical Engineering Division of the ASEE.

Trustee of the CACHE Corporation (Computer Aids for Chemical Engineering Education).

Member, Executive Committee of the Chemical Engineering Division of the American Society for Engineering Education.

Member, Martin Award Committee of the Chemical Engineering Division of the American Society for Engineering Education.

Member, Corcoran Award Committee of the Chemical Engineering Division of the American Society for Engineering Education.

Member, CACHE Corporation Committees: Curriculum, Process Engineering, Developing Innovative Engineers, Simulated Laboratory Modules.

#### **CAN ERKEY**

Session Chair, Reactions in Supercritical Fluids, AIChE Meeting, Miami, 1998.

### **JAMES M. FENTON**

Tutorials in Electrochemical Engineering - Mathematical Modeling, jointly sponsored by the Energy Technology Division, and the Industrial Electrolysis and Electrochemical Engineering Division of The Electrochemical Society, The Electrochemical Society Meeting, Seattle, WA, May 2-6, 1999.

Chairman, Industrial Electrolysis and Electrochemical Engineering Division of the Electrochemical Society.

Member of Board of Directors, Electrochemical Society.

Member of Publication Committee, Electrochemical Society.

Member of Programming Committee for Area 1e, American Institute of Chemical Engineers.

Divisional Representative to The Electrochemical Society's Council of Local Sections.

Chairman of the Symposium Planning Committee, Industrial Electrolysis and Electrochemical Engineering Division of the Electrochemical Society.

Chairman of the Student Membership Committee, Industrial Electrolysis and Electrochemical Engineering Division of the Electrochemical Society.

### **ROBERT J. FISHER**

Program Committee for EMBS/IEEE 2nd Annual BEACON Conference to be held September 1999 in Hartford, CT; Area Coordinator for Transport Phenomena, Session Chair for Fundamental Research in Pharmaceutical Engineering and Editorial Board Member for Conference Proceedings.

Section Editor: Biomedical Transport Phenomena - CRC Press; BME Handbook Steering Committee/Session Chair - Systems Modeling for IEEE 25th Annual Northeast Bioengineering Conference, Hartford, CT, April 1999.

Program Committee/Paper Selection Chair; Area Coordinator for Biotechnology and Drug Delivery; Session Chair for Transport and Systems Modeling; Editorial Board for Conference Proceeding: For IEEE 26th Annual Northeast Bioengineering Conference, Boston, MA, April 2000.

Secretariat Member - Consortium for Plant Biotechnology Research, Inc. (CPBR).

Session Chair - IEEE 25th NEBC: "Biomimetics and Pharmaceutical Engineering."

Session Chair - Whitaker/BEACON Symposium "Drug Transport and Delivery."

IEEE/NEBE - Program Committee: Fundamental Research in Biological Transport Phenomena.

### **JOSEPH J. HELBLE**

American Chemical Society, Fall 2000 National Meeting, Session Organizer, Division of Fuel Chemistry, 10 Year Retrospective on 1990 Clean Air Act Amendments, Washington, D.C., August 2000.

Scientific Conference Planning Committee, Engineering Foundation Conference on Vapor Phase Processing of Materials, to be held in Haikko Manor, Finland, July 1999.

Scientific Planning Committee, 4th International Symposium on Gas Cleaning at High Temperatures, to be held in Karlsruhe, Germany, September 1999.

Session Chair, 31st Mid-Atlantic Industrial and Hazardous Waste Conference, Storrs, CT, June 1999.

AAAR Comb. Aerosols working group.

### **H. RUSSELL KUNZ**

Session Organizer for The Electrochemical Society for Seattle Meeting in Fall of 1999 and Hawaii Meeting for Spring 1999. Energy Technology Division of Electrochemical Society.

**MONTGOMERY T. SHAW**

Associate Editor, *IEEE Transactions on Dielectric and Electrical Insulation*.

Treasurer, Society of Rheology.

Executive Committee, The Society of Rheology.

Society Treasurers Committee, American Institute of Physics.

**ROBERT A. WEISS**

Editor-in-Chief, *Polymer Engineering and Science*.

Editor-in-Chief, *Polymer Composites*.

U. S. Representative for Organizing Committee of MacroUK99, Bath, England, 1999.

Chairman, Research Conference on Processing of Composite Materials, Soc. Plastics Eng., 1999.

International Advisory Board, *Polymers and Polymer Composites*.

Board of Directors, Engineering Properties and Structure Div., Society of Plastics Engineers.

Board of Directors, Division of Polymer Chemistry, American Chemical Society.

Society of Plastics Engineers: Publications Committee, International Research Conference Committee (Chair), Intersociety Relations (Chair).

American Chemical Society: U.S. Representative to MacroUK'99, Intersociety Relations for Div. of Polymer Chemistry.

**THOMAS K. WOOD**

Conference Chair, American Chemical Society National Meeting, Anaheim, CA, March 23, 1999.

Session Chair, 31st Mid-Atlantic Industrial and Hazardous Waste Conference, Storrs, CT, June 1999.



# Civil & Environmental Engineering Department

## Annual Report Summary

### 1998-1999

#### GENERAL

This year has witnessed many exciting changes for the Department of Civil & Environmental Engineering. We have new leadership and have adopted a strong proactive philosophy geared toward assuring national recognition for our excellent programs in teaching and research. Professor R. Malla agreed to serve as Associate Department Head and the department was restructured into three organizational units: Environmental and Water Resources Engineering, Structures and Applied Mechanics, and Transportation Systems. New group leaders are: Professor N. Nikolaidis, Professor M. Accorsi, and Professor J. Ivan, respectively.

#### DEPARTMENTAL PUBLICATIONS

Consistent with the objective of improving of visibility and recognition, we are reshaping our image. We have adopted a new departmental seal (above). The seal that appears on our home page and many publications is a physical symbol of our mission and highest goals as a department. Our motto, found in the banner beneath the seal, is *Veritas in Consilio per Scientiam*, a Latin phrase meaning *Truth in Design Through Knowledge*. The coat of arms displays three icons that define our department:

A book representing the need to acquire expansive knowledge that informs all civil engineering decisions with a contextual understanding of social, historical, economic, and scientific thought.

A structural pillar symbolizing the traditional foundation of construction that underlies our profession.

Water droplets representing the vital communion between civil engineers and the environment, which ensures the integrity of our water, earth, and air.

We have created a new web page (<http://www.eng2.uconn.edu/cee>), that not only highlights the strengths of our department but also serves as an introduction to prospective students and as a resource for employment and educational opportunities for current students. The department has also published a new abbreviated brochure for prospective students. We are now in the process of creating a detailed full-length brochure that will serve as a recruitment tool and as well a report of accomplishments. As part of our new full-length brochure development, the department hosted a contest requesting cover art submissions from the State of Connecticut's students (K-12) on their perspectives of Civil & Environmental Engineering. Over 150 outstanding entries were received and four winners selected (Jacob Fedors, Grade 1, Ledyard Center School; Ryan Hamelin Grade 2, Cold Spring School, New Haven; Kathy Chmist, Grade 8, Timothy Edwards School, South Windsor; Cynthia Fishman, Grade 11, Danbury High School). A reception was held at the William Benton Museum of Art where the winning entries were displayed prior to finding a permanent home in the departmental offices. The winners each received a framed certificate and a modest monetary award; additionally, the winners' schools also received a monetary award. The contest was generously underwritten with the kind support of GEI Environmental-Atlantic Division, Blakeslee Prestressed Concrete, and Wilbur Smith Associates.

A newly formed Department Council comprised of the Head, Associate Head and Group Leaders worked very hard this year to restructure many departmental procedures and protocols. Among the many revisions was an entirely redesigned and executed open house presentation. The new presentation included a Power Point® slide presentation, movie presentation of Civil Engineering structures, professionally prepared posters that now grace the walls of the Castleman building — highlighting our exciting research program — and thoughtful, well executed demonstrations in the three departmental sub areas. As a result of reworking our open house presentation the CEE Department had the highest yield of entering freshman in the entire School of Engineering.

#### PERSONNEL CHANGES

Professor Emmanouil N. Anagnostou joined our faculty after completing a post-doc at NASA Goddard Space Flight Center and a Ph.D. at the University of Iowa. His area of expertise, broadly, is hydrologic analysis, modeling and prediction with specific expertise in remote sensing application in hydrometeorology and hydroclimatology and uncertainty analysis of hydrologic processes. Dr. Allison Mackay accepted an offer as a tenure track Assistant Professor in environmental engineering starting in the fall of 1999. She is currently a post-doctoral associate in the lab of Dr. Joseph Pignatello at the Connecticut Agricultural Experiment Station. She holds a Ph.D. in environmental engineering from MIT under Professor Gschwend. Mr. Robert Balfe,

Lab Technician, and Mr. Phil Caron, computer technician, left the Department. Associate Professors M. Accorsi, D. Grasso, and G. Hoag were all promoted to Full Professor. Professor Nikolaidis stepped down as Director of the Environmental Engineering Program effective July 1, 1999.

#### **FACULTY SCHOLARSHIP**

The faculty has been very productive this year with 31 journal articles, 62 conference proceedings published and 70 conference presentations delivered.

Professor Anagnostou recently won the prestigious NASA New Investigator Award. He joins our elite group of young Federal Young Investigator award winners: Professor B. Smets (NSF CAREER Award) and Professor F. Ogden (ARO Young Investigator Award).

Professor Fred Ogden received two awards from the American Society of Civil Engineering this year. He was selected by the ASCE Committee on Younger Members to receive the 1999 *Collingwood Prize* for the paper, "Sediment Control at Water Intakes Along Sand-Bed Rivers," *Journal of Hydraulic Engineering*, June 1998. Selection of the *Collingwood Prize* recipient is based on a review of all papers published by the society during a given year. Professor Ogden was also selected by the ASCE Water Resources Engineering Division to receive the 1999 *Journal of Irrigation and Drainage Engineering* Best Reviewer Award. This award is given to one reviewer each year who has made the most significant impact on the quality of papers published the Journal.

Professor Michael Accorsi served as Technical Co-Chair for the 15th CEAS/AIAA Aerodynamic Decelerator Systems Technology Conference in Toulouse, France on June 9-11, 1999. This international conference was co-sponsored by the *American Institute of Aeronautics and Astronautics* and *Association Aeronautique et Astronautique de France*, and is the premier conference in the world for dissemination of knowledge related to parachute technology.

Professor Domenico Grasso was elected to the Board of Directors of the *Association of Environmental Engineering and Science Professors*, an international organization with over 1,000 members.

Professors John DeWolf and Nikolaos Nikolaidis shared the Klewin award for excellence in teaching. Professor Nikolaidis also won the LIDA award for excellence in graduate research direction.

New merit procedures were adopted to properly recognize worthy accomplishments that contribute to the goals of the Department.

A more extensive promotion, tenure and reappointment procedure was also adopted by the faculty.

#### **DEPARTMENTAL ENDOWMENT**

Professor Emeritus Victor Scottron, in association with UConn 2000, generously created a \$60,000 endowment fund to provide scholarships to deserving undergraduate CEE students.

The establishment of the *Northeast Utilities Foundation Chair in Environmental Engineering* was announced. The Chair is funded by a combined \$1 million endowment from the Northeast Utilities Foundation, the Geib Family Endowment, and UConn 2000 (a \$1 billion State program to enhance the University's infrastructure and programming). The Department in cooperation with the Environmental Research Institute will be seeking a distinguished scholar of international stature, with a record of excellence in research and teaching to fill the NUF Chair position.

#### **ENROLLMENT**

We currently have 134 undergraduates and 60 graduate students (25 Ph.D., 35 M.S.) enrolled in departmental programs. Although we have a modest entering class of 17 declared majors, our department had the highest yield of students who attended open house presentations.

# Civil & Environmental Engineering Department

## Journal Publications

### 1998-1999

#### EMMANOUIL N. ANAGNOSTOU

“Real-Time Radar Rainfall Estimation: 1. Algorithm Formulation,” (with W.F. Krajewski), *Journal of Atmospheric and Oceanic Technology*, 16(2), 189-197, March 1999.

“Real-Time Radar Rainfall Estimation: 1. Case Study,” (with W.F. Krajewski), *Journal of Atmospheric and Oceanic Technology*, 16(2), 198-205, March 1999.

“Uncertainty Quantification of Mean-Field Radar-Rainfall Estimates,” (with W.F. Krajewski and J. Smith), *Journal of Atmospheric and Oceanic Technology*, 16(2), 206-215, March 1999.

#### JOHN T. DeWOLF

“Structural Monitoring Using Artificial Neural Networks,” (with J. Zhao and J.N. Ivan), *ASCE Journal of Infrastructure Systems*, September 1998.

“Nondestructive Evaluation of the Steel Bridge Infrastructure,” (with M.P. Culmo), *Technology, Law and Insurance Journal*, Vienna, Vol. 3, December 1998.

“Sensitivity Study for Vibrational Parameters Used in Damage Detection,” (with Jun Zhao), *ASCE Journal of Structural Engineering*, 125 (4), April 1999.

#### GREGORY C. FRANTZ

“Freeze-Thaw Bond Durability of Rapid-Setting Concrete Materials,” (with S. Li, D.G. Geissert and J.E. Stephens), *ACI Materials Journal*, American Concrete Institute, 96(2), March-April 1999, pp. 242-249.

“Splitting Prism Test Method to Evaluate Concrete-to-Concrete Bond Strength,” (D.G. Geissert, S. Li and J.E. Stephens), *ACI Materials Journal*, American Concrete Institute, 96(3), May-June 1999, pp. 359-366.

#### DOMENICO GRASSO

“Surface Complexation Modeling of Phosphate on Ferric Hydroxide Matrix,” (with M. Butkus and C. Schultess), *Journal of Environmental Quality*, 27 (10), 1998.

“Impact of Phosphate Sorption of Water Treatment Plant Residual Surface Characteristics: Prelude to Reuse,” (with M. Butkus), *Environmental Engineering Science*, 16 (2), 1999.

“Quantitative Prediction of Colloid Detachment in a Model Porous Media: Thermodynamics,” (with J. Bergendahl), *AIChE Journal*, 45 (3), 1999.

“Degradation and Detoxification of the Wood Preservatives Creosote and Pentachlorophenol in Water by the Photo-Fenton Reaction,” (with P. Engwall and J.J. Pignatello), *Water Research*, 33 (5), 1999.

“Equilibrium Modeling of Pseudomonad Aggregation and Partitioning to Dolomite,” (with B.F. Smets), *Journal of Dispersion Science Technology*, 19 (6/7): 1081-1106, 1998. *Invited*.

“Inhibition of Nickel Precipitation by Gluconate: Part I. Kinetic Studies and Spectroscopic Analyses,” (with H-L Hu and N. Nikolaidis), *Journal of Environmental Engineering*, ASCE, 124 (8), pp. 677-684, 1998.

“Inhibition of Nickel Precipitation by Gluconate: Part II. Mechanistic Modeling,” (H-L Hu and N. Nikolaidis), *Journal of Environmental Engineering*, ASCE, 124 (8), pp. 685-689, 1998.

#### GEORGE E. HOAG

“Kinetic Study of Oxidation of Trichloroethylene by Potassium Permanganate,” (with K. Huang, P. Chheda, B. Woody and

G. Dobbs), *Environmental Engineering Science*, 16(4), 1999, pp. 265-274.

“Use of Coal Tar Contaminated Soil in Road Paving Asphalt, Land Contamination and Reclamation,” (with A. Dahmani, F. Nadim, C.S. Dulam, and E. Quinn), *Journal of Land Contamination and Reclamation*, 6(2), 1998.

#### **JOHN N. IVAN**

“Structural Monitoring Using Artificial Neural Networks,” (with J. Zhao and J. DeWolf), *Journal of Infrastructure Systems*, Vol. 4, No. 3 (Sep. 1998), pp. 93-101.

“Data Fusion of Fixed Detector and Probe Vehicle Data for Incident Detection,” (with V. Sethi), *Computer-Aided Civil and Infrastructure Engineering*, Vol. 13 (1998), pp. 329-337.

#### **RUSK Y. MASIH**

“Reliability of the energy Method to Predict Stability of Lift Slab Structures,” (with V. Hambertsumian), *ASCE Journal of Performance of Constructed Facilities*, August 1998, Vol. 12, No. 3, pp. 153-160.

“Dynamic Load Effect on Lift Slab Structures,” (with V. Hambertsumian), *ASCE Journal of Performance of Constructed Facilities*, February 1999, Vol. 13, No. 1, pp. 34-38.

#### **NIKOLAOS P. NIKOLAIDIS**

“Nitrogen Mobility in Biosolid-Amended Glaciated Solid,” (P. Cheeda, J.A. Lackovic, K. Guillard, B. Simpson and T. Pedersen), *Water Environment Federation, Research Journal*, 71(3), pp. 368-376, 1999.

“Inhibition of Nickel Precipitation by Gluconate: Part I. Kinetic Studies and Spectroscopic Analyses,” (with H-L Hu and D. Grasso), *Journal of Environmental Engineering*, ASCE, 124 (8), pp. 677-684, 1998.

“Inhibition of Nickel Precipitation by Gluconate: Part II. Mechanistic Modeling,” (H-L Hu and D. Grasso), *Journal of Environmental Engineering*, ASCE, 124 (8), pp. 685-689, 1998.

#### **CHARLES S. SAWYER**

“Mixed-Integer Chance-Constrained Models for Ground-Water Remediation,” (with Yu-Feng Lin), *Journal of Water Resources Planning and Management*, Vol 124, No. 5, pp. 285-294, 1998.

“Optimal Flow Rates and Well Locations for Soil Vapor Extraction Design,” (with M. Kamakoti), *Journal of Contaminant Hydrology*, Vol. 32, pp. 63-76, 1998.

#### **BARTH F. SMETS**

“Equilibrium Modeling of Pseudomonad Aggregation and Partitioning to Dolomite,” (with D. Grasso), *Journal of Dispersion Science Technology*, 19 (6/7): 1081-1106, 1998. *Invited*.

“High Affinity *p*-Nitrophenol Oxidation by *Bacillus Sphaericus* JS905,” (with K. Venkateswarlu, K. Chandran, and J. C. Spain), *FEMS Microbiological Letters*, 166, pp. 115-120, 1998.

“Aerobic Growth on Nitroglycerin as the Sole Source of Carbon, Energy, and Nitrogen by a Mixed Microbial Culture,” (with J.V. Accashian, R.T. Vinopal, and B.-J. Kim), *Applied & Environmental Microbiology*, 64, pp. 3300-3304, 1998.

“Kinetic Analysis of Simultaneous 2,4-Dinitrotoluene (DNT) and 2,6-DNT Biodegradation in Aerobic Fluidized-Bed Biofilm Reactor,” (with R.G. Riefler, U. Lendenmann, and J.C. Spain), *Biotechnology & Bioengineering*, 63, pp. 642-653, 1999.

# Civil & Environmental Engineering Department

## Conference Publications

### 1998-1999

#### NELLY M. ABOUD

“Sensitivity Analysis of Microbial Particle Concentration to Model Parameters,” (with T.S. Boulattouf), *Advances Filtration & Separation Solutions for the Millennium, American Filtration & Separation Society Proceedings*, Vol. 13, 172-178, 1999.

#### MICHAEL L. ACCORSI

“Special Kink and Fold Elements for Simulating Parachute Dynamics,” (with K. Lu, J.W. Leonard, R. Benney and K. Stein), *4<sup>th</sup> International Conference on Computational Structures Technology*, Edinburgh, August 1998.

“Parachute Fluid-Structure Interaction: Coupling Issues,” (with K. Stein, R. Benney, V. Kalro, T. Tezduyar, and J. Leonard), *Proceedings, International Conference on Computational Engineering Science-98*, October 1998, Atlanta.

“Controllable Airdrop Simulations Utilizing a 3-D Structural Dynamics Model,” (with R. Benney, K. Stein, W. Zhang, and J. Leonard), *15<sup>th</sup> CEAS/AIAA Aerodynamic Decelerator Systems Technology Conference*, June 1999, Toulouse, France.

“Issues in Parachute Structural Modeling: Damping and Wrinkling,” (with K. Lu, J. Leonard, R. Benney and K. Stein), *15<sup>th</sup> CEAS/AIAA Aerodynamic Decelerator Systems Technology Conference*, June 1999, Toulouse, France.

“3-D Computation of Parachute Fluid-Structure Interactions: Performance and Control,” (with K. Stein, R. Benney, V. Kalro, T. Tezduyar, and J. Leonard), *15<sup>th</sup> CEAS/AIAA Aerodynamic Decelerator Systems Technology Conference*, June 1999, Toulouse, France.

#### JOHN T. DeWOLF

“Long-Term Bridge Monitoring in Connecticut,” (with R.G. Lauzon), *Transportation Research Board Annual Meeting*, January 1999.

“Strain and Acceleration of Bridge Performance,” *Proceedings of the ASCE Structures Conference*, New Orleans, LA, April 1999.

#### HOWARD I. EPSTEIN

“Revisiting the Question of Why Four Years,” *ASEE Annual Meeting*, Charlotte, NC, June 1999.

#### C. ROGER FERGUSON

“GPS Control Networks Using Multiple Base Stations – The ConnDOT Model,” (with John E. Bean), *ACSM Annual Conference*, Portland, OR, March 1999.

#### NORMAN W. GARRICK

“Data Reconciliation Based Traffic Count Analysis System,” (with Ming Zhao and Luke K. Achenie), *Transportation Research Board Meeting*, Washington, D.C., 1998.

“Estimating Benefits from Specific Highway Safety Improvements, Phase I: Feasibility Study,” (With Fei Yuan, Christian F. Davis, and John N. Ivan), *Transportation Research Board Meeting*, Washington, D.C., January 1999.

#### DOMENICO GRASSO

“Mineralization of Wood Preservative (creosote and Pentachlorophenol) Contaminated Water by Photo-Assisted Fenton Reaction,” (with P. Engwall and J.J. Pignatello), *Proceedings 30<sup>th</sup> Mid-Atlantic Industrial and Hazardous Waste Conference*, Villanova University, July 12-15, 1998.

“Consequences of Colloid Generation for Coal-Tar Contaminated Soil Leaching Tests,” (with J. Bergendahl), *Proceedings 30<sup>th</sup> Mid-Atlantic Industrial and Hazardous Waste Conference*, Villanova University, July 12-15, 1998.

“Time-Based Approach in the Analysis and Design of Chlorine Flash Mixing in Low Ammonia Effluent,” (with L. Devkota, D. Williams, J. Matta, and P. Fox), *Proceedings 71<sup>st</sup> Water Environment Federation Annual Conference*, Orlando, October 3-7, 1998.

“Quantifying the Impact of Surface Complexation on Acid-Base Interactions,” (with M. Butkus), *Proceedings of the Second International Symposium on Acid-Base Interactions: Relevance to Adhesion*, Newark, NJ, October 19-21, 1998.

“Colloid Detachment in Porous Media,” (with J. Bergendahl), *American Filtration Society Annual Conference*, Boston, MA, April 6-9, 1999.

“Enhanced Desorption of Polycyclic Aromatic Hydrocarbons from Weathered Soil by Complexing Agents,” (with A. Tabatabai, Y. Yang, D. Ratte, B. Smets, J. Pignatello, J. Dries), *American Chemical Society 73<sup>rd</sup> Colloid and Surface Science Symposium*, MIT, Cambridge, MA, June 13-16, 1999.

“Studies Relating Sorption and Bioavailability of PAHs in Single and Multisolute Systems,” (with J.J. Pignatello, J. White, M. Hunter, Y. Yang, D. Ratte, J. Dries, and B.F. Smets), *The 5<sup>th</sup> International In Situ and On-Site Bioremediation Symposium*, April 19-22, 1999. *Invited*

#### **GEORGE E. HOAG**

“Oxidation of Trichloroethylene in a Porous Medium with Permanganate,” (with K.C. Huang, P. Chheda, B.A. Woody, and G.M. Dobbs), *31<sup>st</sup> Mid-Atlantic Industrial and Hazardous Waste Conference Proceeding*, June 1999.

“Detection, Quantitation and Remediation of Soil and Aquifer Systems Contaminated with Petroleum Products,” (F. Nadim, S. Liu, R. Carley, and P. Zack), *Proceedings of the 2<sup>nd</sup> International Non-Renewable Energy Sources Congress*, Tehran, Iran, December 12–16, 1998, National Research Council of Iran, 2, 566–77.

#### **JOHN N. IVAN**

“Safety and the Highway Design Process,” (with P. Ossenbruggen), Risk Assessment and Policy Association, *2<sup>nd</sup> Biennial Meeting*, Alexandria, VA, March 25-26, 1999.

“Factors Influencing Peak Spreading on Connecticut Freeways: A Preliminary Investigation,” (with S. Allaire), *Transportation Research Board Annual Meeting*, Washington DC, January 1999.

“Estimating Benefits from Specific Highway Improvements: Phase 1 - Feasibility Study,” (with F. Yuan, C.F. Davis and N.W. Garrick), *Transportation Research Board Annual Meeting*, Washington DC, Jan. 1999.

“Predicting Two-Lane Highway Crash Rates Using Land Use and Hourly Exposure,” *24<sup>th</sup> International Forum on Traffic Records & Highway Information Systems*, July 1998.

#### **JOHN W. LEONARD**

“Special Kink and Fold Elements for Simulating Parachute Dynamics,” (with K. Lu, M.L. Accorsi, R. Benney, and K. Stein), *4<sup>th</sup> International Conference on Computational Structures Technology*, Edinburgh, August 1998.

“Parachute Fluid-Structure Interaction: Coupling Issues,” (with K. Stein, R. Benney, V. Kalro, T. Tezduyar, and M. Accorsi), *Proceedings, International Conference on Computational Engineering Science 98*, October 1998, Atlanta.

“Controllable Airdrop Simulations Utilizing a 3-D Structural Dynamics Model,” (with R. Benney, K. Stein, W. Zhang, and M. Accorsi), *15<sup>th</sup> CEAS/AIAA Aerodynamic Decelerator Systems Technology Conference*, June 1999, Toulouse, France.

“Issues in Parachute Structural Modeling: Damping and Wrinkling,” (with M. Accorsi, K. Lu, R. Benney, and K. Stein), *15<sup>th</sup> CEAS/AIAA Aerodynamic Decelerator Systems Technology Conference*, June 1999, Toulouse, France.

“3-D Computation of Parachute Fluid-Structure Interactions: Performance and Control,” (with K. Stein, R. Benney, V. Kalro, T. Tezduyar, and M. Accorsi), *15<sup>th</sup> CEAS/AIAA Aerodynamic Decelerator Systems Technology Conference*, June 1999, Toulouse, France.

#### **RAMESH B. MALLA**

“A Special Forward Time Division Multiplexing Optical Fiber for Force and Displacement Sensing,” (with N.W. Garrick, A.

Sen, and P. Dua), *CT Critical Technologies Conference*, Hartford, CT, June 30, 1998 (poster presentation).

“Special Fiber Optic Weigh-in-Motion Sensor,” (with N.W. Garrick and A. Sen), *1998 Photonics Opportunities for Connecticut*, Plainville, CT, September 10, 1998 (poster presentation).

#### **RUSK Y. MASIH**

“An Innovative Concept to Design Structures Subjected to Earthquake Forces,” *Proceedings of Structural Engineering World Wide 1998 Conference*, San Francisco, July 1998.

“Multimedia-A Forum for Unifying Engineering Standards and Engineering Education Throughout the World,” *ICCEE Proceedings*, Auckland, New Zealand, 1999, pp. 162-165.

#### **NIKOLAOS P. NIKOLAIDIS**

“Evaluation of the Hydrologic and Chemical Mass Balances of Copper Within an Urban Watershed,” (with B. Boulanger, R. Carley, and C. Perkins), *31st Mid-Atlantic Industrial and Hazardous Waste Conference*, Storrs, CT, June 20-23, 1999.

“Modeling of Bromide in a Single-Well Injection-Withdrawal Experiment,” (with L.A. Hellerich, C.R. Johnson, and P.M. Gschwend), *31st Mid-Atlantic Industrial and Hazardous Waste Conference*, Storrs, CT, June 20-23, 1999.

“A Site Assessment Methodology for the Characterization of Mixed Organics and Redox Sensitive Heavy Metal Plumes,” (with G.M. Dobbs and R.E. Post), *31st Mid-Atlantic Industrial and Hazardous Waste Conference*, Storrs, CT, June 20-23, 1999.

“Redox-Sensitive Mobility of Arsenic in Proximity to a Municipal Landfill,” (with J.A. Lackovic and G.M. Dobbs), *31st Mid-Atlantic Industrial and Hazardous Waste Conference*, Storrs, CT, June 20-23, 1999.

“Modeling the Mobility of Cadmium in Soils,” (with L.A. Hellerich and S. Seymour), *31st Mid-Atlantic Industrial and Hazardous Waste Conference*, Storrs, CT, June 20-23, 1999.

“Innovative Technology for Arsenic Remediation From Drinking Water Supplies,” (Invited), *The 1999 Borchardt Conference, Advancements in Water and Wastewater*, University of Michigan, Ann Arbor, Michigan, Feb. 23-25, 1999.

“Removal of Arsenic From Ground Water: The AsRT Field Trials,” (with J.A. Lackovic and G.M. Dobbs), (Invited), *International Conference, Arsenic in Bangladesh Ground Water*, Wagner College, New York, NY, February 27-28, 1999.

“Methodology for Hazardous Waste Site Assessment and Remediation: Case Study #1: Arsenic Contamination From a Landfill and Case Study #2: Chromium Contamination From a Metal Finishing Industry,” *Institute of Geology and Mineral Exploration*, Athens, Greece, January 28-29, 1999.

“Rehabilitation of Industrial Contaminated Sites: A Manager’s Point of View,” Graduate Program in Systems of Environmental Protection and Energy Management, Department of Industrial Management, University of Piraeus, Piraeus, Greece, March 12, 1999.

“Arsenic Contamination: Assessment and Remediation of Landfill Leachate,” (Invited) Technical University of Crete, Department of Environmental Engineering, Chania, Greece, January 25, 1999.

“Methodology for the Assessment and Remediation of Industrial Sites,” (Invited) Department of Civil Engineering, Aristotle University of Thessaloníi, Greece, March 14, 1999.

“Characteristic Times and Recovery of Metals in Contaminated Soils: The Role of Interfacial Processes,” (with L.A. Hellerich), *American Chemical Society*, Anaheim, CA, March 25-27, 1999.

“Manipulating Subsurface Colloids by Citrate Addition to a Chromium Contaminated Aquifer,” (with C.R. Johnson, L.A. Hellerich, and P.M. Gschwend), *American Chemical Society*, Anaheim, CA, March 25-27, 1999.

“Arsenic Contamination of Ground Water: Issues of Assessment and Remediation,” (Invited) Environment Institute, Joint Research Center, European Commission, Ispra, Italy, June 12, 1998.

“Innovative Arsenic Remediation Technology (AsRT) for Ground Water, Drinking Water and Waste Streams,” (with J.A. Lackovic), *30th Mid-Atlantic Industrial and Hazardous Waste Conference*, Philadelphia, PA, July 12-15, 1998.

“A Framework for Developing Site-Specific Mobility Based Cleanup Standards for Heavy Metal Contaminated Soils,” (with L.A. Hellerich and J.A. Lackovic), *30th Mid-Atlantic Industrial and Hazardous Waste Conference*, Philadelphia, PA, July 12-15, 1998.

“Mobility and Remediation of Lead From Shooting range Soils,” (with R. Bruell and R.P. Long), *30th Mid-Atlantic Industrial*

and Hazardous Waste Conference, Philadelphia, PA, July 12-15, 1998.

“Development and Application of a Conceptual Site Model for Evaluating Contaminant Mobility,” (with J.A. Lackovic), *IV International Conference on the Protection and Restoration of the Environment*, Halkidiki, Greece, July 1-4, 1998.

#### **FRED L. OGDEN**

“GIS-Hydrologic Model Integration,” *Proceedings 1998 ASCE Hydraulics Specialty Conference*, Memphis, TN, August 4-9, 1998.

“Propagation of Radar-Rainfall Estimation Efforts Through Runoff Predictions for Extreme Events in an Urban Environment,” Poster Presentation (with H.O. Sharif), *American Geophysical Union Fall Meeting*, San Francisco, CA, December 6-10, 1998.

“Modeling Fate and Transport of Copper in a Storm Water System,” Poster Presentation, (with H.O. Sharif, B. Boulanger, and N.P. Nikolaidis), *1998 American Geophysical Union Fall Meeting*, San Francisco, CA, December 6-10, 1998.

“Radar-Rainfall Estimation Error Propagation Through Hortonian Runoff Predictions,” Poster Presentation, (with H.O. Sharif, M. Grecu, and W.F. Krajewski), *1999 American Geophysical Union Spring Meeting*, Boston, MA, June 1-4, 1999.

“Distributed Hortonian Hydrologic Model Calibration Uniqueness,” Poster Presentation, (with S.U.S. Senarath), *1999 American Geophysical Union Spring Meeting*, Boston, MA, June 1-4, 1999.

#### **BARTH F. SMETS**

“Modeling the Mineralization of Trinitrotoluene and Dinitrotoluenes in Aerobic/Anoxic Biofilm,” (with R.G. Riefler), *The 5<sup>th</sup> International In Situ and On-Site Bioremediation Symposium*, April 19-22, 1999.

“Studies Relating Sorption and Bioavailability of PAHs in Single and Multisolute Systems,” (with J.J. Pignatello, J. White, M. Hunter, Y. Yang, D. Ratte, J. Dries, and D. Grasso), *The 5<sup>th</sup> International In Situ and On-Site Bioremediation Symposium*, April 19-22, 1999. *Invited*.

“Estimation of Two-Step Nitrification Kinetics Using Extant Respirometry,” (with K. Chandran), *AICHE National Meeting*, Houston, TX, March 14-18, 1999. *Invited*.

“Enhanced Desorption of Polycyclic Aromatic Hydrocarbons from Weathered Soil by Complexing Agents,” (with D. Grasso, A. Tabatabai, Y. Yang, D. Ratte, J. Pignatello, J. Dries), *American Chemical Society 73rd Colloid and Surface Science Symposium*, MIT, Cambridge, MA, June 13-16, 1999.



# Civil & Environmental Engineering Department

## Active Research Grants and Contracts

### 1998-1999

#### **MICHAEL L. ACCORSI**

- “IPA on Advanced Parachute Simulations,” U.S. Army Natick RD&E Center, May 23, 1998–August 23, 1998, \$15,951.
- “New Structural Model for Parachute Inflation Simulations,” (with J.W. Leonard), U.S. Army Research Office, April 15, 1996 – April 14, 1999, \$118,178.
- “(NWV) Simulation and Modeling of Wind Effects on Airdrop Systems,” U.S. Air Force Office of Scientific Research, February 1, 1998 – January 31, 2001, \$140,478.
- “Simulation & Evaluation of Innovative Tactical Parachute Systems,” (with J.W. Leonard), U.S. Department of Defense AASERT, June 1, 1998 – May 31, 2001, \$49,412.
- “Computer Simulations and Design of High Performance Parafoil Systems,” (with J.W. Leonard), Connecticut Innovations, Inc. Yankee Ingenuity Initiative, December 31, 1998 – December 30, 2000, \$67,623.
- “IPA on Advanced Parachute Simulations,” U.S. Army Natick RD&E Center, May 21, 1999 – August 26, 1999, \$12,523.
- “Advanced Structural Modeling for Fully-Coupled Parachute Dynamics,” (with J.W. Leonard), U.S. Army Research Office, June 1, 1999 – May 31, 2002, \$111,999.

#### **EMMANOUIL N. ANAGNOSTOU**

- “Calibration of Ground-Based Weather Radar Systems From TRMM Space-Based Radar Observations: A Demonstration Project, Tropical Rainfall Measuring Mission,” NASA, January 1, 1999 – December 31, 2001, \$340,000.

#### **CHRISTIAN F. DAVIS**

- “Establishment of a Connecticut Advanced Pavement Laboratory (CAP LAB),” (with J.E. Stephens), Connecticut Department of Transportation, July 1, 1998 – June 30, 1999, \$200,972.
- “Management of the New England Transportation Consortium for 1998,” (with G. McCarthy), Connecticut Department of Transportation, January 1, 1998 – December 31, 1998, \$73,021.
- “Management of the New England Transportation Consortium for 1998,” (with G. McCarthy), Connecticut Department of Transportation, January 1, 1999 – December 31, 1999, \$98,066.
- “Technology Transfer Center Program for 1998,” (with G. McCarthy), Connecticut Department of Transportation, January 1, 1998 – December 31, 1998, \$220,000.
- “Technology Transfer Center Program for 1999,” (with G. McCarthy), Connecticut Department of Transportation, January 1, 1999 – December 31, 1999, \$244,777.
- “Estimating Benefits from Specific Highway Safety Improvements: Phase 2 – Initial Implementation,” (with J.N. Ivan and N.W. Garrick), Connecticut Department of Transportation, JHRAC Project 97-1(2), June 1, 1998 – May 31, 1999, \$53,561.

#### **KENNETH R. DEMARS**

- “Determining Properties, Standards, and Performance of Wood Waste Compost as an Erosion Control Mulch and as a Filter Berm,” (with R.P. Long), New England Transportation Consortium, NETC Project 97-3, July 1, 1998 – December 31, 1999, \$54,649.
- “Evaluation of Source Separated Compost for Connecticut DOT Projects,” (with R.P. Long), Connecticut Department of Transportation, Department of Environmental Protection, and U.S. Environmental Protection Agency, JHRAC Project 96-5, July 1, 1996 – January 31, 1999, \$80,000.

### **JOHN T. DeWOLF**

“Network of Continuous Computer-Based Bridge-Monitoring Systems in the State of Connecticut,” Connecticut Department of Transportation (with Federal Highway Funds), June 1, 1994 – May 31, 2000, \$807,200.

“Strain Monitoring of Gano Street Ramp, Washington Bridge, Providence, Rhode Island,” Vanasse Hangen Brustlin/Rhode Island DOT, January 6, 1997 – December 31, 1999, \$10,350.00.

“Evaluation of Sign Support Structures,” Connecticut Department of Transportation JHRAC Project 98-3, July 1, 1998 – June 30, 1999, \$34,603.

### **HOWARD I. EPSTEIN**

“Block Shear Investigation of Structural Tees and Other Tension Connections,” National Science Foundation, September 1, 1997 – December 31, 2000, \$169,592.

“A New Block Shear Failure,” American Institute of Steel Construction, July 1, 1996 – December 31, 1998, \$10,000.

### **C. ROGER FERGUSON**

“Optimizing GPS Use in Transportation Projects,” (with J.E. Bean), New England Transportation Consortium Project 96-2, July 1, 1997 – June 30, 1999, \$120,000.

### **GREGORY C. FRANTZ**

“Protection of Reinforcement with Corrosion Inhibitors, Phase I,” (with J.E. Stephens), Connecticut Department of Transportation Joint Highway Research Program Project 96-2(1), June 1, 1998 – August 31, 1998, \$26,004.

“Protection of Reinforcement with Corrosion Inhibitors, Phase II,” (with J.E. Stephens), Connecticut Department of Transportation Joint Highway Research Program Project 96-2(2), June 1, 1998 – May 31, 1999, \$39,087.

### **NORMAN W. GARRICK**

“Estimating Benefits from Specific Highway Safety Improvements: Phase 2 – Initial Implementation,” (with J.N. Ivan and C.F. Davis), Connecticut Department of Transportation, JHRAC Project 97-1(2), June 1, 1998 – May 31, 1999, \$53,561.

“Visualization Method for Teaching the Geometric Design of Highways,” New England University Transportation Center, September 1, 1998 – August 31, 1999, \$22,500.

“A Portable Method to Determine Chloride Concentration on Roadway Pavements,” (with N.P. Nikolaidis), New England Transportation Consortium, NETC Project 97-1, September 1, 1998 – August 31, 1999, \$97,502.

“Assessing the Effects of Frost Condition on the Deterioration of Highway Pavements,” University of Connecticut Research Foundation, January 1998 - May 1998, \$5,200.

“Dual Core FTDM Fiber Optics WIM System,” (with R.B. Malla), NCHRP-IDEA Program of the National Academy of Sciences, June 1997 - December 1998, \$179,265.

### **DOMENICO GRASSO**

“Study on Agricultural Use of Water Treatment Residual,” South Central Connecticut Regional Water Authority, January 1, 1996 – August 31, 1999, \$218,571.

“PAH Bioremediation at Former Manufactured Gas Plant Sites,” (with B.F. Smets), Northeast Utilities Corporation, July 7, 1997 – July 31, 1999, \$130,941.

“Fenton Oxidation of Chlorinated Solvents,” Handex Corporation, May 1, 1998 – December 31, 1998, \$30,000.

“Study of Inorganic Colloids: Evaluation of Zero Valent Iron,” Applied Research Associates for U.S. Air Force, August 3, 1998 – November 30, 1999, \$13,500.

“Inhibition of Biological Nitrogen Removal: Microbiology, Physical Chemistry & Process Engineering,” (with B.F. Smets and J. Semon-Brown [City of Stamford, CT]), Long Island Sound Research Fund, Environmental Protection Agency

Region 1, March 15, 1999 – March 14, 2001, \$81,310 (year 1).

“The Physical Chemistry of Bacterial Adhesion,” Research Corporation-Olin Charitable Trust, \$14,000.

#### **GEORGE E. HOAG**

“DNAPL Remediation Initiative: Technology Evaluation for the Remediation of Subsurface Accumulations of Chlorinated Solvents,” (with J. Cherry and B. Parker), United Technologies Corporation, June 10, 1996 - February 28, 2000, \$926,750.

“Groundwater, Soil and DNAPL Characterization and Treatability Study,” (with P. Chheda), United Technologies Automotive, July 14, 1997 – August 31, 1999, \$754,976.

“Northeast Environmental Securities Training and Education Alliance (NESTEA),” U.S. Department of Defense, September 27, 1994 – June 30, 1999, \$440,221.

“Industrial Affiliates Program,” (with N.P. Nikolaidis), Multiple Industries, December 16, 1992 – December 31, 1999, \$374,945.

#### **JOHN N. IVAN**

“Estimating Benefits from Specific Highway Improvements,” (with P. Ossenbruggen), U.S. Department of Transportation (New England University Transportation Center), September 1, 1997 – August 31, 1999, \$65,000.

“Estimating the Temporal Distribution of Traffic Within the Peak Period,” Connecticut Department of Transportation, JHRAC Project 97-2, June 1, 1997 – December 31, 1998, \$47,059.

“Estimating Benefits from Specific Highway Improvements: Phase 2 – Initial Implementation,” (with C. Davis and N. Garrick), Connecticut Department of Transportation, JHRAC Project 97-1(2), June 1, 1997 - May 31, 2001, \$178,435.

“Rural Pedestrian Crash Rates: Alternative Measures of Exposure,” (with P. Ossenbruggen), U.S. Department of Transportation (New England University Transportation Center), September 1, 1998 – August 31, 1999, \$67,500.

“New England University Transportation Center Year 11 Fellowship Program,” New England University Transportation Center (USDOT), September 1, 1998 – August 31, 1999, \$20,000.

#### **JOHN W. LEONARD**

“New Structural Model for Parachute Inflation Simulations,” (with M.L. Accorsi), U.S. Army Research Office, April 15, 1996 – April 14, 1999, \$118,178.

“IPA on Advanced Parachute Simulations,” U.S. Army Natick RD&E Center, May 23, 1998 – August 31, 1998, \$24,200.

“Simulation & Evaluation of Innovative Tactical Parachute Systems,” (M.L. Accorsi), U.S. Department of Defense AASERT, June 1, 1998 – May 31, 2001, \$49,412.

“Computer Simulations and Design of High Performance Parafoil Systems,” (with M.L. Accorsi), Connecticut Innovations, Inc. Yankee Ingenuity Initiative, December 31, 1998 – December 30, 2000, \$67,623.

“IPA on Advanced Parachute Simulations,” U.S. Army Natick RD&E Center, May 21, 1999 – August 26, 1999, \$18,769.

“Advanced Structural Modeling for Fully-Coupled Parachute Dynamics,” (with M.L. Accorsi), U.S. Army Research Office, June 1, 1999 – May 31, 2002, \$111,999.

#### **JIA D. LIN**

“Hydrodynamic and Transport Models Coastal Waters Use in the Design and Management of Highway Structures,” (with M. Lefor), Connecticut Department of Transportation, JHRAC Project JH 93-4, July 1, 1998 – June 30, 1999, \$129,830.

#### **RICHARD P. LONG**

“Field Treatment of Soil Contaminated with Lead,” Connecticut Department of Transportation JHRAC Project 96-1, June 1, 1998 to August 31, 1998, \$27,626.

“Determining Properties, Standards, and Performance of Wood Waste Compost as an Erosion Control Mulch and as a Filter Berm,” (with K.R. Demars), New England Transportation Consortium, NETC Project 97-3, July 1, 1998 – December 31, 1999, \$54,649.

“Evaluation of Source Separated Compost for Connecticut DOT Projects,” (with K.R. Demars), Connecticut Department of Transportation, Department of Environmental Protection, and U.S. Environmental Protection Agency, JHRAC Project 96-5, July 1, 1996 – January 31, 1999, \$80,000.

#### **RAMESH B. MALLA**

“Dual Core FTDM Fiber Optics Weigh-in-Motion System,” (with N.W. Garrick), IDEA Program, National Cooperative Highway Research Program, National Academy of Science, June 1, 1997 – August 31, 1999, #179,265.

“An Innovative Fiber Optic Weigh-in-Motion System,” University of Connecticut Research Foundation, June 1, 1999 – August 31, 2000, \$10,800.

“Preliminary Studies of Space Station Oxygen Generation Assembly Structure Systems,” Hamilton Standard, February 1, 1999 – January 31, 2001, \$5,000.

#### **ERLING MURTHA-SMITH**

“Design Against Progressive Collapse,” National Science Foundation, September 1, 1996 – August 31, 1999, \$189,277.

#### **NIKOLAOS P. NIKOLAIDIS**

“A Portable Method to Determine Chloride Concentration on Roadway Pavements,” (with N.W. Garrick), New England Transportation Consortium, NETC Project 97-1, September 1, 1998 – August 31, 1999, \$97,502.

“Hydraulic Characterization of the Ground Water Aquifer at National Chromium, Inc.,” Massachusetts Institute of Technology, June 1, 1997 – September 14, 1999, \$68,000.

“Environmental Sampling and Analysis at Sikorsky, Stratford, CT,” United Technologies Research Center, June 15, 1998 – July 19, 1999, \$53,145.

“Characterization of Arsenic Contamination in the Winthrop Landfill and Ground Water,” United Technologies Corporation, September 15, 1998 – March 15, 1999, \$67,000.

“Contribution of Copper-Based Architectural Material to Copper Concentrations and Toxicity in Storm Water Runoff,” International Copper Development Association, March 1, 1998 – November 1, 2000, \$319,213.

“Long-Term Pilot Scale Demonstration of the AsRT Technology for In-Situ Remediation of Arsenic Contaminated Ground Water,” United Technologies Corporation, February 28, 1997 – March 1, 2000, \$50,000.

“Industrial Affiliates Program,” (with G.E. Hoag), Multiple Industries, December 16, 1992 – December 31, 1999, \$374,945.

#### **FRED L. OGDEN**

“Assessment of the Applicability of Engineering Hydrologic Models in Connecticut,” (with G.S. Warner), Connecticut Department of Environmental Protection, January 1, 1997 – March 21, 2000, \$112,000.

“Studies of Radar-Rainfall Error Propagation in Runoff Predictions,” U.S. Army Research Office, Department of Army, April 1, 1996 – March 31, 1999 (pending supplement & extension), 191,000.

“2-Dimensional Hydrological Modeling of Large Watersheds with Uncertain Input,” U.S. Army, March 6, 1998 – March 5, 1999 (pending a no-cost extension to 12/31/99), \$59,513.

#### **BARTH F. SMETS**

“PAH Bioremediation at Former Manufactured Gas Plant Sites,” (with D. Grasso), Northeast Utilities Corporation, July 7, 1997 – July 31, 1999, \$130,941.

“Fundamental Study for Biodegradation of Nitroglycerin in Biofilter,” U.S. Army Corps of Engineers CERL, May 1, 1998 – December 31, 1998, \$24,990.

“Fundamental Study for Biodegradation of Nitroglycerin in Biofilter,” U.S. Army Corps of Engineers CERL, March 1, 1999 – December 31, 1999, \$36,469.

“Quantification of Horizontal Gene Transfer as Adaptive Response to Contaminant Stress in Microbial Communities - Development of an Experiential Environmental Engineering Course,” National Science Foundation CAREER Program, July 1, 1997 – June 30, 2001, \$209,585 (plus \$12,500 supplement for REU and \$25,000 supplement as match to industrial to procured industrial match).

“Horizontal Gene Transfer as Adaptive Response to Heavy Metal Stress in Subsurface Microbial Communities,” U.S. Department of Energy, Office of Energy Research NABIR Program, September 15, 1997 – August 31, 2000, \$305,045.

“Inhibition of Biological Nitrogen Removal: Microbiology, Physical Chemistry & Process Engineering,” (with D. Grasso and J. Semon-Brown [City of Stamford, CT]), Long Island Sound Research Fund, Environmental Protection Agency Region 1, March 15, 1999 – March 14, 2001, \$81,310 (year 1).

“Evaluation of Engineered Bioattenuation at Sikorsky Stratford Site,” United Technologies Research Center, July 1, 1999 – December 31, 1999, \$25,000.

# Civil & Environmental Engineering Department Awards, Honors, Patents 1998-1999

## **MICHAEL A. ACCORSI**

LIDA Foundation Award for Excellence in Graduate Research Direction, September 1998.

## **EMMANOUIL N. ANAGNOSTOU**

NASA Young Investigator Award, 1999-2002 (\$335,000).

## **C. ROGER FERGUSON**

Surveying Excellence Award, "In Recognition of Your Outstanding Contribution and Dedication to the Surveying Profession," The National Society of Professional Surveyors.

Earle J. Fennell Award for "Outstanding Contributions to Surveying and Mapping Education," The American Congress on Surveying and Mapping.

The Award of Fellowship in the American Congress on Surveying and Mapping.

C.R. Klewin, Inc. Excellence in Teaching Award, The University of Connecticut Civil & Environmental Engineering Department, 1998.

## **GREGORY C. FRANTZ**

"Enhancing Concrete Durability to Inhibit Corrosion of Steel Reinforcement, to withstand Freeze-Thaw Cycling, and to Resist Water Penetration," (with J.E. Stephens, M. Allyn, J. Mahoney, and R. Humphrey), Patent Disclosure under review by UConn Research Foundation.

## **DOMENICO GRASSO**

Fellow, Connecticut Academy for Education in Mathematics, Science & Technology.

Appointed member, U.S. EPA Science Advisory Board.

Elected to Board of Directors, Association of Environmental Engineering & Science Professors.

## **GEORGE E. HOAG**

Appointed member, Connecticut Academy of Sciences & Engineering.

"Chemical Oxidation of Volatile Organic Compounds," (with P. Chheda, B.A. Woody, and G.M. Dobbs) U.S. Patent pending, submitted May 1998.

## **FRED L. OGDEN**

Young Investigator Award, U.S. Army Research Office.

## **BARTH F. SMETS**

Career Award, National Science Foundation.

# Civil & Environmental Engineering Department

## Major Professional Activities

### 1998-1999

#### **NELLY M. ABOUD**

Editorial board reviewer, *The Fluid/Particle Separation Journal*.

President, American Filtration and Separation Society, New England Chapter.

Board member, American Lebanese Engineering Society.

Board member, American Filtration and Separation Society.

Organized and Chaired American Filtration and Separation Meeting, New England Chapter, August 1998.

#### **CHRISTIAN F. DAVIS**

Board of Directors, Institute of Transportation Engineers.

#### **KENNETH R. DEMARS**

Technical Co-Editor-in-Chief, *ASTM Geotechnical Testing Journal*.

Editorial Board Member, *Journal of Marine Georesources and Geotechnology*.

Chairman, ASTM Subcommittee D18.92 on *Geotechnical Testing Journal*.

Vice Chairman, ASTM Subcommittee D18.13 on Marine and Freshwater Geotechnics.

#### **C. ROGER FERGUSON**

Secretary, American Congress on Surveying and Mapping.

Board of Directors, American Congress on Surveying and Mapping.

Board of Directors, Geographic and Land Information Society.

Board of Directors, University Consortium for Geographic Information Science (UConn Director).

Connecticut Governor, National Society of Professional Surveyors Board of Governors.

President, New England Section of the American Congress on Surveying and Mapping.

NSPS Director of the Connecticut Association of Land Surveyors.

#### **NORMAN W. GARRICK**

Director, Connecticut Transportation Institute.

#### **DOMENICO GRASSO**

Editor-in-Chief, *Environmental Engineering Science*.

Selected Theme Editor, *Encyclopedia of Life Support Systems – A United Nations Project*.

Board of Directors, Association of Environmental Engineering & Science Professors.

National Peer Review – NSF CAREER Panel.

Member, Sea Change, Board of Directors, New Bedford, MA.

Chair, Association of Environmental Engineering Professors, Grad Committee.

Member, U.S. EPA Science Advisory Board.

**GEORGE E. HOAG**

Editorial Advisory Board, *Journal of Soil Contamination*.

Chair, ERI/DEP Research Council.

Director, Environmental Research Institute.

**JOHN N. IVAN**

Member, Board of Directors, Intelligent Transportation Society of Connecticut.

**JOHN W. LEONARD**

Associate Editor, *Ocean Engineering*.

**RAMESH B. MALLA**

Associate Editor, *Journal of Spacecraft and Rockets*.

Editorial Board, *Journal of Aerospace Engineering*, American Society of Civil Engineers.

Editorial Board, *International Journal of Space Structures*.

Editorial Board, *Proceedings of SPACE 2000 & ROBOTICS 2000 Conference*, American Society of Civil Engineers, February-March 2000.

Secretary, Executive Committee, Aerospace Division, American Society of Civil Engineers.

Member, Board of Directors, Connecticut Invention Convention, Inc.

Connecticut Director, "Connecticut Space Grant College Consortium," (with University of Hartford, Trinity College, and University of New Haven), National Aeronautics and Space Administration, March 1, 1995 – February 29, 2000.

**ERLING MURTHA-SMITH**

Editorial Board, *International Journal of Space Structures*.

**NIKOLAOS P. NIKOLAIDIS**

Co-organizer with C. Erkey and B.F. Smets, of the 1999 Hazardous and Industrial Wastes Conference Proceedings, 31<sup>st</sup> Mid-Atlantic Industrial and Hazardous Waste Conference, June 20-23, Storrs, CT.

Member, Scientific Council of the National Centre for Marine Research, Athens, Greece (Appointed by Minister of Development, Mrs. V. Papandreou).

Board of Directors (CT), New England Section, American Water Resources Association.

Member, Technical Advisory Group – Technical Guidance Document for Site Investigations and Demonstration of Compliance with the Remediation Standard Regulations, Connecticut Department of Environmental Protection.

Member, Watershed Modeling Steering Committee, Connecticut Department of Environmental Protection.

**FRED L. OGDEN**

Associate Editor, *Journal of Irrigation and Drainage Engineering*, American Society of Civil Engineers.

Member, Federal Task Force, U.S. Department of the Interior, Geological Survey, \$157,000,000 State-Federal Cooperative Water Program, October 1998 – June 1999.



**CHARLES S. SAWYER**

Chairman, Environmental and Water Resources Technical Committee, Connecticut Society of Civil Engineers.

**BARTH F. SMETS**

Selected Theme Editor, *Encyclopedia of Life Support Systems – A United Nations Project*.

Co-organizer with C. Erkey and N. Nikolaidis, of the 1999 Hazardous and Industrial Wastes Conference Proceedings, 31<sup>st</sup> Mid-Atlantic Industrial and Hazardous Waste Conference, June 20-23, Storrs, CT.

# Computer Science & Engineering Department Annual Report Summary 1998-1999

During the year, the Computer Science & Engineering Department increased its research productivity and continued to deliver high quality education. The department continued its emphasis on an integrated computer science and engineering approach to balancing the engineering paradigm with the scientific exploration in its educational and research programs. In addition, the department developed two new undergraduate degree programs: in *Computer Science* and — jointly with the Electrical & System Engineering Department — *Computer Engineering*. Both programs have been approved and will be implemented in fall 1999.

The job market for computer scientists and engineers is very strong. Our graduates quickly find fulfilling positions in top companies in the region owing to their superb training and engineering orientation. Currently, the department has 34 percent of the total School of Engineering students, 40 percent of the School's freshmen, and more than 40 percent of the 1999 Class. A number of course sections have been added to accommodate the increasing enrollment demands in the lower division and introductory graduate courses. We expect this healthy growth to continue. The department will take all measures to cope with this enrollment increase while keeping the high quality of our programs.

Equipment funds have been used mainly to expand departmental laboratories of the United Technologies Engineering Building (UTEB). Expansion and growth in our laboratory facilities will remain an important element as we strive to cope with the rapidly changing technology. However, space will continue to be a major challenge influencing our ability to add new laboratories and provide sufficient classroom seating for the anticipated increase in class size.

Unfortunately, we did not receive enough resources to offer our M.S. degree in Stamford as part of the Connecticut Information Technology Institute (CITI). However, the CSE department remains committed to participating in industrially-sponsored educational activities, including senior design projects, summer internship, cooperative education, and cooperative research and development projects.

Dr. Marios Mavronicolas, a Harvard graduate, joined the faculty last January. The search for two new faculty members in the computer engineering area succeeded in our hiring one new individual, Dr. Alex Russell, a graduate of MIT who currently is completing a postdoctoral post at the University of California, Berkeley. He will join the department in the fall '99 term. The search for the second position was unsuccessful. The Department also hired Mrs. Donna Whitman as a secretary, and Professor B. Lovell as an emeritus faculty member with 30 years of teaching experience. In addition, three adjunct faculty members were hired to handle our heavy teaching load. They also bring more academic and industrial experience to our teaching.

## RESEARCH HIGHLIGHTS

The department's research and creative scholarship activities are aimed in several general directions. We are treating the computing as a unified field of computer science and engineering for the advancement of computational systems. We view computing as the core of many new scientific discoveries and emerging high technologies, and therefore, we are increasing our collaboration with diverse disciplines. We also perceive that computing plays an important role in economic development and we will intensify our interactions with industry for cooperative research and technology transfer. Furthermore, based on our belief that computing plays a major role in improving learning, we focus our research on intelligent systems for learning. Faculty research interests include communications and network computing, bio-informatics, distributed computing, data and network security, real-time systems, object-oriented computing, intelligent systems, agent-based computing, performance modeling and analysis, graphics and geometric modeling.

Our research productivity has increased this year as assessed both by publications and by external funding. There are 23 different externally funded projects. The direct cost of these externally-funded projects is \$1,181,710. Most of this funding is used to support graduate students. The number of research proposals has also increased. Faculty generated 21 different research proposals this year. Research results have been published in six book chapters, 15 journal papers, 54 professional conference papers, and 13 technical reports.

Professor Dong-Guk Shin received the Chancellor's Information Technology Award. He is the first faculty member from the

School of Engineering to receive this distinguished award. Faculty members have also been invited to present their research directions and results, including keynote addresses, in several major international and national conferences. A total of 35 keynote lectures and seminar presentations were delivered. Two faculty members organized and chaired two major IEEE conferences. In addition, several others were officers of major international conferences. Professor Gerald L. Engel was elected president of the IEEE Society on the Social Implications of Technology.

### **STUDENT RECRUITMENT, OUTREACH AND STUDENT**

The department participated in all student-recruiting activities, including the provision of six undergraduate scholarships. Twelve students were accepted into the Honors program. Additionally, we concentrated on several high profile "image" building areas, including an upgrade of the department's web page and design and implementation of a department logo. Reda Ammar, Professor and Head of Computer Science & Engineering, coordinated recruiting of top graduate students and research scholars from Egyptian universities and research institutes. The department currently has six Egyptian graduate students who are fully funded by the Egyptian government.

### **CONCLUDING REMARK**

The CSE department is in a period of expansion. Enrollment continues to increase, the quality of our research continues to grow, and new faculty members have been hired. However, we will continue to face some difficult challenges and growing pains. The department has changed its outlook and will move rapidly toward its new goal of excellence in both teaching and research. The Administration's understanding and management support remain the key factors for the success of the department.

### **MISSION STATEMENTS**

The mission of the CSE department will continue to be the following:

Expanding both education and research programs in a complementary approach to respond to the pressing needs of society and the rapidly changing technology in the information era;

Providing the needed human capital and upgrading the existing work force in the computing industry and organizations that depend on computing;

Assuming research leadership in exploring new directions and new developments in computing and its application areas; and

Preparing all university students for entering the information era.

**Computer Science & Engineering Department**  
**Journal Publications**  
**1998-1999**

**REDA AMMAR**

“High Performance Arabic Character Recognition,” (with J. Alherbish) *Journal of Systems and Software*, Published by Elsevier Science Publishers B.V. (North-Holland), October 1998.

**IAN GREENSHIELDS**

“Coherent Computation of the Maximal Directional Derivative,” *Image and Vision Computing* (with F. DiMario, Jr.), A System For Computing Neuromorphometry from Magnetic Resonance Images, *Computers in Medicine and Biology*, 29:3, 1999.

“A System for Computing Neuromorphometry from Magnetic Resonance Images,” (with R. DiMario, Jr.), *Computers in Medicine and Biology*, 29:3, 1999.

**LESTER LIPSKY**

“The Importance of Power-Tail Distributions for Modeling Queuing Systems,” (with M. Jobmann and M. Greiner), *Operations Research*, 47(2), March/April 1999.

**MARIOS MAVRONICOLAS**

“Linearizable Read/Write Objects,” (with D. Roth), *Theoretical Computer Science*, Special Issue on Distributed Algorithms, Vol. 220(1), pp. 267-319, June 1999.

**ROBERT MCCARTNEY**

“Small Robot Projects: Before You Start,” (with K. Sanders), *Computer Science Education*, 8(1), 1998, pp. 56-63.

**EUGENE SANTOS, JR.**

“Deterministic Approximation of Marginal Probabilities in Bayes Nets,” (with S. E. Shimony) *IEEE Transactions on Systems, Man, and Cybernetics*, 29(4), pp. 377-393, 1998.

“An Architecture to Support Large Numbers of Computer-Generated Actors for Distributed Virtual Environments,” (with M. Stytz, S. Banks, and L. Hutson), *Presence*, 7(6), pp. 558-616, 1998.

“A Framework for Building Knowledge-Bases Under Uncertainty,” (with E.S. Santos), *Journal of Experimental and Theoretical Artificial Intelligence*, 11, pp. 265-286, 1999.

**DONG-GUK SHIN**

“A Methodology of Constructing Canonical Form Database Schemes in a Multiple Heterogeneous Database Environment,” (with J. Lim), *Journal of Database Management*, 9(4), pp. 4-11, 1998.

“A Metadata Approach to Query Interoperation between Molecular Biology Databases,” with K-H. Cheung, P.M. Nadkarni), *Bioinformatics*, Vol. 14(6), 1998.

**ALEXANDER SHVARTSMAN**

“Implementing and Evaluating an Eventually-Serializable Data Service as a Distributed System Building Block,” (with O. Cheiner) *Networks in Distributed Computing*, DIMACS Series on Discrete Mathematics and Theoretical Computer Science, Vol. 45, pp. 43-71, AMS, 1999.

“Timing Conditions for Linearizability in Uniform Counting Networks,” (with N. Lynch, N. Shavit and D. Touitou), *Theoretical Computer Science special issue on Distributed Algorithms*, Vol. 220, pp. 67-91, 1999.

“Eventually-Serializable Data Services,” (with A. Fekete, D. Gupta, N. Lynch, and V. Luchangco), *Theoretical Computer Science special issue on Distributed Algorithms*, Vol. 220, 1999.

**Computer Science & Engineering Department  
Books, Book Chapters, Book Sections & Edited Volumes  
1998-1999**

**BOOK/VOLUME CHAPTERS & SECTIONS**

**STEVEN DEMURJIAN**

“Role-Based Security and Java,” (with D. Smarkusky, M. Bastarrica, and T.C. Ting), *Database Security, XII: Status and Prospects*, (Ed: S. Jajodia), Kluwer, 1999.

**THOMAS J. PETERS**

“Object Modeling to Localize Knowledge for Feature Interrelationships,” (with T. Peters, S. Demurjian, R. McCartney, and D. Needham), *Knowledge Intensive CAD*, Vol. 2 (Eds: M. Mantyla, S. Finger, and T. Tomiyama), Chapman and Hall, London, 1998, pp. 198-207.

**T.C. TING**

“Role-Based Security and Java,” (with S. Demurjian, D. Smarkusky, and M. Bastarrica), *Database Security, XII: Status and Prospects*, (Ed: S. Jajodia), Kluwer, 1999.

**EDITED VOLUMES**

**MARIOS MAVRONICOLAS**

“Timing-Based Connection Management,” (Edited with M. Merritt and N. Shavit), *Networks in Distributed Computing, DIMACS Series in Discrete Mathematics and Theoretical Computer Science*, Vol. 45, (Eds: M. Mavronicolas, M. Merritt and N. Shavit), American Mathematical Society, October 1998, pp. 113-134. (In memory of late Professor Parish C. Kanellakis.)

# Computer Science & Engineering Department

## Conference Publications

### 1998-1999

#### REDA AMMAR

“Using Preemptive Access to the Critical Section in Shared Memory Environment to Minimize the Execution Time of the Fork-Join Structure,” (with M-S. Kim), *IEEE Symposium on Computers and Communications (ISCC’98)*, Athens, Greece, June 30 – July 1, 1998.

“A Heuristic Scheduling Algorithm to Order Parallel Processes Competing for the Critical Section in Shared Memory Environment,” (with M-S. Kim), *11<sup>th</sup> International Conference on Parallel and Distributed Computing Systems*, Chicago, IL, September 1998.

“Software Architecture for the Analysis of Module Level Computations,” (with C. Rosiene), *The 11<sup>th</sup> International Conference on Computer Applications in Industry and Engineering*, November 11-13, 1998.

#### STEVEN DEMURJIAN

“Security Capabilities and Potentials of Java,” (with D. Smarkusky, M. Bastarrica, and T.C. Ting), *Proceedings of the Twelfth IFIP WG 11.3 Working Conference on Database Security*, Chalkidiki, Greece, July 1998.

“Software Architectural Specification for Optimal Object Distribution,” (with M. Bastarrica and A. Shvartsman), *Proceedings of the XVII International Conference of the Chilean Society of Computer Science*, Antofagasta, Chile, November 1998.

“Implementing a Culling and Self-Intersection Algorithm for Stereo-lithography Files in Ada95,” (with J. Reisner, Z. Lainwala, and T. Peters), *Proceedings of the SIGAda’98 - Annual International Conference*, Washington, D.C., November 1998.

“A Binary Integer Programming Model for Optimal Object Deployment,” (with M. Bastarrica and A. Shvartsman), *Proceedings of the Second International Conference on Principles of Distributed Systems (OPODIS’98)*, Amiens, France, December 1998.

#### IAN GREENSHIELDS

“Extended Superquadric Models of Elastic Hollow Viscera,” *12<sup>th</sup> IEEE Symposium on Computer-Based Medical Systems*, Stamford, CT, 1999.

“Compression of Sequential Images,” (with M. Kerasha), *12<sup>th</sup> IEEE Symposium on Computer-Based Medical Systems*, Stamford, CT, 1999.

“Asynchronous, Parallel Pseudo-Gibbs Classification of the VF Dataset,” (with T. Daggett, G. Weerasinghe), *12<sup>th</sup> IEEE Symposium on Computer-Based Medical Systems*, Stamford, CT, 1999.

#### LESTER LIPSKY

“Performance Results for Models of Traffic in Telecommunication Systems, Based on Multiple ON-OFF Sources with Self-Similar Behavior,” (with Hans-Peter Schwefel), *Proceedings of the 16<sup>th</sup> International Teletraffic Congress*, Edinburgh, Scotland, June 7-11, 1999.

“Buffer Size Issues in the Presence of Self-similar Traffic,” (with Hans-Peter Schwefel), *3<sup>rd</sup> IFIP Workshop on Traffic Management and Design of ATM Networks*, London, 26, 27, April, 1999.

“Analytic Model of Performance in Telecommunication Systems, Based on ON-OFF Traffic Sources with Self-Similar Behavior,” (with P.M. Fiorini and Hans-Peter Schwefel), *7<sup>th</sup> International Conference on Telecommunication Systems*, Nashville, TN, March 18-21, 1999.

“A Heavy-Tailed ON-OFF Source Model with Applications to Network Capacity Planning,” (with P.M. Fiorini and Yiping

Ding), *PDCS'98*, September 1998.

“Queuing Models and Evaluation Techniques: A Linear Algebraic Approach, I – Background,” (with Hans-Peter Schwefel), *Workshop on Stochastic Modeling of High-Speed Networks*, Technical University of Munich, June 18, 1998.

“Queuing Models and Evaluation Techniques: A Linear Algebraic Approach, II – Multiburst Processes,” (with Hans-Peter Schwefel), *Workshop on Stochastic Modeling of High-Speed Networks*, Technical University of Munich, June 18, 1998

#### **MARIOS MAVRONICOLAS**

“Threshold Counters with Increments and Decrements,” (with C. Busch, N. Demetriou, M. Herlihy), *Proceedings of the 6<sup>th</sup> International Colloquium on Structural Information and Communication Complexity (SIROCCO'99)*, Lacanau, France, June/July 1999.

“Sequentially Consistent versus Linearizable Counting Networks,” (with M. Merritt and G. Taubenfeld), *Proceedings of the 18<sup>th</sup> Annual ACM Symposium on Principles of Distributed Computing (PODC'99)*, pp. 133-142, Atlanta, GA, May 1999.

“Supporting Increment and Decrement Operations in Balancing Networks,” (with W. Aiello, C. Busch, M. Herlihy, N. Shavit and D. Touitou), *Proceedings of the 16<sup>th</sup> Annual Symposium on Theoretical Aspects of Computer Science (STACS'99)*, (G. Meinel and S. Tison, Eds.) pp. 377-386, Vol. 1563, Lecture Notes in Computer Science, Springer-Verlag, Trier, Germany, March 1999.

“Max-Min Fair Flow Control Sensitive to Priorities,” (with P. Fatourou, and P. Spirakis), *Proceedings of the 2<sup>nd</sup> International Conference on Principles of Distributed Systems (OPODIS'98)* pp. 45-59, Amiens, France, December 1998.

“Optimal, Distributed Decision-Making: The Case of No Communication,” (with P. Spirakis), *Proceedings of the 18<sup>th</sup> Annual ACM Symposium on Principles of Distributed Computing (PODC'99)*, p. 279, Atlanta, GA, May 1999.

“The Global Efficiency of Distributed, Rate-Based, Flow Control Algorithms,” (with P. Fatourou and P. Spirakis), *Proceedings of the 17<sup>th</sup> Annual ACM Symposium on Principles of Distributed Computing (PODC'98)*, p. 311, Puerto Vallarta, Mexico, June/July 1998.

#### **ROBERT MCCARTNEY**

“Partial Plan Recognition Using Predictive Agents,” (with J-J. Lee), *Proceedings of the First Pacific Rim International Workshop on Multi-Agents*, Springer-Verlag, Singapore, November, 1998.

“Communicating Robots,” *University of Connecticut Conference on Cognitive Science* (invited presentation), Storrs, CT, May, 1999.

“Partial Plan Recognition with Incomplete Information,” (with J-J. Lee), *Proceedings of the Third International Conference on Multi-Agent Systems*, IEEE Computer Society, (plus poster and presentation), p. 445-446, Paris, France, July, 1998.

#### **THOMAS J. PETERS**

“Is Robust Geometry Possible?” (with K. Weiler, T. Duff, S. Fortune, and C. M. Hoffmann), *ACM Siggraph*, July 22, 1998, Orlando, FL, Conference Abstracts and Applications, pp. 217 - 219.

“Implementing a Culling and Self-Intersection Algorithm for Stereolithography Files in Ada 95,” (with J.A. Reisner, Z. Lainwala, and S. Demurjian, Sr.) *Proceedings of the ACM SIGAda International Conference (SIGAda 98)* November 8-12, 1998, Washington, DC, pp. 104-113.

“Geometry and Graphics Accuracy,” Conference Proceedings and Presentations (short paper) *ACM Siggraph*, July 22, 1998, Orlando, FL, Conference Abstracts and Applications, p. 218.

#### **EUGENE SANTOS, JR.**

“Utility Theory-Based User Models for Intelligent Interface Agents,” (with S. Brown and S. Banks), *Lecture Notes in Artificial Intelligence 1418: Advances in Artificial Intelligence – AI '98*, 378-392, Springer-Verlag, 1998.

“IaDEA: A Development Environment Architecture for Building Generic Intelligent User Interface Agents,” (with S. Brown, S. Banks, and M. Stytz), *Proceedings of the AAAI-98 Workshop on Software Tools for Developing Agents*, 97-106, Madison, WI, 1998.



“Automated Knowledge Acquisition and Dynamic Curriculum Synthesis for Intelligent Tutoring systems,” (with S. Banks, M. Dyson, and F. Kilpatrick), *Proceedings of the 20<sup>th</sup> Interservice/Industry Training Systems and Education Conference (ITSEC’98)*, Orlando, FL, 1998.

“Solving Hard Computational Problems Through Collections (Portfolios) of Cooperative Heterogeneous Algorithms,” (with S. Shimony and E. Williams), *Proceedings of the 11<sup>th</sup> International FLAIRS Conference*, 356-360, Orlando, FL, 1999.

“Identifying and Handling Structural Incompleteness for Validation of Probabilistic Knowledge-Bases,” (with S. Banks, S. Brown and D. Bawcom), *Proceedings of the 11<sup>th</sup> International FLAIRS Conference*, 506-510, Orlando, FL, 1999.

“Dynamic User Model Construction with Bayesian Networks for Intelligent Information Queries,” (with S. Brown, M. Lejter, G. Ngai, S. Banks, and M. Stytz), *Proceedings of the 11<sup>th</sup> International FLAIRS Conference*, 3-7, Orlando, FL, 1999.

“Probabilistic Reasoning Through Genetic Algorithms and Reinforcement Learning,” (with X. Zhong), *Proceedings of the 11<sup>th</sup> International FLAIRS Conference*, 477-481, Orlando, FL, 1999.

## **DONG-GUK SHIN**

“Xyntagma: A Graphical Query Interface for the AceDB Genome Databases,” (with W. Grajewski and L. Liu), *Proceedings of the Twelfth IEEE Symposium on Computer-Based Medical Systems*, June 18-20, 1999, Stamford, CT.

“An Intelligent Database Query Interface,” (with L. Chu), *Proceedings of the 11<sup>th</sup> International Conference on Computer Applications in Industry and Engineering*, Las Vegas, NV, November 11-13, 1998.

“Automatic Query Mapping among Genomic Databases: A Pilot Exploration,” (with K-H. Cheung, P. Miller and P. Nadkarni), *Proceedings of the American Medical Informatics Associations*, Orlando, FL., November 7-11, 1998

“Finding the Steiner Tree in a Distributed Graph,” (with L. Chu), *Proceedings of the International Conference on Parallel and Distributed Computing Systems (IASTED)*, Las Vegas, NV, October 28-31, 1998.

“An Improved Heuristic Approach for the Steiner Problem in Graphs,” (with L. Chu), *Proceedings of the Fourth International Conference on Computer Science and Informatics (CS&I’98)*, Research Triangle Park, NC 27709, October 23-28, 1998.

“A Parallel Mark and Backtrack Algorithm for the Steiner Problem in Graphs,” (with L. Chu), *Proceedings of the 11<sup>th</sup> International Conference on Parallel and Distributed Computing Systems (PDCS)*, Chicago, IL, September 1-4, 1998

“A Methodology of Constructing Canonical Form Database Schemas in a Multiple Heterogeneous Database Environment,” (with J. Lim), *Proceedings of Issues and Applications of Database Technology*, Berlin, Germany, July 6-9, 1998.

“A Framework Designed to Represent both Data and Meta-Data to Enhance Database Interoperability,” (with K-H. Cheung), *Proceedings of Issues and Applications of Database Technology*, Berlin, Germany, July 6-9, 1998.

“Representative Word Methodology for Schema Conflict Resolution,” (with J. Lim), *Proceedings of the ISCA 7<sup>th</sup> International Conference on Intelligent Systems*, Melun, France, July 1-2, 1998.

“A Graphical Work-Flow Environment Seamlessly Integrating Database Querying and Data Analysis,” (with L. Chu, L. Liu, R. Nori, J. Leone, R. Landers and W. Grajewski), *Proceedings of DOE Human Genome Program Contractor-Grantee Workshop VII*, Oakland, CA, January 12-16, 1999.

## **ALEXANDER SHVARTSMAN**

“A Dynamic View-Oriented Group Communication Service,” (with R. De Prisco, A. Fekete, N. Lynch), *Proceedings of the 16th ACM Symposium on Principles of Distributed Computing*, pp. 227-236, 1998.

“Software Architectural Specification for Optimal Object Distribution,” (with C. Bastarrica, S. Demurjian), in *Proceedings of the XVIII International Conference of the Chilean Society of Computer Science*, IEEE Press, 1998.

“A Binary Integer Programming Model for Optimal Object Distribution,” (with C. Bastarrica, S. Demurjian), *International Conference on Principles of Distributed Computing OPODIS’98*, pp. 11-25, 1998.

“Implementation of an Eventually Serializable Data Service,” (with O. Cheiner), *International Conference on Principles of Distributed Computing OPODIS’98*, pp. 91-105, 1998.

“Implementation of an Eventually Serializable Data Service,” (with O. Cheiner), *Proceedings of 16th ACM Symposium on Principles of Distributed Computing*, (short paper), 1998.

“Dynamic Load Balancing with Group Communication,” (with S. Dolev, R. Segala), *Proceedings of 6<sup>th</sup> International Colloquium on Structure of Information and Communication Complexity (SIROCCO ‘99)*, pp. 111-125, 1999.

**T.C. TING**

“Security Capabilities and Potentials of Java”, (with D. L. Smarkusky, S. A. Demurjian, and M. C. Bastarrica) *Proceedings of the Twelfth Annual IFIP Wg 11.3 Working Conference On Database Security*, Porto Carras Complex, Chalkidiki, Greece, July 15-17, 1998.

# **Computer Science & Engineering Department Active Research Grants and Contracts 1998-1999**

## **REDA AMMAR**

“Information Technology and High Performance Computing,” NASA (with co-PIs: I. Greenshields, P. Luh, K. Pattipati, E. Santos, H. Sholl, and P. Willett), June 1, 1999 – May 31, 2000, \$30,350.

“Real-Time Architecture for High Speed Pipe Inspection,” Connecticut DED and Dapco Industries, (with co-PIs: Howard Sholl and Ian Greenshields), September 1, 1998 – May 31, 1999, \$47,000.

“System Synthesis Environment,” DARPA, (with Howard Sholl and Ramesh Reddi) (INFOPIKE, Inc., Norwich, CT), June 1998 – June 2000, \$225,000.

## **STEVEN DEMURJIAN**

“Interoperability Issues in Heterogeneous, Multi-Language, Multi-Process, Distributed, Client/Server Platforms,” Mitre, Eatontown, NJ, (with co-PIs: D.G. Shin, A. Shvartsman, and R. McCartney) September 1, 1997 - May 30, 1999, \$147,725.

“Prototyping the Inter-TOC Data Distribution Model of Army Battle Command Systems,” (with co-PI: D.G. Shin), December 22, 1998 - January 15, 1999, \$30,400.

“Large-Scale, Multi-Agent, Distributed Mission Planning and Execution in Complex Dynamic Environments,” U.S. Air Force Office of Scientific Research, (with co-PIs: M. Cox, S. DeLoach, E. Santos, A. Shvartsman), May 31, 1999 – December 31, 2001, \$774,982.

“Feasibility Study of Information System Reengineering,” State of Connecticut Insurance Department, (with co-PI: D.G. Shin), January 25, 1999 - August 30, 1999, \$60,062.

## **IAN GREENSHIELDS**

“Distributed Services Telemedicine,” State of Connecticut Critical Technologies Program Photonics Section, January 1, 1999 – December 31, 1999, \$47,500.

“University of Connecticut’s High Performance connections to the Internet,” National Science Foundation, (with co-PIs: Vietzke, P. Luh, K. Pattipatti, D-G Shin, M. Young) October 1, 1998 – September 30, 2000, \$350,000.

“Real-Time Architecture for High Speed Pipe Inspection,” DAPCO, Inc., (with co-PIs: R. Ammar, H. Sholl), September 1, 1999 – May 31, 2000, \$47,000.

## **LESTER LIPSKY**

“Self-Similar Traffic,” Tech. University of Munich, Germany, May 23, 1998 – December 31, 1999, \$43,000.

## **THOMAS J. PETERS**

“Java-based Space Filling Curve Algorithms,” The University of Connecticut Institute for Teaching and Learning, Fall 1998, \$500.

“Web-based Space Filling Curve Algorithm,” The University of Connecticut Institute for Teaching and Learning, Fall 1998, \$500.

## **EUGENE SANTOS, JR.**

“On Intelligent Reasoning and Training for Simulation and Decision Support,” Ball Aerospace & Technologies Corp., September 1, 1997- August 31, 1998, \$160,000.

“Lessons Learned in Applying Artificial Intelligence to the Real World,” Air Force Research Laboratories, Phillips Labs, September 17, 1998 – December 31, 1998, \$1,400.

“Verification and Validation of Embedded Knowledge-Based Software Systems,” Air Force Office of Scientific Research, November 1, 1998 – October 31, 2001, \$165,000.

“Large-Scale, Multi-Agent, Distributed Mission Planning and Execution in Complex Dynamic Environments,” U.S. Air Force Office of Scientific Research, (with co-PIs: M. Cox, S. DeLoach, S. Demurjian, A. Shvartsman), May 31, 1999 – December 31, 2001, \$774,982.

#### **DONG-GUK SHIN**

“A Graphical Ad Hoc Query Interface for GenBank,” National Institutes of Health, January 1, 1999 – December 31, 2001, \$555,011.

“Developing a Database Supporting Cell Biology Modeling – Feasibility Study,” National Science Foundation (with co-PI: L. Loew), March 15, 1999 – February 29, 2000, \$99,994.

“Feasibility Study of Information System Reengineering,” State of Connecticut Insurance Department (with co-PI: Steve Demurjian), January 25, 1999 – August 30, 1999, \$60,062.

“University of Connecticut’s High Performance Connections to the Internet,” National Science Foundation (with co-PIs: R. Vietzke, P. Luh, M. Young, I. Greenshields, and K. Pattipati), October 1, 1998 – September 30, 2000, \$350,000.

“Prototyping the Inter-TOC Data Distribution Model of Army Battle Command Systems,” Mitre, Eatontown, NJ, October 22, 1998 – January 15, 1999, \$30,400.

“Prototyping of an Object-Relational Mediator,” Mitre, Eatontown, NJ, August 1, 1998 – September 30, 1998, \$20,972.

“Interlinking Laboratory and Public Genome Databases,” National Institute of Health, January 1, 1996 – December 31, 1998, \$425,822.

#### **ALEXANDER SHVARTSMAN**

“Large-Scale, Multi-Agent, Distributed Mission Planning and Execution in Complex Dynamic Environments,” U.S. Air Force Office of Scientific Research, (with Co-PIs: E. Santos, S. Demurjian and M. Cox), May 1, 1999 – December 31, 2001, \$774,982.

“Interoperability Issues in Heterogeneous: Multi-Language, Multi-Process, and Distributed Client/Server Platforms,” MITRE Corp., Eatontown, NJ, (with co-PIs: D.G. Shin, S. Demurjian and R. McCartney) October 1997 - August 1999, \$147,725.

“Distributed Resource Management,” GTE Laboratories, Waltham, MA, December 1997 - August 1999, \$20,000.

**Computer Science & Engineering Department  
Awards, Honors, Patents  
1998-1999**

**DONG-GUK SHIN**

Chancellor's Excellence in Information Technology Award, University of Connecticut, 1999.

**T.C. TING**

Fellow, Computing Research Association.

# Computer Science & Engineering Department

## Major Professional Activities

### 1998-1999

#### REDA AMMAR

Associate Editor, *Journal of Simulation*.

Associate Editor, *International Journal of Computers and Their Applications*.

Chairman, IEEE Technical Committee on Simulation.

Vice President and member, Board of Directors, International Society of Computers and Their Applications.

Registration & Finance Chair, The IEEE Symposium on Computers and Communications, Performance Evaluation of Computer and Telecommunication Systems, Athens, Greece, June 30-July 4, 1998.

Member, Program Committee, the International Symposium on Performance Evaluation of Computer and Telecommunication Systems, Reno, Nevada, July 19-22, 1998.

Member, Program Committee, the International Conference on Parallel and Distributed Computing, Chicago, IL, September 1998.

Member, Program Committee, the International Conference on Computer Applications in Industry and Engineering, Las Vegas, NV, November 1998.

Member, Program Committee, the International Conference on Computers and Communication, Phoenix, AZ, March 1999.

Reviewer, ISCA Conferences and Journals.

Reviewer, *The Journal of Systems and Software*.

Reviewer, Saudi Arabia Promotion and Tenure Committee.

Reviewer, IEEE Concurrency.

UConn Coordinator, agreement and cooperation between the University of Connecticut and Ain Shames University, Egypt.

Keynote speaker, International Conference on Artificial Intelligent Applications, Cairo, Egypt, February 4, 1999.

#### STEVE DEMURJIAN

Reviewer, 13<sup>th</sup> IFIP WG11.3 Working Conference on Database Security, IEEE Transactions on Software Engineering.

Reviewer, International Conference on Distributed Computing (DISCO'98).

#### IAN GREENSHIELDS

General Chairman, 12<sup>th</sup> IEEE Symposium on Computer-Based Medical Systems, Stamford, CT, 1999.

Steering Committee Member, 11<sup>th</sup> IEEE Symposium on Computer-Based Medical Systems, Texas, 1998.

Session Chair, 11<sup>th</sup> IEEE Symposium on Computer-Based Medical Systems, Texas, 1998.

#### MARIOS MAVRONICOLAS

Editor, *Theoretical Computer Science*, July 1998-present.

Guest Editor, special issue on Distributed Algorithms, Vol. 220, *Theoretical Computer Science*, June 1999.

Member, Program Committee, 13<sup>th</sup> International Symposium on Distributed Computing, Bratislava, Slovakia, September

1998.

Program Committee Vice-Chair on Distributed Systems and Algorithms, Euro-Par '98, Southampton, England, September 1998.

Member, Program Committee, 12<sup>th</sup> International Symposium on Distributed Computing, Andros, Greece, September 1998.

Member, Steering Committee, International Symposium on Distributed Computing, annual European Conference, October 1996-1999.

Reviewer, *Theoretical Computer Science*.

Reviewer, *Journal of the ACM*.

Reviewer, *Journal of Parallel and Distributed Computing*.

Reviewer, *The International Journal of Computers and Their Applications*.

*Ad hoc* Reviewer, 19<sup>th</sup> Annual ACM Symposium on Principles of Distributed Computing, May 1999.

*Ad hoc* Reviewer, 3<sup>rd</sup> IEEE Symposium on Computer and Communications, June/July 1998.

*Ad hoc* Reviewer, 18<sup>th</sup> Annual ACM Symposium on Principles of Distributed Computing June/July 1998.

#### **ROBERT MCCARTNEY**

Member, Program Committee, National Conference on Artificial Intelligence (AAAI).

Member, Editorial Board, *Computer Science Education*.

Session Chair, National Conference on Artificial Intelligence.

#### **THOMAS J. PETERS**

Chair, Mini-symposium, "The Interaction of Geometry and Topology for Features," Society of Industrial and Applied Mathematicians, Workshop on Mathematical Foundations for Features in Computer-Aided Design, Engineering and Manufacturing, October 22-23, 1998.

Industrial outreach collaborative research with The Boeing Company, Seattle, WA.

Industrial outreach collaborative research with PDES, Inc., Charleston, SC.

Industrial outreach collaborative research with STEP Tools, Inc., Troy, NY.

Program committee member for Society of Industrial and Applied Mathematicians, Workshop on Mathematical Foundations for Features in Computer-Aided Design, Engineering and Manufacturing, October 22-23, 1998, Somerset Inn, Troy, Michigan.

**Mini-symposium organizer for Society of Industrial and Applied Mathematicians, Workshop on Mathematical Foundations for Features in Computer-Aided Design, Engineering and Manufacturing, October 22-23, 1998, Somerset Inn, Troy, Michigan.**

*Ad hoc* Reviewer, Association for Computing Machinery, *Transactions on Graphics*.

*Ad hoc* Reviewer, Association for Computing Machinery, Solid Modeling Conference.

*Ad hoc* Reviewer, *Research in Engineering Design*.

#### **EUGENE SANTOS, JR.**

Co-Chair, Conference on AI Meets the Real World '98 (AIMTRW '98).

Workshop Co-Chair, IUI '98 Workshop on Real-Time Intelligent User Interfaces for Decision Support and Information Visualization.

Program Committee, Genetic and Evolutionary Computation Conference (GECCO-99).

Program Committee, The Sixth Bar-Ilan Symposium on Foundations of Artificial Intelligence (BISFAI-99).

Program Committee, The Third International Conference on Autonomous Agents (Agents '99) Workshop on Metrics for Autonomy Control Software.

Program Committee, The 1<sup>st</sup> Asia-Pacific Conference on Intelligent Agent Technology (IAT '99).

Program Committee, The 11<sup>th</sup> International Conference on Software Engineering and Knowledge Engineering (SEKE '99).

UConn Coordinator, Information Institute, Air Force Research Laboratories, Rome, NY.

Board of Directors, ACM SIGCHI Connecticut Chapter.

*Ad hoc* Reviewer, International Conference on Software Engineering and Knowledge Engineering (SEKE '99).

Reviewer, *Neural Computation*.

Reviewer, *Artificial Intelligence*.

*Ad hoc* Reviewer, Bar-Ilan Symposium on Foundations of Artificial Intelligence (BISFAI '99).

*Ad hoc* Reviewer, Autonomous Agents Workshop on Metrics for Autonomy Control Software (Agents '99).

*Ad hoc* Reviewer, International Symposium on Distributed and Computing (DISC '99).

Reviewer, The International Journal for Computers and Their Applications.

## **DONG-GUK SHIN**

Treasurer, IEEE Computer Society Computational Medicine TC.

Program Committee Member, International Workshop for User Interface to Data Intensive Systems, Manchester, UK, 1999.

Program Committee Member, ISCA 8<sup>th</sup> International Conference on Intelligent systems, Denver, CO, June 24-26, 1999.

Program Committee Member, 12<sup>TH</sup> IEEE Symposium on Computer-based Medical Systems, Stamford, CT, June 18-20, 1999.

Program Committee Member, 3<sup>rd</sup> IFCIS Conference on Cooperative Information Systems (CoopIS'98), New York, NY, August 20-22, 1998.

*Ad hoc* Reviewer, Research Proposal for University of Rhode Island Transportation Center, 1999.

*Ad hoc* Reviewer, 12<sup>th</sup> International Conference on Parallel and Distributed Computing Systems, Fort Lauderdale, FL, August 17-29, 1998.

## **ALEXANDER SHVARTSMAN**

Chair, Conference and local arrangements, 20<sup>th</sup> ACM Symposium on Principles of Distributed Computing, PODC 2001.

Program Committee Member, 12<sup>th</sup> International Symposium on Distributed Computing, DISC '98, 1998.

Conference Session Chair, 12<sup>th</sup> International Symposium on Distributed Computing, DISC '98, 1998.

Program Committee Member, 3<sup>rd</sup> International Conference on Principle of Distributed Systems, OPODIS '99, 1999.

Program Committee Member, 19<sup>th</sup> ACM Symposium on Principles of Distributed Computing, PODC '2000, 2000.

Committee Member, Computer Architecture, USA – European Union Consortium for Harmonization of Undergraduate Programs in Computing Sciences, 1998-99.

Member, IEEE TC on Enterprise Networking.

Voting Member, ACM.

Full Member, Sigma Xi.

Associate Member, IEEE Computer Science.

Panel Member, Enterprise Networking, International Symposium on Integrated Network Management, IM-99, 1999.

Member, Cornell Society of Engineers.

*Ad hoc* Reviewer, 13<sup>th</sup> International Symposium on Distributed Computing, DISC '99, 1999.



*Ad hoc* Reviewer, 18<sup>th</sup> ACM Symposium on Principles of Distributed Computing, PODC '98, 1999.

*Ad hoc* Reviewer, Theoretical Computer Science, 1998-99.

*Ad hoc* Reviewer, IEEE Transactions on Computers, 1998.

*Ad hoc* Reviewer, International Conference on Software Engineering and Knowledge Engineering, 1999.

#### **T.C. TING**

Editor, *International Journal on Computer Standards and Interfaces*.

Editor, *International Journal on Data and Knowledge Systems*.

General Chair, 12<sup>th</sup> International Conference on Computer Applications in Industry and Engineering.

Program Panel Member and Reviewer, National Science Foundation.

Member, National Information Technology Board, Office of the Vice President.

President, Asia Faculty and Staff Association, UConn.

#### **RUTH UNGAR**

Member, ACM.

Member, IEEE Computer Society.

# Electrical & Systems Engineering Department

## Annual Report Summary

### 1998-1999

The Electrical & Systems Engineering Department is committed to addressing the research frontiers of the new millennium in: (a) biotechnology (b) materials (c) micro/optoelectronics (d) wireless communication and networking (e) mechatronics and (f) computing. The department's current strength in micro/optoelectronics, materials, biotechnology and systems engineering will be augmented to include strong programs in computer engineering and communications.

Dr. Douglas A. Abraham joined the department in the fall 1998 as a Visiting Assistant Professor and is making fundamental contributions in the area of sonar signal processing. Dr. Quing Zhu also joined the department in the fall, 1998 as an Assistant Professor, and she brings expertise in the area of novel medical imaging to strengthen the biotechnology area. Dr. Ian Papautsky will join the department in the fall, 1999 and will be a part of the biomedical engineering faculty. His expertise is in the rapidly developing area of Micro-Electro Mechanical Systems (MEMS). Dr. Mansour Keramat, an expert in Very Large Scale Integration (VLSI), is joining the department this fall and will be affiliated with the core of faculty members in the general area of computer engineering. The department is committed to filling two other positions in the area of computer engineering over the course of the next year. The department also anticipates filling additional positions in communications by the fall, 2000. Currently, we are hosting four visiting professors and international scholars.

#### UNDERGRADUATE PROGRAMS

Beginning in the fall, 1999 the department of Electrical & Systems Engineering will offer a new undergraduate degree in Computer Engineering. The degree is offered in collaboration with the Computer Science & Engineering department. We are deeply committed to this new program and anticipate hiring two new faculty members in the area of Computer Engineering. We are hopeful this new degree program, combined with our efforts in Biomedical Engineering, will increase undergraduate enrollment in electrical engineering. Owing to department's keen interest in educating high school students in engineering, we have become active members of the school-wide Engineering 2000 Program.

The Senior Design laboratory and the seminar room in the ABB building will go through a major renovation that will include new flooring, air conditioning and a new drop ceiling. The Information Processing Systems/Optical Computing Laboratory has moved from Booth Research Center to the Bronwell Building. The renovated space will also be used to offer the EE 267 laboratory. The department is committed to offering the best quality education, as evidenced by our having two faculty members named University of Connecticut Teaching Fellows in two consecutive years.

#### FACULTY

Scholarly productivity of the faculty has continued to be very strong. Over the past year, the faculty have published more than 200 scholarly publications, including over 50 full-length journal articles, 11 book chapters, 124 full conference proceedings papers, 10 lecture notes and 30 other publications. The faculty have offered short courses at foreign institutions and have been invited to be keynote speakers at international conferences. Throughout the year, the faculty conducted research funded by more than 90 sponsored grants, with annual expenditures over \$4 million, and were awarded 11 patents and invention disclosures. The department's efforts were supported by more than 110 graduate students and culminated in 12 Ph.D. awards and 22 M.S. degree awards. This level of scholarly productivity has been recognized through appointment of the faculty to seven major journal editorships, 18 associate editorships or conference chairs, 15 other editorial appointments and a multitude of other officer-ships, honors and awards.

The faculty members continue to make significant contributions in their fields and have been recognized for their efforts. Of particular note is the Distinguished Professor Award, sponsored by Motorola Corporation, given to Yaakov Bar-Shalom. Professor John E. Ayers was named a University of Connecticut Teaching Fellow. Dr. Haoxun Chen received the 1998 King-Sun Fu memorial best paper award. Professor David Jordan received the AAUP Service Excellence Award. It should be noted that the ESE department currently has 25 Fellows in different professional societies. The faculty have continued to receive professional service appointments reflective of their contributions. Professors Luh and Pattipati hold editor or editor-in-chief positions for three major journals.

#### PERSONNEL CHANGES

The department underwent several personnel changes in 1998-99. Professor Mehdi Anwar was appointed as the interim head of the department in June, when Professor David Jordan retired after serving for 29 years in various capacities in the university. In January, Lauren Whitaker left her position as Computer Lab Coordinator II for a position at the University of Maryland, and Barbara Zlotnick joined the departmental office as a Secretary II, transferring from Manchester Community College.

As the department looks to the future, it sees challenges and opportunities. The next few years will bring continued change with the opportunity to define and change the direction of the department to meet external needs. At the same time, the program assessment and resource allocation processes will bring the department closer to well-defined goals and performance. Thus, the department will need to make intelligent choices and work with the other departments in the school to maximize the effectiveness of the faculty in carrying out the school's mission.

# Electrical & Systems Engineering Department

## Journal Publications

### 1998-1999

#### MEHDI ANWAR

“Energy Bandgap of  $\text{Al}_x\text{Ga}_{1-x}\text{As}_{1-y}\text{Sb}_y$  and Conduction Band Discontinuity of  $\text{Al}_x\text{Ga}_{1-x}\text{As}_{1-y}\text{Sb}_y/\text{InAs}$  and  $\text{Al}_x\text{Ga}_{1-x}\text{As}_{1-y}\text{Sb}_y/\text{InGaAs}$  Heterostructures,” (with R. T. Webster), *Solid State Electronics*, Vol. 42, No. 11, p. 2101, 1998.

“Physics-Based Intrinsic Model for AlGaN/GaN HEMTs,” (with S. Wu and R.T. Webster), *MRS Internet Journal of Nitride Semicond. Research* 4S1, G6.58, 1999.

“Base Transit Time in Abrupt GaN/InGaN/GaN and AlGaN/GaN/AlGaN HBTs,” (with S. Chiu and S. Wu), *MRS Internet Journal of Nitride Semicond. Research* 4S1, G6.7, 1999.

“Electron-phonon Interaction within an Unbiased and Biased Quantum Well,” (with K.R. LeFebvre), *IEEE Journal of Quantum Electronics*, Vol. 35, No. 2, p. 216, 1999.

#### JOHN E. AYERS

“Removal of Threading Dislocations from Patterned Heteroepitaxial Semiconductors by Glide to Sidewalls,” (with X. G. Zhang, P. Li, D. W. Parent and F. C. Jain), *Journal of Electron. Mat.*, Vol. 27, pp. 1248-1253, November 1998.

“Comparison of X-ray Diffraction Methods for Determination of the Critical Layer Thickness for Dislocation Multiplication,” (with X.G. Zhang, P. Li, D.W. Parent, G. Zhao and F.C. Jain), *Journal of Electron. Mat.*, Vol. 28, pp. 553-558, May 1999.

#### RAJEEV BANSAL

“AP-S Turnstile,” a continuing column series in the *IEEE Antennas and Propagation Magazine*, Vols. 40-41, August, October, December, 1998; February, April, June 1999.

“Design of Fiber-Laser Arrays with Genetic Algorithms,” (with D. Wu and P.K. Cheo), *International Journal of IR and Millimeter Waves*, Vol. 20, No. 5, May 1999.

#### YAAKOV BAR-SHALOM

“Maximum Likelihood Track-before-Detect with Fluctuating Target Amplitude,” (with S. Tonissen), *IEEE Transactions on Aerospace Electronic Systems*, AES-34(3), pp. 796-809, July 1998.

“Unbiased Converted Measurements in Tracking,” (with L. Mo, X. Song, Y. Zhou and Z. Sun), *IEEE Transactions on Aerospace Electronic Systems*, AES-34(3), pp. 1023-1027, July 1998.

“IMM Tracking of Maneuvering Targets in the Presence of Glint,” (with E. Daeipour), *IEEE Transactions on Aerospace Electronic Systems*, AES-34(3), pp. 996-1003, July 1998.

“IMMPDAF for Radar Management and Tracking Benchmark with ECM,” (with T. Kirubarajan, W.D. Blair and G.A. Watson), *IEEE Transactions on Aerospace Electronic Systems*, AES-34(4), pp. 1115-1134, October 1998.

“Benchmark for Radar Allocation and Tracking Targets in ECM,” (with W.D. Blair, G.A. Watson and T. Kirubarajan), *IEEE Transactions on Aerospace Electronic Systems*, AES-34(4), pp. 1097-1114, October 1998.

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“A Generalized S-D Assignment Algorithm for Multisensor-Multitarget State Estimation,” (with K. R. Pattipati, Y. Bar-Shalom and S. Deb), *Proceedings of the INFORMS ‘98*, October 1998.

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“A Hidden Markov Model-based Algorithm for Online Fault Diagnosis with Partial and Imperfect Tests,” (with Y. Jie and K. R. Pattipati), *Proceedings of the UTECA Conference*, April, 1999. Also in *Proceedings of the IEEE Midnight-Sun Workshop on Soft Computing Methods in Industrial Applications*, June 1999.

“A Radar Power Multiplier Algorithm for Acquisition of LO Ballistic Missiles Using an ESA Radar,” (with S. Sivananthan and Y. Bar-Shalom), *Proceedings of the 1999 IEEE Aerospace Conference*, Snowmass, CO, March, 1999. Also in *Proceedings of the 1999 Mediterranean Conference on Control and Automation*, Haifa, Israel, June 1999.

“Trajectory and Launch Point Estimation for Ballistic Missiles Based on Boost-Phase LOS Measurements,” (with Y. Li, Y. Bar-Shalom and M. Yeddanapudi), *Proceedings of the 1999 IEEE Aerospace Conference*, Snowmass, CO, March, 1999. Also in *Proceedings of the 1999 Mediterranean Conference on Control and Automation*, Haifa, Israel, June 1999.

“Multitarget Tracking Using an IMM Estimator with Debaised E-2C Measurements for Airborne Early Warning Systems,” (with Y. Bar-Shalom, Richard McAllister, Robert Schutz and Bruce Engelberg), *Proceedings of the 1999 Symposium on Situational Awareness in the Tactical Air Environment*, Piney Pt., MD, June 1999.

“Passive Ranging of a Low Observable Ballistic Missile in a Gravitational Field Using a Single Sensor,” (with Y. Wang and Y. Bar-Shalom), *Proceedings of the International Information Fusion Conference*, June 1999.

“Efficient Multidimensional Data Association for Multisensor-Multitarget Tracking Using Clustering and Assignment Algorithms,” (with M. C. Riad, K. R. Pattipati and Y. Bar-Shalom), *Proceedings of the International Information Fusion Conference*, June 1999.

## **PETER B. LUH**

“Job Shop Scheduling with Multi-level Assembly and Lead Time Penalty,” (with Y. Zhang, K. Yoneda, Y. Kyoya and T. Kano), *Proceedings of the Rensselaer’s International Conference on Agile, Intelligent and Computer-Integrated Manufacturing*, Troy, NY, (CD ROM), October 1998.

“Optimization-Based Manufacturing Scheduling and Multiple Resources and Setup Requirements,” (with D. Chen, L.S. Thakur and J. Moreno, Jr.), *Proceedings of the SPIE: Intelligent Systems in Design and Manufacturing*, Boston, MA, pp. 314-325, November 1998.

“A Fuzzy Gradient Method in Lagrangian Relaxation for Integer Programming Problems,” (with X. Zhao), *Proceedings of the 37<sup>th</sup> IEEE Conference on Decision and Control*, Tampa, FL, pp. 3372-3377, December 1998.

“Lagrangian Relaxation Neural Networks for Job Shop Scheduling,” (with X. Zhao, Y. Wang and L.S. Thakur), *Proceedings of the 1999 NSF Design and Manufacturing Grantees Conference*, Los Angeles, CA, January 1999.

“A Lagrangian Relaxation Neural Network for Unit Commitment,” (with Y. Wang and X. Zhao), *Proceedings of the IEEE Power Engineering Society 1999 Winter Meeting*, New York, NY, February 1999.

“An Effective Method to Reduce Inventory in Job Shops,” (with X. Zhou and R. N. Tomastik), *Proceedings of the 1999 IEEE International Conference on Robotics and Automation*, Detroit, MI, pp. 787-792, May 1999.

“Optimization Based Bidding Strategies in the Deregulated Market,” (with D. Zhang and Y. Wang), *Proceedings of the 21<sup>st</sup>*

*Power Industry Computer Applications Conference*, Silicon Valley, CA, (CD ROM), May 1999.

#### **KRISHNA R. PATTIPATI**

“An M-Best 2D Assignment Algorithm and Multi-level Parallelization,” (with R.L. Popp and Y. Bar-Shalom), *Proceedings of the European Conference on Parallel and Distributed Systems*, Vienna, Austria, July 1998.

“A Virtual Test-Bench for Mixed-signal Circuit Testability Analysis and Fault Diagnosis,” (with S. Chakraborty, V. Rajan, Y. Jie and Z. Kadambaya), *Proceedings of the IEEE Autotest Conference*, Salt Lake City, UT, pp. 337-352, August 1998.

“Design of Adaptive Organizations,” (with Y. Levchuk and D. L. Kleinman), *Proceedings of the European Command and Control Conference*, Stockholm, Sweden, September 1998.

“Machine Learning Algorithms for Analog Fault Diagnosis,” (with S. Chakraborty, V. Rajan and Y. Jie), *Proceedings of the IEEE SMC Conference*, San Diego, CA, pp. 1874-1879, October 1998.

“Adaptive Human Organizations to Solve a Complex Mission: Algorithms and Software Implementations,” (Y. Levchuk, H. Li and D.L. Kleinman), *Proceedings of the IEEE SMC Conference*, San Diego, CA, pp. 1835-1840, October 1998.

“Graphical Scheduling Heuristics for Complex Task Environments,” (with M. Curry and D.L. Kleinman), *Proceedings of the IEEE SMC Conference*, San Diego, CA, pp. 388-392, October 1998.

“A Model-based Approach to Verification of Autocode Software,” (with V. Malepati, H. Li and H. Patterson-Hines), *Proceedings of the IEEE SMC Conference*, San Diego, CA, pp. 3004-3009, October 1998.

“Decentralized Real-Time Monitoring and Diagnosis,” (with S. Deb, A. Mathur and P. Willett), *Proceedings of the IEEE SMC Conference*, San Diego, CA, October 1998.

“Multisignal Modeling for Diagnosis, FMECA and Reliability,” (with S. Deb, S. Ghoshal, A. Mathur and R. Shresta), *Proceedings of the IEEE SMC Conference*, San Diego, CA, October 1998.

“An Integrated Process for System Maintenance, Fault Diagnosis and Support,” (with S. Ghoshal, R. Shresta, A. Ghoshal, V. Malepati and S. Deb), *Proceedings of the IEEE Aerospace Conference*, Aspen, CO, March 1999.

“A Hidden Markov Model-based Algorithm for Online Fault Diagnosis with Partial and Imperfect Tests,” (with J. Ying and T. Kirubarajan), *Proceedings of the IEEE Conference on Soft Computing Methods for Industrial Applications*, Kuusamo, Finland, June 1999.

“Analytic Model Driven Organizational Design and Experimentation in Command and Control,” (with Y. Levchuk and D.L. Kleinman), *Proceedings of the 1999 Command and Control Symposium*, Newport, RI, pp. 2-12, June 1999.

“A Software Environment for the Design of Adaptive Organizations,” (with Y. Levchuk, J. Luo and G. Levchuk), *Proceedings of the 1999 Command and Control Symposium*, Newport, RI, pp. 65-90, June 1999.

“Algorithms for Single and Multiple Fault Diagnosis in Complex Systems,” *Proceedings of the International Conference on Quality Management*, Ahemmadabad, India, January 3-6, 1999.

#### **CHANDRA ROYCHOUDHURI**

“Degree of Spatial Coherence in Fabry-Perot Fringes,” (with D.-I. Lee), *Proceedings of the Annual Conference of the Optical Society of America*, October 1998.

“Computer Graphic Display of Propagation of a Train of Pulses through a Long Fiber,” (with D.-I. Lee and P. Dua), *Proceedings of the Annual Conference of the Optical Society of America*, October 1998.

“High-Contrast, High-Finesse Fiber Fabry-Perot Spectrometer with Bragg Gratings,” (with X. Peng and D.-I. Lee), *Proceedings of the Annual Conference of the Optical Society of America*, October 1998.

“Measurement of Structural Strain Using Mode-Mixing Properties of Multimode Fibers,” (with P. Dua), *Proceedings of the Annual Conference of the Optical Society of America*, October 1998.

“Measurement of Ultrashort Pulse Width from the Fringe Visibility of Double and Multiple Slit Interference Patterns,” (with D. Young), *Proceedings of the Annual Conference of the Optical Society of America*, October 1998.

“Photonics Curriculum for Associate Degree,” (with D. Hull and A. Guenther), *Proceedings of the Annual Conference of the Optical Society of America*, October 1998.

“High Power Picosecond Laser Diode,” (with O. Smolski and E. Portnoi), *Proceedings of the Connecticut Symposium on Microelectronics & Optoelectronics*, Yale University, New Haven, USA, March 16<sup>th</sup>, 1999, pp. P11-1 and P11-2.

“Spatio-Temporal Impulse Response of Spectrometers,” (with D.-I. Lee), *Centennial Meeting of the American Physical Society*, Atlanta, GA, March 1999.

“Wide Continuous Tunability of Grating Surface Emitting Laser,” (with J. Jiang, O. Smolski, E. Portnoi, G. Venus, I. Gadjiev and J. McKillop), *Proceedings of the Diode Laser Technology Review*, Ft. Walton Beach, Florida, May 1999.

“Periodontal Surgery using Fiber Coupled Diode Lasers,” (with L. Leaderman and P. Chapple), *Proceedings of the Diode Laser Technology Review*, Ft. Walton Beach, Florida, May 1999.

#### **GEOFFREY TAYLOR**

“A Novel Optoelectronic Analog to Digital Converter,” (with J. Cai and R. C. Fedors), *Proceedings of the GOMAC Technical Digest*, Monterey, March, 1999 and *Proceedings of the CMOC Conference*, March 1999.

“Self-Routing Optoelectronic Circuit Technology for Optical Packet Switching,” (with J. Cai and T.K. Oh), *Proceedings of the GOMAC Technical Digest*, March 16, 1999 and *Proceedings of the GOMAC Conference*, Monterey, CA, March 1999.

#### **PETER WILLETT**

“Analysis of Image Detection Based on Fourier Plane Nonlinear Filtering in a Joint Transform Correlator,” (with B. Javidi and M. Lops), *Proceedings of the Selected Papers on Optical Pattern Recognition Using Joint Transform Correlation*, SPIE Press, 1998.

“An Array Interpolation Technique for Improved SAR Imaging,” (with A. Barthelemy), *Proceedings of the SPIE Conference on Radar Processing, Technology, and Applications*, San Diego, CA, July 1998.

“Testing the Statistical Similarity of Discrete Observations Using Dirichlet Priors,” *Proceedings of the International Symposium on Information Theory*, Boston, MA, August 1998.

“De-centralized Real-time Monitoring and Diagnosis,” (with S. Deb and A. Mathur), *Proceedings of the International Conference on Systems, Man and Cybernetics*, San Diego, CA, October 1998.

“Tracking A General, Frequency Modulated Signal in Noise,” (with T. Luginbuhl), *Proceedings of the ISIS/PMHT Workshop*, Paris, France, November 1998.

“A Variety of PMHTs,” (with Y. Ruan and R. Streit), *Proceedings of the ISIS/PMHT Workshop*, Paris, France, November 1998.

“Optimal Quantization under Dependence,” (with P. Swaszek), *Proceedings of the Asilomar Conference*, Monterey, CA, November 1998.

“On the CRLB When Measurements are of Uncertain Origin,” (with Y. Bar-Shalom), *Proceedings of the 1998 Conference on Decision and Control*, Tampa, FL, December 1998.

“Bayesian Classification and the Reduction of Irrelevant Features from Training Data,” (with R. Lynch), *Proceedings of the 1998 Conference on Decision and Control*, Tampa, FL, December 1998.

“Bayesian Classification and Discrete Symbol Quantity When the Training Data are Mislabeled,” (with R. Lynch), *Proceedings of the DECI99*, February 1999.

“From the Waveform through the Resolution Cell to the Tracker,” (with R. Niu and Y. Bar-Shalom), *Proceedings of the 1999 Aerospace Conference*, Snowmass, CO, March 1999.

“Making the PMHT the Tracker of Choice,” (with Y. Ruan and R. Streit), *Proceedings of the 1999 Aerospace Conference*, Snowmass, CO, March 1999.

“Transient Detection Using a Homogeneity Test,” (with B. Chen and R. Streit), *Proceedings of the 1999 ICASSP*, Phoenix, AZ, March 1999.

“Classification Using Dirichlet Priors when the Training Data are Mislabeled,” (with R. Lynch), *Proceedings of the 1999 ICASSP*, Phoenix, AZ, March 1999.

“Comparison of PMHT and SD-Assignment Trackers,” (with Y. Ruan and R. Streit), *Proceedings of the 1999 SPIE*



*Conference 3692*, Orlando, FL, April 1999.

“A Comparison of the PMHT and PDAF Tracking Algorithms Based on their Model CRLBs,” (with Y. Ruan and R. Streit), *Proceedings of the SPIE Conference 3720*, Orlando, FL, April 1999.

“System-Level Performance of Radar Waveforms,” (with R. Niu and Y. Bar-Shalom), *Proceedings of the 1999 Mediterranean Conference on Control and Automation*, Haifa, Israel, June 1999.

## **QUING ZHU**

“A Novel Combined Ultrasound and Near Infrared Diffusive Light Imaging Using a Two-dimensional Hybrid Array,” (with T. Dunrana and A. Yodh), *Proceedings of the IEEE Ultrasonics Symposium*, pp. 1681:1684, October 1998.

“A Simple 2-D Ultrasound Array and Front-end Electronics for 3-D Volumetric Imaging,” (with Y. Zhi and P. Guo), *Proceedings of the IEEE Annual Northeast Bioengineering Conference*, 85:86, April 1999.

“Optical Imaging as an Adjunct to Ultrasound in Differentiating Benign from Malignant Lesions,” (with E. Conant and B. Chance), *SPIE Proceedings*, Vol. 3597, February 1999.

“Combined Ultrasound and Optical Tomography Imaging,” (with T. Durduran and A. Yodh), *SPIE Proceedings*, Vol. 3597, February 1999.

# Electrical & Systems Engineering Department

## Active Research Grants and Contracts

### 1998-1999

#### DOUGLAS ABRAHAM

“Statistical Modeling of Low Frequency Active Sonar Reverberation,” NUWC, February 12, 1999-September 30, 1999, \$54,000 (\$20,250).

“Multipath Estimation using Electromagnetic Matched Field Processing for DS-CDMA Communication Systems,” (with Co-PI: T. Kirubarajan), San Diego State University Foundation, March, 1999-January, 2000, \$27,998 (\$10,181).

#### MEHDI ANWAR

“Tunable Laser Diodes for Spectrometry,” (with PI: C. Roychoudhuri (75%)), Perkin Elmer Corporation, September 20, 1993-December 31, 1999, \$30,000 (\$600).

“Hand-held Cellular Phone Project,” Startel Cellular Group, Inc., July, 1, 1995-August 31, 2001, \$427,000 (\$70,192).

#### JOHN E. AYERS

“Electroluminescent Flat Panel Displays using MOCVD Grown ZnS and Ternary Compounds for Enhanced Blue Emission,” (with PI: F. Jain (33%) and co-PI: F. Papadimitrakopoulos (33%)), UCRF, January, 1998-December, 1999, \$14,711 (\$2,427).

“Growth of Quantum Dot Nanocrystals using UV and RF Enhanced Microwave Metal Organic Chemical Vapor Disposition (MOCVD) Reactor,” (with PI: F. Jain (33%) and co-PI: F. Papadimitrakopoulos (33%)), UCRF, January 1, 1998-December 31, 1999, \$12,783 (\$2,109).

“Development of Low Voltage, High Brightness Flexible Electroluminescent Lamps for Display Applications,” (with PI: F. Jain (33%) and co-PI: F. Papadimitrakopoulos (33%)), CII/Yankee Ingenuity Grant 97G025/DED, July 15, 1998-July 15, 2000, \$200,000 (\$33,000).

“Development of High Brightness Quantum Dot Based Nanophosphors for Electroluminescent Flat Panel Displays and Illuminators,” (with PI: F. Jain (40%) and co-PI: F. Papadimitrakopoulos (40%)), BMDO/E-lite Technologies, May 14, 1998-February 14, 2001, \$518,286 (\$37,694).

#### RAJEEV BANSAL

“Architecture for an Optically Controlled Phased Array Radar using Novel Micro-electronic and Photonic Devices,” (with PI: F. C. Jain (60%) and co-PI: A. DeMaria), Office of Naval Research/Raytheon, prime contract # N00014-95-C-0186, August 14, 1995-July 1, 1998, \$550,000 (\$6,111).

“Graduate Research Program in Applied Electromagnetics,” United Technologies Research Center, November, 1998-Depletion, \$18,000 (\$1,488).

#### YAAKOV BAR-SHALOM

“Distributed Tracking Algorithm Study,” Subcontract C/UB-2730-5A from CUBRC-CALSPAN UB Res. Ctr., June 12, 1998-December 31, 1999, \$32,200 (\$21,467).

“Tracking with Electronically Scanned Arrays”, (Co-PIs: K. Pattipati (10%) and P. Willett (10%)), ONR N00014-97-1-0502, March 1, 1997-September 30, 1999, \$300,000 (\$96,000).

“Estimation with Multisensor-Multiscan Detection Fusion,” (Co-PIs: K. Pattipati (10%) and P. Willett (10%)), AFOSR F49620-97-1-0198, April 1, 1997-November 30, 1999, \$379,286 (\$117,456).

“Multisensor-Multitarget Data Fusion and Tracking,” (Co-PI: K. Pattipati), ONR N00014-91-J-1950, June 1, 1991-May 31, 2000, \$1,210,267 (\$134,474).

### **STEVEN A. BOGGS**

“Evaluation of Silicone Coating Resistance to Corona,” Consolidated Edison Co., November 1, 1996-October 31, 1998, \$157,000 (\$26,167).

“Dielectric Rejuvenation of Secondary Cable Insulation,” Utility Equipment T&D, Inc., December 1, 1995-December 31, 1998, \$110,000 (\$17,838).

“Development of Improved Extrudable Dielectrics for Transmission Cables,” Electric Power Research Institute, WO7954-01, September 1, 1997-December 31, 1998, \$67,500 (\$27,000).

“Development of Electronics to Measure AC Capacitive, AC Restrictive and DC Ground,” Union Carbide Corp., September 1, 1997-December 31, 1998, \$25,000 (\$10,000).

“HRRM Cable Study: Phase I Testing,” Electric Power Research Institute, EPRI WO5616-02), May 1, 1998-December 31, 1998, \$22,800 (\$17,100).

“High Voltage Testing of Tree Wire,” Notheast Utilities Service Co., January 15, 1996-December 31, 1999, \$18,000 (\$9,000).

“Promotion of EPR Cable Technology,” DuPont Dow, Exxon, Kerite, Okonite and Uniroyal, January 1, 1999-December 31, 1999, \$150,000 (\$7,500).

“HRRM Cable Study: Phase II,” EPRI, WO5616-02, January 1, 1999-December 31, 1999, \$100,000 (\$50,000).

### **ERIC DONKOR**

“Low Power All-Optical Switching in a CdS<sub>2</sub>-doped Fiber,” UCRF, June 1, 1999-May 31, 2000, \$8,356 (\$696).

### **JOHN D. ENDERLE**

“An Annual Review of Projects to Aid the Disabled,” NSF, January 16, 1995-September 30, 1998, \$104,173 (\$7,103).

“IEEE-EMBS President’s Fund,” IEEE-EMBS, January 1, 1997-December 31, 1998, \$4,500 (\$2,250).

“Biomedical Engineering Alliance for Central Connecticut (BEACON),” (with PI: J.D. Bronzino and co-Pis: M. Fox and R. Northrop ), Whitaker Foundation, January 1, 1997-December 31, 1999, \$328,200 (\$109,400).

“UConn Biomedical Engineering Industrial Internship Program at UTRC,” UTRC, May 24, 1999-May 24, 2000, \$26,971 (\$2,922).

“UConn Biomedical Engineering Industrial Internship Program at Corometrics,” Corometrics, Inc., August 23, 1998-August 22, 2000, \$46,234 (\$23,117).

“UConn Biomedical Engineering Industrial Internship Program at Neurogen,” Neurogen Corp., June 5, 1998-August 22, 2000, \$35,482 (\$15,207).

“Chicago 2000,” IEEE-EMBS, January 1, 1999-December 31, 2001, \$20,000 (\$3,333).

“Annual Review of Engineering Senior Design Projects to Aid Persons with Disabilities,” (Co-PI: M.B. Hallowell), NSF, September 15, 1998-July 31, 1999, \$91,320 (\$83,018).

“Engineering Design Projects for the Disabled,” (Co-PI: B. Hallowell), NSF, September 15, 1998-August 31, 1999, \$45,626 (\$7,604).

“Clinical Engineering Internship Program at Baystate Medical Center,” Baystate Medical Center, August 23, 1997-August 22, 2007, \$356,000 (\$35,600).

“Clinical Engineering Internship Program at Bridgeport Hospital,” Bridgeport Hospital/NovaMed., June 1, 1997-August 22, 2007, \$260,000 (\$25,574).

“Clinical Engineering Internship Program at Hartford Hospital,” Hartford Hospital, August 23, 1997-August 22, 2007, \$290,000 (\$29,000).

“Clinical Engineering Internship Program at UConn Health Center,” UConn Health Center, August 24, 1997-August 23, 2007, \$240,730 (\$24,073).

“Clinical Engineering Internship Program at Yale-New Haven Hospital,” Yale-New Haven Hospital, August 23, 1997-August 22, 2007, \$280,000 (\$28,000).

#### **MARTIN D. FOX**

“MORE: Magneto-Optical Rotation Effect for Diabetic Glucometry,” Torsana Diabetes Diagnostics A/S, February 1, 1999-September 30, 1999, \$20,000 (\$11,111).

“Knowledge Harvest from Breast Cancer Detection Research,” American Institute of Biological Sciences, November 1, 1998-May 14, 1999, \$23,001 (\$23,001).

#### **FAQIR C. JAIN**

“Architecture for an Optically Controlled Phased Array Radar using Novel Micro-electronic and Photonic Devices,” (Co-PIs: R. Bansal (40%) and A. DeMaria), ONR/Raytheon, prime contract # N00014-95-C-0186, August 14, 1995-July 1, 1998, \$550,000 (\$9,167).

“Environmentally Conscious Manufacturing of Large Area Electroluminescent Displays and Illuminators,” (with PI: F. Papadimitrakopoulos (60%)), NSF, January 1, 1996-December 31, 1998, \$300,000 (\$20,000).

“Advanced Multitasking RF System Architecture for an Optically Controlled Phased Array Radar using Novel Micro Electronic and Photonic Devices,” Office of Naval Research/Raytheon Company, Contract # N00014-97-C-0177, May, 1997-February 26, 1999, \$50,000 (\$19,048).

“A Lithographic Stage of High Performance,” (with PI: B. Zhang (50%) and H. Elmali (20%)), NSF, March 1, 1996-February 28, 1999, \$229,745 (\$15,316).

“Electroluminescent Flat Panel Displays using MOCVD Grown ZnS and Ternary Compounds for Enhanced Blue Emission,” (with Co-PIs: J. Ayers (33%) and F. Papadimitrakopoulos (33%)), UCRF, January, 1998-December, 1999, \$14,711 (\$2,427).

“Growth of Quantum Dot Nanocrystals using UV and RF Enhanced Microwave Metal Organic Chemical Vapor Disposition (MOCVD) Reactor,” (with Co-PIs: J. Ayers (33%) and F. Papadimitrakopoulos (33%)), UCRF, January 1, 1998-December 31, 1999, \$12,783 (\$2,109).

“Development of Low Voltage, High Brightness Flexible Electroluminescent Lamps for Display Applications”, (with Co-PIs: J. Ayers (33%) and F. Papadimitrakopoulos (33%)), CII/Yankee Ingenuity Grant 97G025/DED, July 15, 1998-July 15, 2000, \$200,000 (\$33,000).

“High Brightness Electroluminescent Flat Panel Displays and Illuminators,” (with PI: F. Papadimitrakopoulos (50%)), Critical Technologies Program, #98 CT025, December 31, 1998-December 31, 2000, \$250,000 (\$36,458).

“Development of High Brightness Quantum Dot Based Nanophosphors for Electroluminescent Flat Panel Displays and Illuminators,” (with Co-PIs: J. Ayers (20%) and F. Papadimitrakopoulos (40%)), BMDO/E-lite Technologies, May 14, 1998-February 14, 2001, \$518,286 (\$75,387).

#### **BAHRAM JAVIDI**

“Optical Verification Laboratory Demonstration for High-Security Identification Cards,” NASA, June 1, 1996-May 31, 1999, \$100,000 (\$33,333).

“Optical Pattern Recognition for Validation and Security Verification,” US Air Force/Physical Optics Corp., Phase II SBIR, September 1, 1996-February 28, 1999, \$84,000 (\$22,400).

“Popularizing Neural Processors: A Project to Place an Optoelectronic Neural System in Every Wallet,” National Science Foundation, March 1, 1997-February 28, 1999, \$50,000 (\$14,583).

“Optical Security and Anti-counterfeiting Device,” Pitney Bowes, December 31, 1998-December 31, 2000, \$100,000 (\$50,000).

“Optical Pattern Recognition for Validation and Security Verification,” MetroLaser Corp./US Air Force, Phase II SBIR, December 17, 1997-December 16, 1999, \$98,000 (\$49,000).

“Optical Security and Anti-counterfeiting Device,” Connecticut Innovation, Inc., December 31, 1998-December 31, 2000, \$225,000 (\$56,250).

### **DAVID JORDAN**

“Development of Business/Technology Post-Baccalaureate Curricula,” (Co-PI: M. Diaby (50%)), General Electric Fund & Duracell Corp., January 1, 1996-December 31, 2000, \$300,000 (\$30,000).

### **THIAGALINGAM KIRUBARAJAN**

“Multipath Estimation Using Electromagnetic Matched Field Processing for DS-CDMA Communication Systems,” (with PI: D. Abraham), San Diego State University Foundation, March, 1999-January, 2000, \$27,998 (\$4,200).

### **DAVID L. KLEINMAN**

“Adaptive Coordination for Flexible C<sup>3</sup> Organization”, (PI: D. Kleinman,70%, Co-PI: K. Pattipati (30%)), Alphatech, Inc., May 1, 1995-April 30, 1999, \$280,947 (\$40,972).

“Organizational Adaptation in Dynamic and Uncertain Task Environments,” (with PI: K. Pattipati (50%)), Office of Naval Research, November 1, 1996-October 31, 1999, \$432,642, (\$72,107), 100%.

### **PETER B. LUH**

“Planning, Scheduling and Coordination of Design and Manufacturing Activities,” United Technologies Research Center, January 1, 1998-December 31, 1998, \$20,000 (\$10,000).

“Forecast Forward Energy Prices in the Deregulated Power Market,” Northeast Utilities, August 1, 1997-January, 1999, \$82,254 (\$31,988).

“Macro-level Scheduler,” Toshiba Corporation, April, 1998-March, 1999, \$25,000 (\$18,750).

“Fuzzy Optimization for Order and Production Scheduling,” (with Co-PI: L. S. Thakur (25%)), National Science Foundation, June, 1995-May, 1999, \$180,000 (\$30,938).

“Optimization-Based Scheduling Systems for Delta Industries,” (with PI: L. Thakur), Delta, July, 1998-July, 1999, \$8000 (\$3,200).

“Distributed and Coordinated Production Scheduling,” United Technologies Research Center, August, 1998-July, 1999, \$40,000 (\$40,000).

“Forecasting Market Clearing Prices in the Deregulated Power Market,” Northeast Utilities, December, 1998-November, 1999, \$80,364 (\$46,879).

“Optimization Based Scheduling for Gas Insulated Switchgears Production,” Toshiba Corporation, September, 1995-December, 1999, \$178,000 (\$41,077).

“Dynamic Planning & Scheduling: A Part of the Allen-Bradley Led Team on Holonic Manufacturing Systems for the Intelligent Manufacturing Systems Feasibility Study,” (with Co-PI: D. Hoimet), UTRC, March 1, 1993-December 31, 1999, \$99,374 (\$16,562).

“Editor-In-Chief Support-IEEE Transactions on Robotics and Automation,” IEEE, January 1, 1999-December 31, 1999, \$21,591 (\$10,796).

“Editorial Support – IEEE Transactions on Robotics and Automation,” Texas A&M, April 1, 1995-March 31, 2000, \$12,000 (\$2,400).

“Advanced Optimization and Cost Estimation for Utilities and Interruptible Customers,” September 1, 1998-August 31, 2000, NSF, \$116,482 (\$58,241).

“University of Connecticut’s High Performance Connections to the Internet,” (with PI: R. Vietzke and co-Pis: M. F. Young, I. Greenshields, K. R. Pattipati and D. G. Shin), NSF, January 1, 1999-December, 2000, \$175,000 (\$29,167).

“Network-Based Scheduling and Coordination Systems with Extensions to Supply Chains,” (with Co-PI: L. S. Thakur), December 31, 1998-December 31, 2000, CII \$98,446 (\$24,612).

“A New Generation of Neural Network Optimization Techniques with Applications to Manufacturing Scheduling,” (with Co-

PI: L. S. Thakur), NSF, October, 1998-September, 2001, \$207,408 (\$51,852).

#### **KRISHNA R. PATTIPATI**

“Adaptive Tele-maintenance of Postal Machines,” (with Co-PI: D. Jordan), Pitney-Bowes Fellowship, May, 1998-April, 1999, \$25,000 (\$20,833).

“Simulation-based Testability Analysis,” Sikorsky Aircraft, September, 1996-August 27, 1999, \$20,000 (\$6,667).

“Adaptive Coordination for Flexible C<sup>3</sup> Organization”, (with PI: D. Kleinman (70%)), Alphatech, Inc., May 1, 1995-August 31, 1999, \$284,947 (\$17,559).

“Tracking with Electronically Scanned Arrays,” (with Co-PIs: P. Willett (10%) and Y. Bar-Shalom (80%)), Office of Naval Research, March 1, 1997-September 30, 1999, \$300,000 (\$10,000).

“Organized Adaptation in Uncertain and Dynamic Task Environments,” (with Co-PI: D. Kleinman (50%)), Office of Naval Research, November 1, 1996-October 31, 1999, \$432,642 (\$72,107).

“Estimation with Multisensor-Multiscan Detection Fusion,” (with PI: Y. Bar-Shalom (80%) and Co-PI: P. Willett (10%)), Air Force of Scientific Research, AFOSR F49620-97-1-0198, April 1, 1997-November 30, 1999, \$379,286 (\$14,682).

“Verification and Validation of High-integrity Software for Safety Critical Application,” NASA-Ames Research Center, December 1, 1997-November 30, 1999, \$99,885 (\$49,943).

“A Comparative Analysis of Dependency and Qualitative Physics,” Sikorsky, August 13, 1993-December 31, 1999, \$48,000 (\$7,579).

“Robust Design Techniques for the Tail RotorSpar Manufacturing Process,” Sikorsky, June 1, 1994-December 31, 1999, \$55,655 (\$10,119).

“University of Connecticut High Performance Connections to the Internet,” (with PI: R. Vitezke, and Co-PIs: P. B. Luh, D.-G. Shin, I. Greenshields and M. Young), NSF, April, 1999-March, 2000, \$175,000 (\$6,856).

“Multi-Sensor-Multi-Target Data Fusion and Tracking,” (with PI: Y. Bar-Shalom), Office of Naval Research, N00014-91-J-1950, June 1, 1991-May 31, 2000, \$1,210,267 (\$0-).

“A Software Environment for the Analysis and Synthesis of Adaptive Organizations,” Office of Naval Research, May 1, 1998-April 30, 2001, \$109,620 (\$36,540).

#### **CHANDRA ROYCHOUDHURI**

“Development of a Non-linear Optical Microscope,” (with PI: L. Loew), NSF, August 1, 1996-July 31, 1999, \$235,040 (\$39,174).

“Science and Technological Education in Photonics (STEP),” NSF, October 1, 1997-September 30, 1999, \$267,000 (\$133,500).

“Photonics Critical Technology,” CII-DED, September 1-1994-September 30, 1999, \$2,135,750 (\$427,150).

“High Power Surface Emitting Diode Lasers for Materials Processing,” Laser Fare, Inc., May 16, 1997-May 15, 1999, \$120,000 (\$40,000).

“Biomedical Imaging Technology,” (with Co-PI: I. Greenshields), CII-DED, July 1, 1994-December 30, 1999, \$2,215,135, (\$147,676).

“Continuously Tunable External Cavity Diode Lasers,” Perkin Elmer Corporation, January 23, 1995-December 31, 1999, \$23,000 (\$5,750).

“Tunable Laser Diodes for Spectrometry,” (with CoPI: M. Anwar), Perkin Elmer Corporation, September 20, 1993-December 31, 1999, \$30,000 (\$5,000).

“Bragg Gratings for Commercial Applications in Photonics, Bio-Tech, Chemical and Communications Industries,” Connecticut Innovations, Inc., December 31, 1998-December 31, 2000, \$298,758 (\$149,379).

## **GEOFFREY TAYLOR**

“Rapid Thermal Annealing Station,” (with Co-PIs: A. F. M. Anwar (30%) and N. Dutta (30%)), UCRF, January 1, 1998 - December 31, 1998, \$53,750 (\$26,875).

“A New CCD/QWIP Combination for Infra-Red Focal Plane Arrays,” Intelligent Automation/BMDO, May 1, 1999 - September 1, 1999, \$92,000.

“III-V Image Sensors with Optical Outputs,” NSF, August 15, 1998 - July 31, 2001, \$180,000 (\$60,000).

“III-V Infrared Image Sensors,” Yankee Ingenuity Initiative, CII, January 31, 1998 - December 31, 2000, \$199,978 (\$99,989).

## **PETER WILLETT**

“In Process Grinding Damage Monitoring by Digital Signal Processing of Acoustic Emission Signals,” (with J. Webster (50%)), NSF, September 1, 1996 - August 31, 1999, \$195,087 (\$65,029).

“Application of the EM Algorithm to Target Tracking, Transient Detection, Matched Field Processing and Data Fusion,” NUWC, June 1, 1998 - July 30, 2000, \$85,000 (\$42,500).

“Tracking with Electronically-Scanned Arrays,” (with PI: Y. Bar-Shalom (80%) and Co-PI: K. Pattipati (10%)), ONR, March, 1997 - September, 1999, \$300,000 (\$12,000).

“Estimation with Multisensor-Multiscan Detection Fusion,” (with PI: Y. Bar-Shalom (80%) and Co-PI: K. Pattipati (10%)), AFOSR, April 1997 - November 1999, \$379,286 (\$14,223).

“Hybrid Bayes/GLRT Signal Detection,” ONR, January 1, 1998 - December 30, 1999, \$96,775 (\$48,388).

“Enhanced Signal Processing for Real-Time Supervisor of Reactive Systems,” Qualtech Systems, Inc., September 1998 - September 1999, \$78,055 (\$65,046).

## **QUING ZHU**

“Optimization of a Novel Imaging System,” UCRF, January 1, 1999 - December 31, 1999, \$20,656 (\$10,328).

# Electrical & Systems Engineering Department

## Awards, Honors, Patents

### 1998-1999

#### YAAKOV BAR-SHALOM

Distinguished Lecturer, IEEE Aerospace and Electronics Society.

Distinguished Engineering Professor, School of Engineering, University of Connecticut, 1998

#### PETER CHEO

“Single-Core and Multicore Fiber Lasers Including Eyesafe Wavelength,” U.S. Patent Application, Serial #08/995,479, in review, March 1999.

#### HAOXUN CHEN

1998 King-Sun Fu Memorial Best Transactions Paper Award.

#### FAQUIR JAIN

“Low Threshold Quantum Well Lasers with Near Symmetric Transverse and Lateral Beam Divergence,” University of Connecticut Invention Disclosure #98-013, June 29, 1998.

“Novel Full Color Flat panel Displays Using Site-Specific Self-Assembled Thin Films of Pseudomorphically Cladded Quantum Dots,” (with F. Papadimitrakopoulos), University of Connecticut Invention Disclosure #98-036, October 1998.

“Methodology to Enhance Optical Gain in Indirect Gap Semiconductors to Obtain Lasing,” University of Connecticut Invention Disclosure 99-002, January 9, 1999.

“Short Wavelength (260nm) Semiconductor Lasers,” University of Connecticut Invention Disclosure 99-003.

“Millimeter Wave Field-effect Transistors for Above 500 GHz Circuits,” (with E. Heller) University of Connecticut Invention Disclosure #98-016, July 8, 1998.

#### BAHRAM JAVIDI

“Method and Apparatus for Encryption,” Invention #08595873, October 1998.

“Binary Encoding of Nonlinear Correlators,” with J. Horner, Invention # 5815597, 9/29/98.

#### DAVID JORDAN

“Elimination of Need for Platform Weighing in Elevator Control,” Patent Disclosure, February 1999.

#### PETER LUH

Listed in *Who's Who in Engineering*; *Who's Who in the East*; *Who's Who in American Education*; *Who's Who in Science and Engineering*; *Who's Who in the World*.

#### CHANDRA ROYCHOUDHURI

“Tunable External Cavity Laser” (with David Tracy, Perkin Elmer and William Hubbard, Spectran Specialty Optics). Perkin Elmer is proceeding with the patent application with UConn's permission in USA and EUROPE.

#### QUING ZHU

“A Novel Hybrid Imaging Transducer Using Ultrasound and Near Infrared Light,” U.S. Patent Provision, filed at U.S. Patent



Office May 7, 1999 University of Connecticut Invention Disclosure #98-037, May 7, 1999.

# Electrical & Systems Engineering Department

## Major Professional Activities

### 1998-1999

#### **JOHN AYERS**

Member, NSF proposal review panel.

#### **RAJEEV BANSAL**

Editor and Reviewer, *Journal of Electromagnetic Waves and Applications*.

Associate Editor, *Radio Science*.

Associate Editor, *IEEE Antennas and Propagation Magazine*.

Member, Technical Program Committee, 1999 IEEE International Microwave Symposium.

#### **YAKOOV BAR-SHALOM**

Honorary Chairman, 2<sup>nd</sup> International Symposium on Information Fusion.

Elected member of Board of Governors of International Society Information Fusion.

Session Chairman IEEE Conference Decision & Control Aerospace Conference.

Program Committee Member, 1999 Australian Decision & Information Fusion Conference.

#### **STEVEN BOGGS**

Contributing Editor, *IEEE Electrical Insulation Magazine*.

#### **PETER CHEO**

Committee Member, SPIE Conference 3714, "Enabling Photonic Technologies For Aerospace Applications," Orlando, FL, April 1999.

Conference Chair, SPIE Conference 3714, Session 3, Orlando, FL, April 1999.

Executive Committee Member, IEEE Connecticut Section Chair, Educational Committee of Lasers and Electro-Optic Society.

#### **ERIC DONKOR**

Committee Member, SPIE Conference 3714, "Enabling Photonic Technologies For Aerospace Applications," Orlando, FL, April 1999.

Conference Chair, SPIE Conference 3714, Session 3, Orlando, FL, April 1999.

Vice-Chairman, Lasers and Electro-Optics Society (LEOS) Connecticut Chapter.

Executive Committee Member, IEEE Connecticut Section Chair, Educational Committee of Lasers and Electro-Optic Society.

#### **JOHN ENDERLE**

Conference Chair, IEEE-EMBS, World Congress on Medical Physics and Biomedical Engineering in 2000, 1999.

Program Chair, IEEE-EMBS, World Congress on Medical Physics and Biomedical Engineering in 2000, 1998.

Editorial Board, Academic Press Biomedical Engineering Book Series.

Session Chair, Rocky Mountain Bioengineering Symposium 1999.  
IEEE Technical Experts Guide.  
Session Chair, Northeast Bioengineering Symposium, 1999.  
Executive Committee, IEEE-EMBS, 1998.  
Chair, Nominating Committee, IEEE-EMBS, 1998.  
Member, IEEE TAB Finance Committee 1998.  
Program Evaluator for Bioengineering Programs, ABET/EAC Engineering Accreditation Commission.  
Member, Academic Council, AIMBE.  
Member, International Conference Committee for the 20<sup>th</sup> Annual International Conference of the IEEE-EMBS.  
Member, Organizing Committee, 1999 Northeast Biomedical Engineering Symposium, Hartford, CT, April 8-9, 1999.  
Member, Management of Medical Technology Institute Advisory Board.  
Member, Board of Directors, Rocky Mountain Bioengineering Symposium.  
Member, Connecticut United for Research Excellence (CURE).

#### **FAQUIR JAIN**

Guest editorship, *DISPLAYS* journal's special issue on laser based displays.  
Co-Organizer, Connecticut Microelectronics and Optoelectronics Symposium, Yale University, March 16, 1999.  
Coordinator, Connecticut Microelectronics and Optoelectronics Consortium.

#### **BAHRAM JAVIDI**

Topical Editor, *IEEE Press* and *SPIE Press Book Series* on Optical Imaging.  
Topical Editor, *Optical Engineering*.  
Topical Editor, *Signal and Image Processing*, Marcel-Dekker.  
Conference Chair and Proceedings Editors (with D. Psaltis), Devices and Systems for Optoelectronics Processing, International Symposium on Optical Science and Engineering, Annual Meeting of the Optical Engineering Society (SPIE), San Diego, California, July, 1998.  
Chair, Pattern Recognition Symposium, 1998 Optical Society of America Annual Meeting, Baltimore, MD, October 1998.  
Program Committee and Chair, Electro-optics Sensors and Systems Committee, Institute of Electrical and Electronics Engineers (IEEE) Annual Meeting of Lasers and Electro-Optics Society (LEOS), Orlando, Florida, November 1998.  
Program Committee, Optical Pattern Recognition Conference, International Symposium on Photonics for Aerospace Applications of Optics, International Society for Optical Engineering (SPIE), Orlando, FL, April 1999.  
Program Committee, Photonics Processing Technology and Applications, International Symposium on Photonics for Aerospace Applications of Optics, International Society for Optical Engineering (SPIE), Orlando, FL, April 1999.  
Program Committee and Co-chair, Euro-American Workshop on Information Systems, French Optical Society (SFO) and Institute of Electrical and Electronics Engineers (IEEE) Lasers and Electro-Optics Society (LEOS) and Optical Engineering Society, LaRochelle, France, June 1999.  
Member, Institute of Electrical and Electronics Engineers (IEEE) Neural Networks Council.  
Chair, Technical Committee, Electro-optics Sensors and Systems, Institute of Electrical and Electronics Engineers (IEEE) Lasers and Electro-Optics Society (LEOS) 1994-1998.  
Chair, Optical Computing and Processing Working Group of Optical Engineering Society (SPIE).  
Session Chair, Optical Society of America's Annual Meeting, Baltimore, MD, October 1998.  
Session Chair, International Symposium on Optical Science and Engineering, Annual Meeting of the Optical Engineering Society (SPIE), San Diego, California, July 1998.

Session Chair, International Symposium on Photonics for Aerospace Applications of Optics, sponsored by the international Society for Optical Engineering (SPIE), Orlando, Florida, April 1999.

Session Chair, Annual Meeting of the Institute of Electrical and Electronics Engineering (IEEE) Lasers and Electro-Optics Society (LEOS), October 1998.

### **THIAGALINGHAM KIRUBARAJAN**

Session Chair, Clustering methods, IEEE Midnight-Sun Workshop on Soft Computing Methods in Industrial Applications, June 1999.

Session Chair, Target Tracking, International Information Fusion Conference, June 1999.

### **PETER LUH**

Editor, *IEEE Transactions on Robotics and Automation*, 1995-1999.

Editor-in-Chief, *IEEE Transactions on Robotics and Automation*, 1999-2004.

Editor, *IEEE Robotics and Automation Magazine*, 1996-1998.

Associate Editor, *International Journal of Intelligent Control and Systems*, 1995-.

Associate Editor, *IIE Transactions on Design and Manufacturing*, 1997-.

Associate Editor, *Discrete Event Dynamic Systems*, 1999-.

Chair, Video Proceedings Committee, 1998 IEEE International Conference on Robotics and Automation.

Technical Program Committee, 1998 IEEE/RSJ International Conference on Intelligent Robots and Systems.

Program Committee, 1998 37<sup>th</sup> IEEE Conference on Decision and Control

Program and Video Proceedings Committee, 1999 IEEE International Conference on Robotics and Automation.

Program Committee, 1999 IEEE/RSJ International Conference on Intelligent Robots and Systems.

Program Committee, 1999 IEEE International Conference on Systems, Man, and Cybernetics.

International Program Committee, 1998 International Conference on Large Scale Systems.

Program Committee, 1998 Rensselaer's International Conference on Agile, Intelligent, and Computer Integrated Manufacturing.

Program Committee, The 2nd Workshop on Intelligent Manufacturing Systems, September 1999.

Program Committee, 2000 Third Asian Control Conference.

Session Chair, 1998 IEEE International Conference on Robotics and Automation.

Session Chair, 1998 Rensselaer's International Conference on Agile, Intelligent, and Computer Integrated Manufacturing.

Session Chair, 1998 37<sup>th</sup> IEEE Conference on Decision and Control.

Session Chair, 1999 IEEE International Conference on Robotics and Automation.

President, Chinese American Control Caucus.

### **KRISHNA PATTIPATI**

Editor-in Chief, *IEEE Transactions on Systems, Man, and Cybernetics – Part B: Cybernetics*.

Vice-President, Technical Activities, IEEE Systems, Man and Cybernetics Society, 1998-2000.

Administrative Committee Member, IEEE Systems, Man, and Cybernetics Society.

Organizer (two invited sessions), IEEE SMC Conference, San Diego, CA, October 1998.

Program Committee Member, 1999 IEEE SMC Conference, Tokyo, Japan.

**ERIC SOULSBY**

Campus Representative, Freshman Programs Division Chair, and Educational Research & Methods Division Secretary/Treasurer, American Society for Engineering Education, 1998/99.

Session Moderator, IEEE/ASEE ERM Frontiers in Education Conference, November 1998.

Faculty Fellows Reviewer, IEEE/ASEE ERM Frontiers in Education Conference, October 1998.

Reviewer for FIE'99, IEEE/ASEE ERM Frontiers in Education, April 1999.

**PETER WILLETT**

Associate Editor, *IEEE Transactions on Systems, Man, and Cybernetics*, 6/98-5/01.

Associate Editor, *IEEE Transactions on Aerospace and Electronic Systems*, 9/98-8/01.

Member, Technical Committee, IEEE Signal Processing Society's "Sensor Array and Multichannel."

**QUING ZHU**

Conference Session Chair, IEEE 25<sup>th</sup> Northeast Bioengineering Conference.

# Mechanical Engineering Department

## Annual Report Summary

### 1998-1999

During the 1998-1999 academic year, the Department of Mechanical Engineering had an undergraduate enrollment of 176 students and a graduate enrollment of 77 students (40 of whom are full time). There are 14 full time faculty and 3 half time faculty members (Dean Amir Faghri, Associate Dean Kazem Kazerounian and John Bennett, Director of the First Year Experience and Cooperative Education Programs). The department is home to three clerical staff members, two professional staff members, two emeritus professors, and three visiting or research scholars. During the 1998-1999 academic year, 36 bachelor's, 11 master's and 2 doctoral degrees were conferred.

#### **UNDERGRADUATE TEACHING AND CURRICULUM**

The faculty taught 46 undergraduate courses and 15 independent study courses during the 1998-1999 academic year. Eleven industrially-sponsored projects were included in the senior design capstone course. Mechanical Engineering faculty also help teach the freshmen engineering courses, and courses offered in the Management and Engineering for Manufacturing program. Modest modifications in the undergraduate curriculum were proposed and approved by the Mechanical Engineering faculty.

#### **GRADUATE PROGRAM**

Consistent with national trends, the graduate program saw a decrease in size relative to previous years. Our 77 graduate students were offered 15 graduate courses. Ninety-three applications were received for graduate study, 57 applicants were offered admission, and 12 applicants accepted. To reverse the trend of diminishing enrollment and enhance department-industry relations, at least some graduate courses will be taught at Pratt & Whitney facilities in East Hartford beginning in the fall of 1999.

#### **STUDENT RECRUITMENT**

In early July of 1998, the second *Mechanica 2000* program was held in order to increase the awareness of high school students to engineering and the University of Connecticut, and the practice of mechanical engineering in particular. Thirty-four high school sophomores and juniors attended the 5-day program. In June of 1999, the program was expanded to include all the departments and programs within the School of Engineering. Approximately 50 high school students attended. To attract top high school graduates, Mechanical Engineering Department scholarships were accepted by 19 students in the fall of 1998. For the fall of 1999, 21 students have accepted Mechanical Engineering Department scholarships. Seventeen scholarships were awarded to non-freshmen undergraduate students at the 1999 School of Engineering Awards Banquet.

#### **SCHOLARLY ACTIVITY AND RESEARCH**

The Mechanical Engineering faculty members were associated with 35 sponsored research (24) and senior design (11) projects. The department faculty's research expenditures were approximately \$935,000. The faculty, along with their students published 48 journal articles and 20 conference proceedings. One book was published, and two patents were awarded.

#### **LABORATORY RENOVATIONS**

To encourage and enable more engineering computation in undergraduate courses and in research, seven new SUN workstations were added to the Mechanical Engineering computer cluster. Improved networking components were installed, and new software for computer-aided design, solid mechanics analysis, and computational fluid dynamics was purchased, installed and used. Four National Instruments data acquisition and control systems were acquired for general laboratory use.

#### **STUDENT ORGANIZATION ACTIVITIES**

The student chapter of the American Society of Mechanical Engineers hosted the 1999 Student Paper presentations sponsored by the ASME Hartford section. Mr. John Romprey represented the Mechanical Engineering Department at the Regional Student Conference held at the University of Massachusetts, Dartmouth. The ASME student chapter organized an awards banquet sponsored by Pratt & Whitney, featuring a presentation by Mr. Paul Greenberg, Chief of Systems Design and Component Integration at P & W. Pi Tau Sigma, the Mechanical Engineering Honor Society, continued tutoring in calculus, chemistry and mechanical

engineering classes.

#### **FACULTY HONORS AND AWARDS**

Bob Jeffers commenced his three-year term as senior vice president of the Council on Member Affairs of ASME, with 15 vice presidents and four board members reporting to him. Lee Langston, Vice President of ASME and member of the Board of Directors of the International Gas Turbine Institute, was one of 6 international finalists for two positions on the ASME Board of Governors. John Bennett was named the winner of the UConn Alumni Association Award for Excellence in Teaching. Nejat Olgac received the Mechanical Engineering Department Outstanding Faculty Award and the Olin Faculty Award from the School of Engineering. Ranga Pitchumani was named one of two Outstanding Junior Faculty members within the School of Engineering.

# Mechanical Engineering Department

## Journal Publications

### 1998-1999

#### MATTHEW R. BEGLEY

- “The Mechanics of Size Dependent Indentation,” (with J.W. Hutchinson), *Journal of the Mechanics and Physics of Solids*, Vol. 46(10), pp. 2049-2068, 1998.
- “Time Dependent Crack Initiation and Growth in Ceramic Matrix Composites,” (with B.N. Cox and R.M. McMeeking), *ASME Journal of Engineering for Gas Turbines and Power*, Vol. 120(1), pp. 1-5, 1998.
- “Plasticity in Fretting of Coated Substrates,” (with J.W. Hutchinson), *Engineering Fracture Mechanics*, Vol. 62, pp. 145-164, 1999.
- “Spherical Impression of Thin Elastic-plastic Substrates,” (with A.G. Evans and J.W. Hutchinson), *International Journal of Solids and Structures*, Vol. 36, pp. 2773-2788, 1999.

#### THEODORE L. BERGMAN

- “A Model for Radiative Cooling of a Semitransparent Molten Glass Jet,” (with M. Song and K.S. Ball), *ASME Journal of Heat Transfer*, Vol. 120(4), pp. 931-938, 1998.
- “Natural Convection Cooling of Vertical Rectangular Channels in Air Considering Radiation and Wall Conduction,” (with D.A. Hall and G.C. Vliet), *ASME Journal of Electronic Packaging*, Vol. 121(2), pp. 75-84, 1999.
- “Thermal Modeling of Plasma Spray Deposition of Nanostructured Ceramics,” (with I. Ahmed), *Journal of Thermal Spray Technology*, Vol. 8(2), pp. 315-322, 1999.

#### BAKI CETEGEN

- “A Phenomenological Model for Near-Field Fire Plume Entrainment,” *Fire Safety Journal*, Vol. 31, pp. 299-312, 1998.
- “Integral Analysis of Planar and Axisymmetric Steady Laminar Buoyant Diffusion Flames,” *Combustion Theory and Modeling*, Vol. 3, pp. 13-32, 1999.
- “Simultaneous Particle Temperature, Velocity and Size Measurements in HVOF Thermal Sprays,” (with W. Yu), *Journal of Thermal Spray Technology*, Vol. 8(1), pp. 57-67, 1999.

#### AMIR FAGHRI

- “Melting and Resolidification of a Subcooled Mixed Powder Bed with Moving Gaussian Heat Source,” (with Y. Zhang), *ASME Journal of Heat Transfer*, Vol. 120(4), pp. 883-891, 1998.
- “Numerical Analysis of Heat Pipe Turbine Vane Cooling,” (with Z.J. Zuo and L.S. Langston), *ASME Journal of Engineering for Gas Turbines and Power*, Vol. 120(4), pp. 735-743, 1998.
- “Melting of a Subcooled Mixed Powder Bed with Constant Heat Flux Heating,” (with Y. Zhang), *International Journal of Heat and Mass Transfer*, Vol. 42(5), pp. 775-788, 1999.
- “Critical Heat Fluxes in Flat Miniature Heat Sinks With Micro-Capillary Grooves,” (with R.C. Hopkins and D.K. Khrustalev), *ASME Journal of Heat Transfer*, Vol. 121(1), pp. 217-220, 1999.
- “Flat Miniature Heat Pipes with Micro-Capillary Grooves,” (with R.C. Hopkins and D.K. Khrustalev), *ASME Journal of Heat Transfer*, Vol. 121(1), pp. 102-109, 1999.
- “Vaporization, Melting and Heat Conduction in the Laser Drilling Process,” (with Y. Zhang), *International Journal of Heat and Mass Transfer*, Vol., 42(10), pp. 1775-1790, 1999.
- “Entropy Generation in Heat Pipe Systems,” (with H. Khalkhali and Z. Zuo), *Applied Thermal Engineering*, Vol. 19, pp.



1027-1043, 1999.

#### **ERIC H. JORDAN**

“Elastic Constants of Hastelloy X at Elevated Temperatures,” (with H.A. Canistraro, S. Shixiang, F.A. Reed and L.H. Favrow), *Journal of Engineering Materials and Technology*, Vol. 120(3), pp. 242-247, 1998.

“A Higher Order Subdomain Method for Finding Local Stress Fields in Composites,” (with J. Cheng and K.P. Walker), *International Journal of Solids and Structures*, Vol. 35(36), pp. 5189-5203, 1998.

“Thermal/Residual Stress in a Thermal Barrier Coating System,” (with J. Cheng, B.W. Barber and M. Gell), *Acta Materialia*, Vol. 46(16), pp. 5839-5850, 1998.

“Measurement of Interfacial Fracture Toughness of Thermal Barrier Coatings,” (with L.L. Shaw, B.W. Barber and M. Gell), *Scripta Metallurgica*, Vol. 39(10), pp. 1427-1434, 1998.

“Assessment of Damage Accumulation in Thermal Barrier Coatings Using a Fluorescent Dye Infiltration Technique,” (with B.W. Barber, M. Gell and A. Geary), *Journal of Thermal Spray Technology*, Vol. 8(1), pp. 79-86, 1999.

“Mechanism of Spallation in Platinum Aluminide/Electron Beam Vapor Deposited Thermal Barrier Coatings,” (with M. Gell, K. Vaidyanathan, B.W. Barber and J. Cheng), *Metallurgical and Materials Transactions A*, Vol. 30A, pp. 427-436, 1999.

“Closed Form Solution for Rectangular Inclusions with Quadratic Eigenstrains,” (with J. Cheng and K.P. Walker), *International Journal of Engineering Sciences*, Vol. 37, pp. 1261-1276, 1999.

#### **LEE S. LANGSTON**

“Numerical Analysis of Heat Pipe Turbine Vane Cooling,” (with Z.J. Zuo and A. Faghri), *ASME Journal of Engineering for Gas Turbines and Power*, Vol. 120(4), pp. 735-743, 1998.

#### **NEJAT OLGAC**

“Robust Lyapunov Control with Perturbation Estimation,” (with J. Moura), *IEEE Transactions on Control Theory and Applications*, Vol. 145(3), pp. 307-315, 1998.

“Modal Analysis of Flexible Beams with Delayed Resonator Vibration Absorber, Theory and Experiments,” (with N. Jalili), *Journal of Sound and Vibration*, Vol. 218(2), pp. 307-331, 1998.

“A New Perspective and Analysis for Machine Tool Chatter,” (with M. Hosek), *International Journal of Machine Tools and Manufacture*, Vol. 38(7), pp. 783-798, 1998.

“Pole Placement for Linear Time-Varying Non-Lexicographically-Fixed Mimo Systems,” (with M. Valasek), *Automatica*, Vol. 35(1), pp. 101-108, 1999.

“Multiple Delayed Resonator Vibration Absorber for MDOF Mechanical Structures,” (with N. Jalili), *Journal of Sound and Vibration*, Vol. 223(4), pp. 567-585, 1999.

“Optimum Delayed Feedback Vibration Absorber for Flexible Beams,” (with N. Jalili), *Smart Structures*, NATO Science Series, Kluwer Academic Publishers, Vol. 65, pp. 237-246, 1999.

“New Concept of Active Multiple Frequency Vibration Suppression Technique,” (with M. Valasek), *Smart Structures*, NATO Science Series, Kluwer Academic Publishers, Vol. 65, pp. 373-382, 1999.

#### **RANGA PITCHUMANI**

“Neural Network-based Optimal Curing of Composite Materials,” (with N. Rai), *Journal of Materials Processing and Manufacturing Science*, Vol. 6(1), pp. 39-62, 1998.

“An Analysis of Mechanisms Governing Fusion Bonding of Thermoplastic Composites,” (with C.A. Butler, R.L. McCullough, J.W. Gillespie, Jr. and A.R. Wedgewood), *Journal of Thermoplastic Composite Materials*, Vol. 11(4), pp. 338-363, 1998.

“Property-based Optimal Design of Composite Materials and Their Internal Architectures,” (with D. Sadagopan), *Journal of Composite Materials*, Vol. 32(19), pp. 1714-1752, 1998.

“A Fractal Geometry Model for Evaluating Permeabilities of Porous Preforms Used in Liquid Composite Molding,” (with B. Ramakrishnan), *International Journal of Heat and Mass Transfer*, Vol. 42(12), pp. 2219-2232, 1999.

“Stochastic Analysis of Isothermal Cure in Resin Systems,” (with S.K. Padmanabhan), *Polymer Composites*, Vol. 20(1), pp. 72-85, 1999.

“Evaluation of Thermal Conductivities of Disordered Composite Media Using a Fractal Model,” *ASME Journal of Heat Transfer*, Vol. 121(1), pp. 163-166, 1999.

“Stochastic Modeling of Nonisothermal Flow During Resin Transfer Molding Processes,” (with S.K. Padmanabhan), *International Journal of Heat and Mass Transfer*, Vol. 42(16), pp. 3057-3070, 1999.

#### **MARIOS SOTERIOU**

“Computational Aeroacoustics Simulations Using the Expansion About Incompressible Flow Approach,” (with S.A. Slimon and D.W. Davis), *AIAA Journal*, Vol. 37(4), pp. 409-416, 1999.

“Particle Dispersion in Variable Density and Viscosity Shear Flows,” (with X. Yang), *Physics of Fluids*, Vol. 11(6), pp. 1373-1386, 1999.

#### **BI ZHANG**

“Workholding Stability in Shoe Centerless Grinding,” (with Z.X. Gan, Y.H. Yang and T.D. Howes), *ASME Journal of Manufacturing Science and Engineering*, Vol. 121(1), pp. 41-48, 1998.

“Effect of Machine Stiffness on Strength of Ground Silicon Nitride,” (with F.L. Yang, J.X. Wang and Z.Q. Zhu and R. Monahan), *Transactions of NAMRI/SME*, Vol. 26, pp. 273-278, 1998.

“The Effect of Machine Stiffness on Grinding of Silicon Nitride,” (with J.X. Wang, F.L. Yang and Z.Q. Zhu), *International Journal of Machine Tool and Manufacture*, Vol. 39(8), pp. 1263-1283, 1999.

“Chatter Suppression via an Oscillating Cutter,” (with F.L. Yang and J. Yu), *ASME Journal of Manufacturing Science and Engineering*, Vol. 121(1), pp. 54-60, 1999.

**Mechanical Engineering Department**  
**Books, Book Chapters, Book Sections & Edited Volumes**  
**1998-1999**

**BOOKS**

**HERBERT KOENIG**

*Modern Computational Methods*, Taylor and Francis Publishing Company, 300 pages, 1998.

**BOOK/VOLUME CHAPTERS & SECTIONS**

**THEODORE L. BERGMAN**

“Heat Transfer in Materials Processing.” (with R. Viskanta), *Handbook of Heat Transfer*, Third Edition, (Eds: W.M. Rohsenow, *et al.*), McGraw-Hill Book Company, New York Chapter 18, 74 pages, 1998.

# Mechanical Engineering Department Conference Publications 1998-1999

## JOHN C. BENNETT

“The Virtual Office,” *Proceedings of the 11<sup>th</sup> Canadian Conference on Engineering Education*, pp. 168-173, 1998.

“Heat Transfer of Turbine Disks in Liquid Quench, Part II: Results for a Solid Disk,” (with R.W. Bass and J. Morral), *Proceedings of the First International Conference on Automotive Heat Treating*, pp. 339-348, 1998.

“Heat Transfer of Turbine Disks in a Liquid Quench, Part III: Results for A Disk Containing A Center Hole,” (with R.W. Bass, J. Morral), *Proceedings of the 18<sup>th</sup> ASM Heat Treating Society Conference*, pp. 552-557, 1998.

## THEODORE L. BERGMAN

“A Model for Polymer Powder Sintering Induced by Laser Irradiation,” (with M. Kandis, and C.W. Buckley), *Proceedings of the 11<sup>th</sup> International Heat Transfer Conference*, Vol. 5, pp. 205-210, 1998.

## ZBIGNIEW BZYMEK

“A Theoretical Model for Optimization of SALD parameters,” (with L.L. Shaw, and W. Marks), *Proceedings of the Ninth Annual SFF Symposium*, pp. 339-406, 1998.

“Stereometric Design for Desk-Top SFF Fabrication,” (with S. Theis, T. Manzur, and C. Roychoudhuri), *Proceedings of the Ninth Annual SFF Symposium*, pp. 285-291, 1998.

“Design of a Computer-Aided Modeling System: A Case Study,” *Proceedings of the ASME/IMECE, Vol. DE-99/MED-7*, pp. 79-91, 1998.

## BAKI CETEGEN

“Mixing Augmentation During Interaction of Weak Shock Waves with Non-homogeneous Turbulent Jets,” (with J.C. Hermanson), *Proceedings of the 27<sup>th</sup> International Symposium on Combustion*, Vol. 2, pp. 2047-2053, 1998.

“Numerical Study of the Unsteady Dynamics of Buoyant Plumes,” (with J. Cai, Y. Dong, and M. Soteriou), *Proceedings of the 27<sup>th</sup> International Symposium on Combustion*, p. 243, 1998.

“Numerical Study of the Near-Field Unsteady Dynamics of Planar Plumes,” (with Y. Dong, and M. Soteriou), *Proceedings of the Annual Conference on Fire Research*, pp. 81-82, 1998.

“Numerical and Experimental Study of the Instabilities of Planar Buoyant Diffusion Flames,” (with M. Soteriou), *Proceedings of the First Joint Meeting of the U.S. Sections of the Combustion Institute*, pp. 496-499, 1999.

## AMIR FAGHRI

“Coupled Liquid and Vapor Flow in Miniature Passages with Micro Grooves,” (with D.K. Khurstalev), *Proceedings of the ASME/IMECE, Vol. HTD/PID-361-3*, pp. 203-208, 1998.

“Condensation of a Forced Convection Two-phase Flow in a Miniature Tube,” (with E.K. Begg, and D.K. Khurstalev), *Proceedings of the 1998 ASME/IMECE, Vol. HTD/PID-361-3*, 1998.

## ERIC JORDAN

“Strategies for Thermal-Barrier Coating Life Prediction,” (with M. Gell), *Proceedings of the ASM International Materials Solutions Conference and Exposition*, p. 96, 1998.

“Thermal Barrier Coating Stress Analysis – A Tool for Understanding Failure,” (with J. Cheng, B.W. Barber, and K. Vaidyanathan), *Proceedings of the ASM International Materials Solutions Conference and Exposition*, p. 120, 1998.

#### **KEVIN D. MURPHY**

“The Effect of Spatially Non-uniform Thermal Fields on the Vibration Frequencies of EDM Wires,” (with Z. Lin), *Proceedings of the ASME/IMECE*, DE-Vol. 98, pp. 227-234, 1998.

#### **NEJAT OLGAC**

“Stability of Multiple Delayed Resonator Vibration Absorbers,” (with N. Jalili), *Proceedings of ASME/IMECE*, Vol. DE-98, pp. 211-217, 1998.

“Experimental Comparison of Delayed Resonator and PD Controlled Vibration Absorbers Using Electromagnetic Actuators,” (with H. Elmali, and M. Renzulli), *Proceedings of ASME/IMECE*, Vol. DSC-65, pp. 201-207, 1998.

“Optimum Delayed Feedback Vibration Absorber for MDOF Mechanical Structures,” (with N. Jalili), *Proceedings of IEEE Conference on Decision Control*, pp. 4734-4739, 1998.

“A Quasi On-Line Tuning Structure for Optimum Delayed Feedback Vibration Absorber,” (with N. Jalili), *Proceedings of ACC '99*, pp. 1550-1554, 1999.

#### **RANGA PITCHUMANI**

“An Intelligent Model-Predictive Process Control Framework for RTM,” (with P.D. Lafferty), *Proceedings of the 13<sup>th</sup> Conference of the American Society for Composites*, pp. 213-225, 1998.

“A Fractal Model for Intimate Contact Development During thermoplastic Fusion Bonding,” (with F. Yang), *Proceedings of the 13<sup>th</sup> Technical Conference of the American Society for Composites*, pp. 1134-1146, 1998.

“Processing Envelopes for Supplemental Internal Resistive Heating During Thermosetting Composites Cure,” (with L. Zhu), *Proceedings of the Eighth Japan-US Conference on Composites*, pp. 122-132, 1998.

“Modeling Interlaminar Contact Evolution During Thermoplastic Composites Processing Using a Fractal Two Surface Description,” (with F. Yang), *Proceedings of ANTEC '99 Conference, Society of Plastics Engineers*, pp. 1316-1320, 1999.

#### **MARIOS SOTERIOU**

“Numerical Study of the Unsteady Dynamics of Buoyant Plumes,” (with J. Cai, Y. Dong, and B. Cetegen), *Proceedings of the 27<sup>th</sup> International Symposium on Combustion*, p. 243, 1998.

“Vortex Simulation of Particle Dispersion in a Variable Density and Viscosity Shear Layer,” (with X. Yang), *Proceedings of the Third International Workshop on Vortex Flows and Related Numerical Methods*, pp. 113-115, 1998.

“Numerical Study of the Near-Field Unsteady Dynamics of Planar Plumes,” (with Y. Dong, and B. Cetegen), *Proceedings of the Annual Conference on Fire Research*, pp. 81-82, 1998.

“Numerical and Experimental Study of the Instabilities of Planar Buoyant Diffusion Flames,” (with B. Cetegen), *Proceedings of the First Joint Meeting of the U.S. Sections of the Combustion Institute*, pp. 496-499, 1999.

“Computational Prediction of Acoustic Fields Due to Low Mach Number Shear Flows,” (with S.A. Slimon), *Proceedings of the First Joint Meeting of the U.S. Sections of the Combustion Institute*, pp. 618-621, 1999.

#### **BI ZHANG**

“The Effect of Machine Stiffness on Grinding of Silicon Nitride,” (with F.L. Yang, J.X. Wang, Z.Q. Zhu, and R. Monahan), *Proceedings of the ASME/IMECE*, Vol. 64, pp. 431-438, 1998.

“Dynamic Modeling of Linear Piezomotors,” (with X.L. Zheng), *Proceedings of the ASME Dynamic Systems and Control Division*, pp. 111-117, 1998.

# Mechanical Engineering Department

## Active Research Grants and Contracts

### 1998-1999

#### **MATTHEW BEGLEY**

“Experimental and Theoretical Investigations of Slip During Fretting of Vibrating Structures,” UCRF, June 1, 1998 – May 31, 1999, \$21,154.

“Acquisition of a Nano-indenter for Moderately Elevated Temperatures,” (with co-PIs: E. Jordan and M. Shaw), National Science Foundation, May 1998 – May 1999, \$140,000.

“Design of Aluminum ‘Ladder Type’ Cable Tray System,” (with co-PI: B. Zhang), Wiremold Company, September 1, 1998 – May 31, 1999, \$5,000.

#### **JOHN C. BENNETT**

“On the Aerodynamics of Golf Balls,” Spalding Sports Worldwide, January 1993 – September 1998, \$181,663.

“Experimental Investigation of the Mechanism Associated with the Heat Transfer of Turbine Disks in Liquid Quench,” (with J. Morral), Subcontract to Techxperts, Incorporated on NASA Contract, December 1996 – November 1998, \$270,678.

“High Speed Combustion Research Facility,” (with E.K. Dabora, B. Cetegen, and E. Jordan), Connecticut Innovations Inc., July 1995 – July 1999, \$129,900.

“Thermal Diffusivity of Solids,” Techxperts, September 1, 1998 – May 31, 1999, \$4,000.

#### **THEODORE L. BERGMAN**

“Void Formation and Part Growth During Non-Isothermal Powder Sintering,” National Science Foundation, June 1, 1997 – May 30, 2000, \$240,029.

“Advanced Coating Technology Development for Enhanced Durability and Reduced Cost in Naval Applications,” (with E. Jordan, M. Gell, B. Cetegen, P. Klemens, N. Padture, and D.M. Pease), Office of Naval Research, June 1997 – September 2001, \$2,992,505.

“ARINC 600 Electronics Unit,” (with M. Soteriou), Hamilton Standard, September 1, 1998 – May 31, 1999, \$5,000.

#### **ZBIGNIEW BZYMEK**

“Design and Development of a New Turret for Metal Processing Machines,” (with R.G. Jeffers), Goss & DeLeeuw Machine Company, September 1, 1998 – May 31, 1999, \$4,000.

#### **BAKI CETEGEN**

“Advanced Coating Technology Development for Enhanced Durability and Reduced Cost in Naval Applications,” (with E. Jordan, M. Gell, T. Bergman, P. Klemens, N. Padture, and D.M. Pease), Office of Naval Research, June 1997 – September 2001, \$2,992,505.

“High Speed Combustion Research Facility,” (with E.K. Dabora, J.C. Bennett, and E. Jordan), Connecticut Innovations Inc., July 1995 – July 1999, \$129,900.

### **AMIR FAGHRI**

“Evaporation Boiling Condensation on/in Capillary Structures of High Heat Flux Two Phase Devices,” NASA, April 1996 – April 1999, \$360,000.

“Micro/Miniature Heat Pipe Science and Technology for Electronic Cooling,” U.S. Air Force, September 1997 – September 2000, \$250,000.

“Miniature Passages with Micro Grooves During Vaporization Forced Convection,” National Science Foundation, September 1997 – September 2000, \$120,214.

### **ROBERT G. JEFFERS**

“Design and Development of a New Turret for Metal Processing Machines,” (with Z. Bzymek), Goss & DeLeeuw Machine Company, September 1, 1998 – May 31, 1999, \$4,000, FRS #633009.

### **ERIC JORDAN**

“Bond Strength and Stress Measurement in Thermal Barrier Coatings,” (with M. Gell), South Carolina Energy Research Center (DOE) and industrial partners (Howmet Inc., Allied Signal, ABB, Westinghouse Inc., Solar Turbine), September 1997 – August 1999, \$620,000.

“Advanced Coating Technology Development for Enhanced Durability and Reduced Cost in Naval Applications,” (with T. Bergman, M. Gell, B. Cetegen, P. Klemens, N. Padture, and D.M. Pease), Office of Naval Research, June 1997 – September 2001, \$2,992,505.

“Chemical and Mechanical Instability at Thermal Barrier Coating Interfaces,” (with M. Gell), Subcontract from University of Pittsburgh, South Carolina Energy Research Center, July 1997 – July 2000, \$261,000.

“Acquisition of a Nano-indenter for Moderately Elevated Temperatures,” (with M. Begley and M. Shaw), National Science Foundation, May 1998 – May 1999, \$140,000.

“High Speed Combustion Research Facility,” (with J.C. Bennett, B. Cetegen, and E.K. Dabora), Connecticut Innovations Inc., July 1995 – July 1999, \$129,900.

“Development of Laser Fluorescence as Non-destructive Investigation Technique for Thermal Barrier Coatings,” (with M. Gell), Clemson University, February 1, 1999 – January 31, 2002, \$620,000.

“Innovation of Method for Coronary Bypass Surgery,” (with K. Murphy), Vascular Therapies, September 1, 1998 – May 31, 1999, \$5,000.

### **KAZEM KAZEROUNIAN**

“Design for Manufacturing and Automation of Pocket Thermometers,” Cooper Instrument, January 1996 – December 1998, \$158,000.

“Automated Feeding Station for Hytrel Sleeved Connectors,” (with M.E. Wood), Singapore Productivity Board, September 1, 1998 – May 31, 1999, \$5,000.

### **HERBERT KOENIG**

“Connecting Block & Termination Tool Life Test Fixture,” (with M.E. Wood), Siemon Company, September 1, 1998 – May 31, 1999, \$5,000.

“Modeling Thermal Transients of 200/300 Bridge and High NA Bridges”, Silicon Valley Group, Inc., September 1, 1998 – May 31, 1999, \$5,000.

### **LEE S. LANGSTON**

“Flexible Curtain Probe Positioner,” Pratt & Whitney, September 1, 1998 – May 31, 1999, \$5,000.

### **KEVIN MURPHY**

“Nonlinear Vibrations, Stability and Control of Axially Moving Material in Manufacturing Processes,” NSF, June 1, 1997 – May 31, 2000, \$210,000.

“The Effect of Thermal Gradients on the Random Response of Plates,” AFOSR, June 1, 1998 – December 31, 1998, \$15,000.

“Determining Optimal Vibration Mode Shapes for Structural Systems,” UCRF, July 1, 1998 – June 30, 1999, \$21,344.

“Innovation of Method for Coronary Bypass Surgery,” (with E. Jordan), Vascular Therapies, September 1, 1998 – May 31, 1999, \$5,000.

### **NEJAT OLGAC**

“Variable Frequency Vibration Elimination Consortium,” Pratt & Whitney, and Electric Boat, 1994-99, \$75,000.

“Tunable Torsional Vibration Absorber: The Centrifugal Delayed Resonator,” UCRF, June 1996 – December 1998, \$6,000.

“Methods for Providing Constant Tension,” Gerber Systems Technology, September 1, 1998 – May 31, 1999, \$5,000.

“Reciprocating Ram Extruder for Thermoset Compound Pelletizing,” (with R. Pitchumani), Rogers, September 1, 1998 – May 31, 1999, \$5,000.

### **RANGA PITCHUMANI**

“Intelligent Simulation-Assisted Liquid Composites Fabrication,” Office of Naval Research, June 1, 1997 – May 31, 2000, \$190,561.

“Total Quality Optimal Fabrication of Composite Materials via Liquid Molding,” Office of Naval Research, June 1, 1996 – May 31, 1999, \$359,990.

“Processing Fundamentals and Process Modification for Rapid Liquid Molding of High-Performance Composites,” National Science Foundation, October 1, 1995 – September 30, 1999, \$224,460.

“Development of a Metered Injection and Control System for Resin Transfer Molding,” October 1, 1997 – September 30, 1999, National Science Foundation, \$10,000.

“Rheometers for Materials Research,” (M. Shaw, R. Weiss, and L. Shaw), Army Research Office – DURIP Program, \$231,000, 1999.

“Reciprocating Ram Extruder for Thermoset Compound Pelletizing,” (with N. Olgac), Rogers, September 1, 1998 – May 31, 1999, \$5,000.

### **MARIOS SOTERIOU**

“ARINC 600 Electronics Unit,” (with T. Bergman), Hamilton Standard, September 1, 1998 – May 31, 1999, \$5,000.

### **MARTY WOOD**

“Automated Feeding Station for Hytrel Sleeved Connectors,” (with K. Kazerounian), Singapore Productivity Board, September 1, 1998 – May 31, 1999, \$5,000.

“Connecting Block & Termination Tool Life Test Fixture,” (with M.E. Wood), Siemon Company, September 1, 1998 – May 31, 1999, \$5,000.

### **BI ZHANG**

“A Lithography Stage of High Performance,” (with F. Jain and H. Elmali), National Science Foundation, Dover Instrument,



March 1996 – February 1999, \$229,746.

“Microgrinding of Nanostructured Materials,” Connecticut Yankee Ingenuity Initiatives, \$168,278, January 1, 1999 – December 31, 2000.

“Design of Aluminum ‘Ladder Type’ Cable Tray System,” (with M. Begley), Wiremold Company, September 1, 1998 – May 31, 1999, \$5,000.

# **Mechanical Engineering Department Awards, Honors, Patents 1998-1999**

## **JOHN C. BENNETT**

Recipient of the University of Connecticut Alumni Association Award for Excellence in Teaching for 1999.

## **THEODORE L. BERGMAN**

Certificate of Appreciation presented by the Heat Transfer Division, American Society of Mechanical Engineers, 1998.

## **AMIR FAGHRI**

Member, Connecticut Academy of Science and Engineering, 1998.

American Society of Mechanical Engineers Heat Transfer Memorial Award (ART), 1998.

American Institute of Aeronautics & Astronautics Thermophysics Award, 1998.

## **NEJAT OLGAC**

Mechanical Engineering Outstanding Faculty Award, 1999.

Olin Faculty Award, 1999.

## **RANGA PITCHUMANI**

Outstanding Junior Faculty Award, School of Engineering, University of Connecticut, 1998.

# Mechanical Engineering Department

## Major Professional Activities

### 1998-1999

#### **THEODORE L. BERGMAN**

Editorial Advisory Committee Member, *ASME Heat Transfer Recent Contents*.

Member, U.S. Scientific Committee, 11<sup>th</sup> International Heat Transfer Conference, Kyongju Korea, 1998.

#### **BAKI CETEGEN**

Member, Board of Directors, Combustion Institute Eastern States Section Treasurer, Combustion Institute Eastern States Section.

#### **AMIR FAGHRI**

North American Editor, *Journal of Enhanced Heat Transfer*.

Executive Editor, *Heat Transfer Engineering Journal (Thermal Storage & Heat Pipes)*.

Editorial Board, *Journal of Heat Transfer Research*.

Honorary Editorial Advisory Board, *International Journal of Heat and Mass Transfer*.

Honorary Editorial Advisory Board, *Communications in Heat and Mass Transfer*.

Editorial Advisory Board, *International Journal of Numerical Methods for Heat and Fluid Flow*.

Editorial Board, *Journal of Process Mechanical Engineering*.

#### **ROBERT G. JEFFERS**

Senior Vice President, American Society of Mechanical Engineers International.

Member, Council Coordinating Committee, American Society of Mechanical Engineers International.

Co-chair, Task Group for Sections & Regions Committee on Merger of American Society of Mechanical Engineers International and Society of Manufacturing Engineers.

#### **KAZEM KAZEROUNIAN**

Associate Technical Editor, *ASME Journal of Mechanical Design*.

Member, ASME Applied Mechanics Review Advisory Board.

#### **LEE S. LANGSTON**

Vice President, American Society of Mechanical Engineers.

Member, Board of Directors, International Gas Turbine Institute.

#### **NEJAT OLGAC**

Associate Editor, *ASME Journal of Dynamic Systems, Measurement and Control*.

Program chair, ASME/Dynamic Systems and Control Division for the IMECE '99.

Symposium Organizer, "Active Vibration Control and Actuation Using Smart Materials," ASME DETC, 17<sup>th</sup> Conference on Vibration and Noise, 1999, Las Vegas.

**RANGA PITCHUMANI**

Guest Editor, *Journal of Thermoplastic Composite Materials*, Special Issues on "Affordable Composites Processing," Vol. 11, Nos. 4 and 6.

Member, Editorial Board, *Journal of Thermoplastic Composite Materials*.

# **Metallurgy & Materials Engineering Department Annual Report Summary 1998-1999**

## **DEPARTMENT DEVELOPMENT**

The Department of Metallurgy & Materials Engineering (MMAT) began the academic year with a new Department Head and a newly printed strategic plan that had been developed over the past several years. The plan calls for a department-wide commitment to excellence in education, research and service.

A first priority of the plan was to establish a high-quality undergraduate degree program culminating in a B.S.E. in metallurgy and materials engineering. The program was approved on April 25<sup>th</sup> and a substantial effort has begun to recruit undergraduate students through open houses, newspaper publicity, mailings to students and professional societies, and an extensive offering on the web. When it debuts in the fall 1999 term, this program will be the only undergraduate program in metallurgy and materials engineering offered at a public university in New England. Similar programs can be found in the region only at two private schools, namely M.I.T. and W.P.I.

Another high priority item was to restructure the MMAT graduate program. A new plan was developed and approved which will be implemented in the coming year. Other priority items are, for example, to develop a faculty succession plan, to define a department focus, and to enhance department facilities.

## **PERSONNEL CHANGES**

Professor Trevor Howes retired in January and Professor Owen Devereux retired in June. In addition, both Hemant Gupta and Jon Rifkin, who held temporary faculty positions for many years, left the department for other positions. Added to the faculty as an Associate Professor was Dr. Mark Aindow, who will take charge of the electron microscopy facilities in the Institute of Materials Science (IMS) and teach our materials characterization courses.

## **TEACHING**

During the year, two Ph.D.s and 12 M.S. degrees were awarded at the graduate level. With regard to recruiting graduate students for next year, the percentage of applicants admitted was 11 percent and the percentage of offers accepted was 80 percent. At the undergraduate level, approximately 20 students graduated with materials engineering as a double major.

## **RESEARCH**

Funding was at a level similar to last year, except for the loss of funding associated with the closing of the Grinding Center. More than half of the faculty continue to have at least one active major grant from an external agency, for a total of 25 grants overall. In addition, the faculty continue to be active scholars, with 35 published journal articles, 12 conference proceedings, and 55 reviews of papers and proposals. In addition, faculty made 24 contributed presentations at conferences and gave 14 invited lectures.

## **SERVICE**

On average, MMAT faculty members serve on three committees within the University and chair at least one of these. Outside the University, department members serve on 36 professional society committees and are active in organizing national and international meetings.

## **AWARDS**

Associate Professor Nitin Padture won the "1999 Robert L. Coble Award for Young Scholars" from the American Ceramic Society. This prestigious award is given only once a year to the individual under the age of 36 who is thought to be the most outstanding scholar in ceramics. In addition, he won the "1998 Outstanding Junior Faculty Award" from the School of Engineering.

# Metallurgy & Materials Engineering Department

## Journal Publications

### 1998-1999

#### PHILIP C. CLAPP

“Nanoparticle Sintering Simulations,” (with P. Zeng, S. Zajac, & J. A. Rifkin), *Materials Science & Engineering*, Vol. A252, pp. 301-306, 1998.

#### JAMES GALLIGAN

“In Situ Ultraviolet Illumination of Porous Silicon during Scanning Tunneling Microscopy,” (with D. Schwall and F.A. Otter), *Journal of Vac. Science & Technology*, Vol. B16, p. 2127, 1998.

“Chaotic Effects in Electron Prog. Processes in Metals,” (with Krivoshey, A.A. Krokhin and G.A. Luna), *Phil. Magazine*, Vol. A77, p. 507, 1998.

“The Tilt Effect in Electron Drag of Dislocation in Metals,” (with A.A. Krokhin and L.N. Gumen), *Phil. Magazine*, Vol. A77, p. 497, 1998.

“The Influence of Quenching on the Ductile to Brittle Transition in Mild Steel,” (with T. McKrell and H. Gupta), *Scripta Materialia*, Vol. 39, p. 213, 1998.

#### MAURICE GELL

“Assessment of Damage Accumulation in Thermal Barrier Coatings Using a Fluorescent Dye Infiltration Technique,” (with Barber, B., Jordan, E.H. and Geary, A), *Journal of Thermal Spray*, Vol. 8(1), pp. 79-86, March 1999.

“Thermal/Residual Stress in a Thermal Barrier Coating System,” (with Cheng, J., Jordan, E.H. and Barber, B), *Acta Materialia*, Vol. 46(16), pp. 5839-5850, October 1998.

“Mechanism of Spallation in Platinum Aluminide/Electron Beam Vapor Deposited Thermal Barrier Coatings,” (with Vaidyanathan, K., Barber, B., Cheng, J. and Jordan, E.H.), *Metallurgical and Materials Transactions A*, Vol. 30A, pp. 427-436, February 1999.

“Measurement of Interfacial Fracture Toughness of Thermal Barrier Coatings,” (with Shaw, L.L., Barber, B., and Jordan, E.H.), *Scripta Metallurgy*, Vol. 39(10), pp. 1427-1434, 1998.

#### THEODOULOS Z. KATTAMIS

“Dendrite Coarsening During Directional Solidification of Al-Cu-Mn Alloy,” (with M. Chen), *Materials Science and Engineering*, Vol. 247, pp. 239-247, 1998.

“Processing Copper and Silver Matrix Composites by Electroless Plating and Hot Pressing,” (with S-Y. Chang, J-H. Lin and S-L. Lin), *Metallurgical and Materials Transactions A*, Vol. 30A, pp. 1115-1136, 1999.

#### HARRIS MARCUS

“Multiple Material Solid Free-Form Fabrication by Selective Area Laser Deposition,” (with Kevin J. Jakubenas, J.M. Sanchez), *Materials and Design*, Vol. 19, p. 11, 1998.

“In-Situ Thermocouples in Macro-Components Fabricated Using SALD and SALDVI Techniques: I,” (with K.J. Jakubenas, J.E. Crocker, Shay Harrison, Leon L. Shaw, L. Sun), *Journal Of Materials Processing*, Vol. 13(6), pp. 859-882, 1998.

“Using SALDVI and SALD with Multi-Material Structures,” (with J.E. Crocker, S. Harrison, L.-C. Sun), *Journal of Metals*, Vol. 50(12), pp. 21-23, 1998.

“In-Situ Thermocouples in Macro-Components Fabricated using SALD and SALDVI Techniques: I. Thermochemical Modeling,” (with L.-C. Sun, K.J. Jakubenas, J.E. Crocker, S. Harrison), *Materials and Manufacturing Processes*, Vol. 13 (6), pp. 859-882, 1998.

“In-Situ Thermocouples in Macro-Components Fabricated using SALD and SALDVI Techniques: II. Evaluation of Processing Parameters,” (with L.-C. Sun, K.J. Jakubenas, J.E. Crocker, S. Harrison), *Materials and Manufacturing Processes*, Vol. 13(6), pp. 883-907, 1998.

“In-Situ Thermocouples in Macro-Components Fabricated using SALD and SALDVI Techniques: III Fabrication and Properties of the SiC/C Thermocouple Device,” (with L.-C. Sun, K.J. Jakubenas, J. E. Crocker, S. Harrison), *Materials and Manufacturing Processes*, Vol. 13(6), pp. 909-919, 1998.

“Gas Phase Solid Freeform Fabrication and Joining of Ceramics,” (with L.-C. Sun, K.J. Jakubenas, J.E. Crocker, S. Harrison), *Naval Research Reviews*, Vol. L (3), pp. 51-57, 1998.

“Gas (SALD) and Gas/Powder (SALDVI) Solid Freeform Fabrication (SFF),” (with J.E. Crocker, S. Harrison, L. Sun, and L.L. Shaw), *Journal of Metals*, 1998.

#### **ARTHUR J. MCEVILY**

“A Coaxing Effect in the Small Fatigue Crack Growth Regime,” (with S. Ishihara), *Scripta Materialia*, Vol. 40, pp. 617-622, 1999.

“On Plane-Stress-Plane Strain Interactions in Fatigue Crack Growth,” (with H. Bao), *International Journal of Fatigue*, Vol. 20, pp. 441-448, 1998.

“Crack Closure and the Fatigue-Crack Propagation Threshold as a Function of Load Ratio,” (with R. O. Ritchie), *Fatigue & Fracture of Engineering Materials and Structures*, Vol. 21, pp. 847-855, 1998.

#### **JOHN E. MORRAL**

“Variation of the Effective Diffusivity in Two-Phase Regions,” (with H. Chen), *Acta Materialia*, Vol. 47, pp. 1175-1180, 1999.

#### **NITIN P. PADTURE**

“Hertzian-Crack Suppression in Ceramics with Elastic-Modulus-Graded Surfaces,” (with J. Jitcharoen, A.E. Giannakopoulos and S. Suresh), *Journal of the American Ceramic Society*, Vol. 81, pp. 2301-08, 1998.

“Coarsening in Liquid-Phase-Sintered  $\alpha$ -SiC,” (with H. Ye and V.V. Pujar), *Acta Materialia*, Vol. 47, pp. 481-87, 1999.

“Surface-Layered Silicon Carbide for Enhanced Contact-Damage Resistance,” (with D.C. Pender), *Journal of Materials Science Letters*, Vol. 17, pp. 999-1002, 1998.

#### **LEON SHAW**

“Synthesis of Nanostructured Chromium Nitride through Mechanical Activation Process,” (with R.M. Ren, Yang), *Nanostructured Materials*, Vol. 11(1), pp. 25-35, 1999.

“On Nitrogen Sorption During High Energy Milling of Silicon Powders in Ammonia and Nitrogen,” (with Z.G. Yang, R.-M. Ren, X.-Q. Xie), *Metallurgical and Materials Transactions*, Vol. 30A(4), pp. 1109-1117, 1999.

“Processing and Creep Resistance of Nickel/Yttria Composites,” (with L.-C. Sun), *Journal of Material Science*, Vol. 33, pp. 4893-4903, 1999.

“Using SALDVI and SALD with Multi-Material Structures,” (with J.E. Crocker, S. Harrison, L.-C. Sun, H. Marcus), *Journal of Metals*, Vol. 50(12), pp. 21-23, 1998.

“Measurements of the Interfacial Fracture Energy of Thermal Barrier Coatings,” (with B. Barber, E.H. Jordan, M. Gell), *Scripta Materials*, Vol. 39(10), pp. 1427-1434, 1998.

“NMR Studies on Mixing of Insoluble Constituents During High Energy Milling,” (with X.-Q. Xie, Z.-G. Yang, R. -M. Ren), *Scripta Materials*, Vol. 39(9), pp. 1169-1175, 1998.

“Solid State  $^{29}\text{Si}$  Magic Angle Spinning NMR: Investigation of Bond Formation and Crystallinity of Silicon and Graphite Powder Mixtures During High Energy Milling,” (with X.-Q. Xie, Z.-G. Yang, R.-M. Ren), *Material Science Engineering*, Vol. A255, pp. 39-48, 1998.

“*In-Situ* Thermocouples in Macro-Components Fabricated using SALD and SALDVI Techniques: I. Thermochemical Modeling,” (with L.-C. Sun, K. J. Jakubenas, J.E. Crocker, S. Harrison, H. Marcus), *Materials and Manufacturing Processes*, Vol. 13 (6), pp. 859-882, 1998.

“*In-Situ* Thermocouples in Macro-Components Fabricated Using SALD and SALDVI Techniques: II. Evaluation of Processing Parameters,” (with L.-C. Sun, K.J. Jakubenas, J.E. Crocker, S. Harrison, H. Marcus), *Materials and Manufacturing Processes*, Vol. 13(6), pp. 883-907, 1998.

“*In-Situ* Thermocouples in Macro-Components Fabricated using SALD and SALDVI Techniques: III. Fabrication and Properties of the SiC/C Thermocouple Device,” (with L.-C. Sun, K.J. Jakubenas, J.E. Crocker, S. Harrison, H. Marcus), *Materials and Manufacturing Processes*, Vol. 13(6), pp. 909-919, 1998.

“Fracture Strength and Damage Progression of the Fiber/Matrix Interfaces in Titanium-Based MMCs with Different Interfacial Layers,” (with P. Karpur, T. Matikas), *Comp. Part B*, Vol. 29B, pp. 331-339, 1998.

“Gas Phase Solid Freeform Fabrication and Joining of Ceramics,” (with L.-C. Sun, K.J. Jakubenas, J.E. Crocker, S. Harrison, H. Marcus), *Naval Research Reviews*, Vol. L (3), pp. 51-57, 1998.

“A Novel Process for Synthesizing Nanostructured Carbides: Mechanically Activated Synthesis,” (with R. Ren and Z. Yang), *Ceramic Engineering Science Proc.*, Vol. 19 (4), pp. 461-468, 1998.



# Metallurgy & Materials Engineering Department

## Conference Publications

### 1998-1999

#### ARTHUR J. MCEVILY

“An Analysis of the Gerber Parabolic Relationship Based Upon Small Fatigue Crack Growth Behavior,” (with S. Ishihara), *Proceedings of the International Conference on Low Cycle Fatigue and Elasto-Plastic Behavior of Materials*, (Rie and Portella, Eds.), Elsevier, pp. 505-510, 1998.

“On the Quantitative Analysis of Overload Effects in Fatigue Crack Growth,” (with H. Bao), *Engineering Against Fatigue*, (J.H. Benyon, M.W. Brown, T.C. Lindley, R.A. Smith and B. Tomkins, Eds.), A.A. Balkema, Rotterdam, pp. 219-225, 1999.

#### JOHN E. MORRAL

“Microstructures Resulting from MCrAlY Coating/Superalloy Interdiffusion,” (with Meisenkothen, F.), *Elevated Temperature Coatings: Science and Technology III*, (J. M. Hampikian and N. Dhaotre, Eds.), TMS, Warrendale, PA, pp. 143-148, 1999.

“Heat Transfer of Turbine Disks in a Liquid Quench: Part II – Experimental Results for a Solid Disk,” (with R.W. Bass, D. Leonard, M. Allen, J.D. Bennett Jr., M. Cross, K. Brown), *The 1<sup>st</sup> International Automotive Heat Treating Conference Proceedings*, ASM International, p. 339, 1999.

“Heat Transfer of Turbine Disks in a Liquid Quench: Part II – Experimental Results for a Solid Disk,” (with R.W. Bass, D. Leonard, M. Allen, J.D. Bennett Jr., M. Cross, K. Brown), *Heat Treating: Including the Liu Dai Memorial Symposium, Proceedings of the 18<sup>th</sup> Conference*, ASM International, p. 552, 1999.

#### HARRIS L. MARCUS

“Preparation and Properties of *In-Situ* Devices Using the SALD and SALDVI Techniques,” (with J.E. Crocker, L.-C. Sun), *Proceedings of the 9<sup>th</sup> Annual Solid Freeform Fabrication Symposium*, edited by D.L. Bourell, J.J. Beaman, R.H. Crawford, H.L. Marcus and J.W. Barlow, The University of Texas at Austin, pp. 543-547, 1998.

“Investigation on Morphology and Microstructure of SALD SiC,” (with L. Sun, J.E. Crocker, L.L. Shaw), *MRS Symposium Proceedings Series*, Vol. 542, 1998.

“Corrosion Fatigue Behavior of a Graphite/Epoxy Composite for Marine Applications,” (with S.T. Mear, H.G. Wheat), *Proceedings of the ISOPE Conference*, May 24-29, 1998, Montreal, Canada.

“Preparation and Properties of *In-Situ* Devices Using SALD and SALDVI Techniques,” (with J.E. Crocker, L. Sun, L.L. Shaw), *SFF Symposium*, Austin, TX, 1998.

“Gas-Phase Selective Area laser Deposition (SALD) Joining of SiC Tubes with SiC Filler Material,” (with S. Harrison), *SFF Symposium*, Austin, TX, 1998.

“Investigation on Morphology and Microstructure of SALD SiC,” (with L. Sun, J.E. Crocker and L.L. Shaw), *MRS Symposium Proceedings Series*, Volume 542, 1998.

#### NITIN P. PADTURE

“Microstructural Tailoring of Ceramics for Mechanical Properties,” (with D.C. Pender and J. Jitcharoen), *Proceedings of the VIIth National Congress on the Mechanical Properties of Solids*, (A. Pajares, F.L. Cumbreira and F. Guiberteau, Eds.), University of Extremadura, Badajoz, Spain, pp. 19-29, 1998.

#### LEON L. SHAW

“A Theoretical Model for Optimization of SALD Parameters,” (with Z.M. Bzymek and W. Marks), *Proceedings of the 9<sup>th</sup>*

*Annual Solid Freeform Fabrication Symposium*, (D.L. Bourell, J.J. Beaman, R.H. Crawford, H.L. Marcus and J.W. Barlow, Eds.), The University of Texas at Austin, pp. 399-406, 1998.

“Sterometric Design for Desk-Top Solid Freeform Fabrication,” (with Z.M. Bzymek, S. Theis, T. Manzur, C. Roychaudhuri and L.-C. Sun), *Proceedings of the 9<sup>th</sup> Annual Solid Freeform Fabrication Symposium*, (D.L. Bourell, J.J. Beaman, R.H. Crawford, H.L. Marcus and J.W. Barlow, Eds.), The University of Texas at Austin, pp. 285-291, 1998.

“Preparation and Properties of *In-Situ* Devices Using the SALD and SALDVI Techniques,” (with J.E. Crocker, L.-C. Sun, and H. Marcus), *Proceedings of the 9<sup>th</sup> Annual Solid Freeform Fabrication Symposium*, (D.L. Bourell, J.J. Beaman, R.H. Crawford, H.L. Marcus and J.W. Barlow, Eds.), The University of Texas at Austin, pp. 543-547, 1998.

# Metallurgy & Materials Engineering Department

## Active Research Grants and Contracts

### 1998-1999

#### PHILIP C. CLAPP

“Diamond Bearings,” NASA, 6/98-8/99, \$6,000.

#### JAMES M. GALLIGAN

“Measurement of Instant. Dist. Velocities,” NSF, July 1, 1997 - June 30, 2000, \$268,700.

#### MAURICE GELL

“Advanced Coatings Technology For Enhanced Durability and Reduced Cost In Naval Applications,” (with co-PIs: T. Bergman, B. Cetegen, E. Jordan, D. Pease, P. Klemens, N. Padture, and L. Shaw), Office of Naval Research, June 1997-Dec. 2000, \$3,600,00.

“Bond Strength and Stress Measurements in Thermal Barrier Coatings,” (with co-PI: E. Jordan), DOE/SCERDC, Sept. 1995-Feb. 1999, \$530,000.

“Development of Laser Fluorescence As a Non-Destructive Inspection Technique For Thermal Barrier Coatings,” DOE/SCERDC, Feb.1999- Jan. 2002, \$420,000.

“Industrial Support for Thermal Barrier Coating Research”, (with co-PI: E. Jordan), BB, E Power, Howmet Intl, Pratt & Whitney, Rolls Royce-Allison, Solar Turbines, Siemens-Westinghouse, Feb. 1999-Jan. 2002, \$180,000.

“Chemical and Mechanical Instabilities At Thermal Barrier Coatings Interfaces,” (with co-PI: E. Jordan), Univ. Pittsburgh/DOE/SCEWRDC, June 1997-June 2000, \$260,000.

#### NORBERT GREENE

“Dental Alloy Corrosion Studies,” (with co-PI: T.D. Taylor.), J.M. Ney Company, Bloomfield, CT, September 1, 1993 to present, completion date extended, \$40,000.

“Corrosion Study of Firearms,” FBI Laboratory, U.S Justice Department, 02/12/97-06/12/99, \$99,775.

#### HARRIS MARCUS

“Solid Freeform Fabrication from Gas,” (with co-PI: L. Shaw) 7/95-12/31/99, ONR, \$574,462.

“Raman Spectrometer,” 2/3/98-2/3/99, Office of Naval Research, \$150,000.

#### JOHN E. MORRAL

“Square Root Diffusivity,” NSF DMR-9401044, 8/94-7/99, \$631,620.

“Experimental Investigation of the Mechanisms Associated with the Heat Transfer of Turbine Disks in a Liquid Quench,” (with co-Pis: J. Bennett and Techxperts), NASA/SBIR, 12/1/96-11/30/98, \$16,000.

#### NITIN P. PADTURE

“Microstructural Evolution in *In Situ*-Reinforced (ISR) Silicon Carbide,” NSF, 1/15/96 to 12/31/98, \$254,700.

“*In Situ*-Processing and Mechanical Behavior of Novel Ceramic Composites,” ONR, 6/1/96 to 7/31/99, \$300,000.

“Novel Ceramics for Thermal Barrier Coatings,” (with co-PIs: M. Gell and P.G. Klemens), Siemens Westinghouse Corp.,

07/1/98 to 3/31/99, \$30,018.

“Fundamental Studies of Novel Contact-Damage Resistant Ceramics,” AFOSR, 7/1/96 to 6/30/99, \$313,400.

“Advanced Coating Technology Development for Enhanced Durability and Reduced Cost in Naval Applications,” (with co-PIs: E. H. Jordan, T. Bergman, B. Cetegen, P.G. Klemens, D. T. Pease, and L. L. Shaw), Office of Naval Research, 6/16/97 to 1/15/2001, \$3,400,000.

#### **LEON L. SHAW**

“Bond Strength and Stress Management in Thermal Barrier Coatings,” (with co-PIs: M. Gell, E. Jordan, D. Pease, N. Pature), 10% of the proposal, Department of Energy, 09/01/95-09/01/98, \$450,000.

“Dense, Nanostructured Ceramic Coatings for Enhanced Durability and Reduced Costs in Naval Applications,” (with co-PI: M. Gell, *et al.*), Office of Naval Research, 10/01/97-09/31/01, \$3,400,000.

“Solid Freeform Fabrication from Gas,” (with co-PI: H. Marcus) 7/1/95-12/31/99, Office of Naval Research, \$574,462.

**Metallurgy & Materials Engineering Department  
Awards, Honors, Patents  
1998-1999**

**NITIN P. PADTURE**

1999 Robert L. Coble Award for Young Scholars, for “outstanding contribution to the understanding and education of the mechanical behavior of ceramics/composites,” American Ceramic Society, 1998.

Outstanding Junior Faculty Award, for “outstanding scholarly achievements and sustained future professional growth,” University of Connecticut School of Engineering.

**LEON L. SHAW**

Honorary Professor of Dalian Railway Institute, Dalian, China, 1998.

**Metallurgy & Materials Engineering Department**  
**Major Professional Activities**  
**1998-1999**

**HAROLD D. BRODY**

Co-chair, M.C. Flemings Symposium, Cambridge, MA, June 2000.

**JAMES M. GALLIGAN**

Chair, International Workshop on the Influence of Fields on Processes, May 17-20, 1999, Charleston, S. Carolina.

**JOHN E. MORRAL**

Deputy Editor, *Journal of Phase Equilibria*.

Associate Editor, *Journal of Mining and Metallurgy*.

Symposium Co-organizer, Symposium L: Interaction of Phase and Defect Microstructures in Metallic Alloys, MRS Fall Meeting, Boston, MA, 11/30-12/1/98.

Symposium Co-organizer, Evolving Paradigms in Microstructural Evolution, TMS Fall Meeting, Rosemont, IL, 10/11-10/15, 1998.

Conference Co-Chair, 5<sup>th</sup> ASM Heat Treating and Surface Engineering Conference in Europe, Gothenburg, Sweden, June 7-9, 2000.

Chair, ASM Alloy Phase Diagram Committee.

**NITIN P. PADTURE**

Associate Editor, *Journal of the American Ceramic Society*.

**LEON L. SHAW**

“Processing and Properties of Nanostructured Materials,” *Materials Week '99*, Cincinnati, OH, October 1999.

Guest Editor, *Nanostructured Materials*.

# Connecticut Transportation Institute Annual Report Summary 1998-1999

## PERSONNEL CHANGES

During the past year, several staffing changes occurred in the Connecticut Transportation Institute. Dr. Norman Garrick was appointed the Interim Director of the Connecticut Transportation Institute, effective May 1, 1999.

Dr. Donald Tepas joined the research staff in the Connecticut Transportation Institute, specializing in Industrial Psychology.

Mr. Lee DelValle, who joined the staff as a Public Service Specialist in the Connecticut Advanced Pavement Laboratory on March 2, 1998, was upgraded to Laboratory Assistant I, effective December 31, 1998. Ms. Lori Mather, who joined the staff as an Administrative Services Specialist I on June 6, 1996, was upgraded to Financial Assistant II, effective April 8, 1998. In addition, Ms. Elizabeth Steele, Program Assistant I, resigned from her position effective February 12, 1999 to accept a position in private industry.

## THE TRANSPORTATION INSTITUTE

The Connecticut Transportation Institute is the focal point for the University of Connecticut activities in the transportation sector. Faculty and students from throughout the University participate in its programs of education, research and service.

The Institute, administered through the Office of the Dean of Engineering, is responsible for the following major program areas:

- The Transportation Technology Transfer Center
- The Cooperative Research Program
- The Transportation Research Program
- The New England Transportation Consortium, and
- The Connecticut Advanced Pavement Laboratory

During Fiscal Year 1999, the Institute administered the following grant-funded programs totaling \$1,157,144.

The Transportation Technology Transfer Center (\$232,389):

The Institute's Technology Transfer Center provided education, training, technical assistance, information and materials to Connecticut's local governments on the planning, design, construction, maintenance, operation and management of roads, bridges and public transit.

The Institute's Technology Transfer Center program accomplished the following during this period:

- Provided instruction and training to 2,410 officials and state and local government employees.
- Researched and responded to 209 requests for technical assistance and information.
- Provided 2,153 transportation-related publications, software, and videotapes in response to requests for information.
- Published four issues of the Center's newsletter, "Technology Transfer," with a circulation to over 4,000 federal, public and private sector transportation agency employees.
- Provided two half-time Transportation Technology Transfer Internships to University of Connecticut Civil and Environmental Engineering graduate students.

The Cooperative Research Program (\$376,976):

The Transportation Institute coordinates and administers the Cooperative Research Program. This continuing research program, a cooperative effort of the Connecticut Department of Transportation and the University, focuses on the development of solutions to high priority issues related to the safe and efficient operation of Connecticut's road and public transit systems.

During the Fiscal Year 1999 period, the Cooperative Research Program funded the following research projects: Field Treatment

of Soil Contaminated with Lead; Protection of Reinforcement with Corrosion Inhibitors; Estimating Benefits from Specific Highway Safety Improvements; Estimating the Temporal Distribution of Traffic Within the Peak Period; Development of a Test to Measure Tendency for a Hot Mix to Segregate; Hydrodynamic and Transport Models of Coastal Waters for Use in the Design and Management of Highway Structures; and Evaluation of Sign Support Structures.

Five Graduate Assistantships and one Post-Doctoral Fellowship were funded through the program to support the above research projects.

The Transportation Research Program (\$107,500):

This program differs from the Cooperative Research Program in that it is funded by sources other than the Connecticut Department of Transportation and focuses on topics beyond the immediate interest of that department.

Fiscal year 1999 funding was provided entirely by the Federal New England University Transportation Center. The New England University Transportation Center consists of the University of Connecticut, the Massachusetts Institute of Technology, Harvard University and the five other state universities in New England. The Massachusetts Institute of Technology is the Center's lead university and the Connecticut Transportation Institute administers and coordinates the University of Connecticut's participation in the program.

During FY 1999, two graduate fellowships totaling \$20,000 were awarded to students concentrating in transportation engineering studies and economics through this program.

The New England Transportation Consortium (\$85,544):

The New England Transportation Consortium, a joint undertaking of the six New England states, pools the financial, professional and academic resources of the region to research and develop improved methods of dealing with common problems in the planning, design, construction, maintenance and operation of the region's transportation systems. The Connecticut Transportation Institute provides administrative, fiscal, and technical management for the Consortium's \$600,000 annual program.

The following research projects (\$536,945 total), funded by the New England Transportation Consortium, were awarded to faculty at the University of Connecticut and were active during the year: Superpave Implementation; Optimizing GPS Use in Transportation Projects; a Portable Method to Determine Chloride Concentration on Roadway Pavements; Determining Properties, Standards and Performance of Wood Waste Compost as an Erosion Control Mulch and as a Filter Berm; and Early Distress of Open-Friction Course.

Two Graduate Assistantships were funded through the program to support these research projects.

Connecticut Advanced Pavement Laboratory (\$200,072):

The Connecticut Advanced Pavement Lab (CAP Lab) at the University of Connecticut serves the needs of Connecticut, as well as other New England states by providing fee-based testing utilizing the Superpave test methods, guidance in mix design for private industry, advice on mix acceptance and field construction, pavement research and education of engineers. The CAP Lab will also train technicians and inspectors in the Superpave methods. The name change to TTCC was not officially adopted by the University, so the name remains CAP Lab.

The major focus of the CAP Lab during the past year was research related. The CAP Lab conducted an extensive asphalt binder round robin as well as a smaller round robin with asphalt binder samples. These round robins were performed in conjunction with the New England Transportation Consortium (NETC) project "Superpave Implementation." The CAP Lab also began a project for the NETC investigating the early distress of open graded friction courses. The CAP Lab also did work on a research project sponsored by the Joint Highway Research Advisory Council (JHRAC) to develop a test to measure a hot mix asphalt's tendency to segregate and, in June, began a new JHRAC research project on the selection of binder grade to be used in when recycled pavement material is incorporated into the hot mix asphalt.

The CAP Lab hosted several different training sessions during the year. The CAP Lab hosted a three-day Superpave mix design course during the winter, a one-day Superpave Gyratory Compactor workshop to train technicians for the New England Transportation Technician Certification Program (NETTCP) recertification, and several other NETTCP certification courses.



The CAP Lab is working in conjunction with the North East Center for Excellence in Paving Technology (NECEPT) in the development of a binder technician certification course. Workshops for binder technicians were held at both the CAP Lab and NECEPT. The CAP Lab also hosted the Connecticut DOT's Superpave Implementation planning session.

# Precision Manufacturing Institute Annual Report Summary 1998-1999

## PERSONNEL

Dr. T.C. Ting was the director of the Precision Manufacturing Center (PMI) from June 8, 1998 to June 3, 1999. Effective June 4, 1999 Dr. Kazem Kazerounian, Associate Dean for Research & Outreach for the School of Engineering, was appointed the Director of PMI on a half-time basis by the Dean of Engineering.

Tricia Bergman joined PMI as the Assistant Director of the Institute effective June 4, 1999. Mrs. Bergman earned a B.S. degree in Mechanical Engineering and an M.S. degree in Industrial Management from Purdue University. Tricia brings to PMI 14 years of experience in technology and industrial management.

Mr. Bernard Vaillette continues to serve PMI as a technical manager for the Center for Grinding Research & Development (CGRD) lab operations. His current appointment is effective through September 30, 1999. His appointment will be extended depending on the need for technical services inside and outside the University.

Professor Trevor Howes, who held the position of Director of CGRD, retired January 31, 1998. His contributions to the center are significant and everlasting, and he will continue to cooperate with PMI in various capacities.

Ms. Julie McDonald, Administrative Assistant, left PMI in May 1999.

## PHYSICAL INFRASTRUCTURE

Planning continued for the Manufacturing Enterprise Building, which will be funded with \$2 million from a Department of Commerce (EDA) grant and \$667,000 from the University.

The final design will have a total gross space of 16,000 square feet instead of 20,000 square feet as originally proposed in August 1995. However, the assignable space is not significantly different due to simpler design for a stand-alone building. The intended functions for the building are:

Near-term and company-sponsored research and development tasks to aid in manufacturing competitiveness.

Innovative research projects leading to new products and processes capable of opening new markets and businesses for Connecticut-based existing and spinoff companies.

Professional education and training program for maintaining and upgrading the technical workforce in Connecticut-based companies.

Business assistance program in cooperation with related organizations within the University.

## CGRD OPEN DAY

The CGRD, a unit of PMI, held a one-day conference on December 3, 1998 to discuss the future direction of the center. Highlights of the conference included presentations by Dean Faghri, who discussed the future of grinding research at the University of Connecticut, and several School of Engineering faculty members who made technical presentations.

## RESEARCH ACTIVITIES

The Precision Manufacturing Institute currently supports research efforts in the areas of Image Sensory with Optical Outputs, Optical Security Systems, Opto-Electronics, the Development of Advanced Coating Techniques, Grinding, and Manufacturing Scheduling and Planning. This research is funded by various national agencies and corporate sponsors, including the National Science Foundation, the U.S. Navy, Toshiba, E-Lite Technology and Connecticut Innovations. Currently, there are numerous proposals outstanding that will support many of these target research areas and also expand the Institute's focus. PMI plans to continue developing research support facilities to house a broad range of diverse and challenging initiatives.

## SPIN-OFFS

Inframat Corporation, a startup company based initially on spin-off technology (in 1997), has continued to lease specialized facilities from PMI, has been a major collaborator on federally funded research, and has increased from three employees to nearly 30 employees in less than three years.

Another spin-off success story is found in Imcorp, a start-up company based on spin-off technology from IMS/EIRC, has leased specialized facilities from PMI and has interacted heavily with University of Connecticut students and faculty members.

#### **FUTURE DIRECTIONS**

PMI currently is undertaking a major strategic planning effort to better position itself for contributing to the advancement of the critical and emerging technologies in the University and at the State level. The strategic restructuring plans will be finalized by the end of August 1999.

# Taylor L. Booth Center for Computer Applications and Research Annual Report Summary 1998-1999

The Booth Research Center (BRC) was organized in 1981 to provide a physical and intellectual environment necessary for computer-oriented research and applications to meet the information technology challenges of the future. It provides opportunities for interdisciplinary research and educational programs among faculty and students, strengthens the capabilities of individuals and groups in the pursuit of industrial and governmental projects, and maintains an environment for research, development, and continuing education that is responsive to the changing needs of society. BRC also provides computing and networking support and services for the School of Engineering, including the Engineering Learning Center and the Undergraduate Unix Laboratory.

## RESEARCH AND APPLICATIONS

BRC uses its resources to support interdisciplinary research activities, which involve not only engineering departments but also projects relating to business, psychology, mathematics, geology, and geophysics. The Center is organized as a set of laboratories, each having a specialized area of expertise and on-going funded research. These laboratories are:

Artificial Intelligence. Director: Dong-Guk Shin, CSE.

Intelligent Distributed Information Systems. Director: Eugene Santos, CSE.

Chemical Process Analysis. Director, Luke Achenie, ChE.

Distributed & High Performance Computing. Director: Reda Ammar, CSE.

Electrical & Systems Engineering:

Detection and Data Analysis. Director: Peter Willett, ESE.

Estimation and Signal Processing. Director: Yaakov Bar-Shalom, ESE.

Optical Computing and Signal Processing. Director: Bahram Javidi, ESE.

Systems Optimization. Director: Krishna Pattipati, ESE.

Image Processing. Director, Ian Greenshields, CSE.

Information and Software Engineering. Director, Steven Demurjian, CSE.

Manufacturing Computing. Director: Peter Luh, ESE.

Automation & Robotics in Manufacturing. Director, Nejat Olgac, ME.

Mathematics Computing. Director, Charles Vinsonhaler, Mathematics.

Psychology Computing. Director, Claudia Carello, Psychology.

Most laboratories involve multiple faculty members and graduate student researchers, with a total of about 110 participants. These laboratories continue to be innovative and productive. In 1998-99, the Center enjoyed strong funded research activities with 60 externally funded grants and contracts, totaling about \$5.2 million. The quality and quantity of research evaluated in terms of journal publications and the level of professional society involvement and recognition are outstanding. The funding sources include:

Federal and State Government: Air Force, Army, NASA, National Institutes of Health, National Science Foundation, Naval Underwater Warfare Center, Navy, Office of Naval Research, Connecticut Department of Transportation, Connecticut Insurance Department, and Connecticut Innovations, Inc.

Industry: Alphatech, Ball Aerospace, Calspan, Cannondale, Dapco Industries, Delta Industries, GTE Labs, Infopike, Northeast Utilities, Pandrol Jackson, PHS, Physical Optics Corp., Pratt & Whitney, Qualtech Systems, Sikorsky, Toshiba Corporation, and United Technologies Research Center.

Institutions or Organizations: American Institute of Biological Science, MIT, Mitre, Technical University of Munich, Transportation Technology Transfer Center, and Texas A&M University.

BRC has also strategically placed itself in a position to make significant contributions on network-based information technology. Recently, a team consisting of researchers from BRC, the University Computer Center, and the School of Education was awarded an NSF grant of \$350,000. The project is to connect the University to the new national "High Speed Backbone Network System" (vBNS), and is a part of the University-wide "Internet 2" effort. BRC researchers involved include Ian Greenshields, Peter Luh, Krishna Pattipati, and Dong-Guk Shin. Recently, a team consisting of researchers from BRC and members of the University's High Performance Computing Committee submitted a proposal to the National Science Foundation for the acquisi-

tion of a "Cluster Computer System" to upgrade BRC's compute server capability and to serve the high performance computing needs of the University. BRC researchers involved include Ian Greenshields and Peter Luh.

## **FACILITIES**

BRC is presently located in the basement of the Wilbur Cross Building. We are relocating to the Homer Babbidge Library where we will have space in the sub-basement for our computer server room, workstation/PC lab areas, research laboratories, offices for faculty and graduate students, and offices for BRC professional staff and administration. This new BRC facility is expected to be completed by August 1999, and we will stay there until the completion of the new "Information Technology Building" as part of the UConn 2000 Phase II project. Several BRC laboratories are distributed at various locations belonging to their home departments, either within the School of Engineering or outside the School. These distributed laboratories will stay with their home departments, and will not move to the Homer Babbidge Library.

Most of BRC laboratories are equipped with workstations, PCs, and specialized experimental apparatus. The central BRC facilities, on the other hand, include networking, general computing facilities, and computing laboratories. All these computing facilities are linked to the School of Engineering communications network, and are easily accessible by faculty and students.

### **Networking**

BRC was instrumental in the late 80's in providing expertise and support to the University Computer Center for establishing UConn's Internet connections and for completing the Engineering Network. BRC continues to play a vital role in Internet activities by administrating the UConn Domain Name Service computers. During this past year, the existing SoE communications backbone, the 100 Mb/sec FDDI token ring, was becoming increasingly unreliable and inadequate in view of the drastic increase in the demand on the network. The Booth Research Center redesigned and implemented the first phase of a new network for the School of Engineering. This new network is based on the "Switched Ethernet Technology" from Bay Networks, and is compatible with the network equipment being purchased by the University Computer Center. The goal is to provide 10 Mb/sec switched access to the network from each data jack. As building wire is upgraded, 100 Mb/sec will be made available. The network currently links 600+ computers of various types (PC, Sun, Digital, SGI, Mac). A new e-mail server was purchased and installed during the winter to prevent Internet abuse of the server.

### **General Computing**

BRC's computing environment includes a DEC file server consisting of two 400 MHz Alpha 1000 computers and forty two disk drives of 4.3 GB each. It assumes the critical file services for Unix-based clients, and has software to allow Microsoft Windows clients to access home directories located on the server. During the past year, additional disk storage and main memory were purchased for the fileserver, and services have been improved after installing user quotas on disk space. BRC also has multiple SUN Servers used for general file and compute serving as well as for network support, and a SparcCenter 2000 parallel computing system with 12 processors supporting both SUN's Solaris multithreaded operating systems and a variety of parallel programming platforms, including MPI, PVM, and LINDA.

BRC manages two School of Engineering public laboratories.

**The Engineering Learning Center.** The Learning Center in Engineering II offers a bright, cheery, and comfortable environment for learning and instruction. All the computers are connected to servers that provide printing support and are linked to the campus network and the Internet. During the past year, 19 new machines were purchased, as well as two new printers, totaling 61 Pentium computers and four printers. The most significant changes have been in the area of software, where the Windows NT environment was successfully installed before classes began in August 1998. BRC staff also made a major effort to integrate the Windows NT and Unix environments. Users at the Learning Center now have access to their home directories and web pages on the Unix file server, which provides them with the backup assurance as well. Furthermore, users previously did not have to be authenticated to gain access to the PCs. The new Windows NT environment now makes use of the integrated Unix/NT account system, and prevents random people from using Engineering computers.

**The Undergraduate Unix Laboratory.** The Undergraduate Unix Laboratory in Room 205 of Castleman is our only School-wide laboratory for undergraduate Unix-based computing. During last year, nineteen new SUN Ultra-5's each with a 4 GB disk and 128 MB memory were purchased and installed, with only two old SparcStation LX's remaining. This recent upgrade makes this laboratory a state-of-the-art facility.

In addition to the above two SoE public laboratories, there is a BRC public computer laboratory located in Wilbur Cross Room 76. During the past year, two new Husky PCs and two Sun Ultra-5's were installed to update the computing capability of this laboratory.

### **Software**

BRC supports software packages requested by faculty and students from the School. This entails installations of new packages and new versions of existing packages, the maintenance of these packages, as well as sufficient training to be able to deal with problems. We currently manage about 75 software packages to support academics and research in all engineering disciplines. During 1998-99, BRC also handled site licenses for Matlab (School of Engineering-wide) as well as software update service contracts with SUN Microsystems, and Digital Equipment Corporation.

Preliminary work has been done to resolve Year 2000 problems for School of Engineering computers. Most PC and Macintosh problems have already been addressed. Work has already begun to remediate the Unix machines. In addition to the above, BRC has continued its Workshop Series to provide training and exposure to Unix, Windows NT, and other selected software and network tools that we support.

The School of Engineering computing environment suffered many outages during this fiscal year as a result of outages caused by UConn 2000 and failure of some aging equipment. Additional disruption to services was caused by Internet abuse from outside the University. An *ad hoc* committee was convened to provide input to BRC on policies and users' concerns. Staffing issues were reviewed and a proposal is being considered for decentralized support of departments under BRC's leadership. In addition, to streamline procedures for the reporting and resolution of problems, and to partially alleviate the staffing issues, BRC very recently set up a *virtual* help desk. This provides users with a central location to log and resolve problems. The staffing of the Help Desk, however, should be strengthened, and off-hour support remains an open issue. A physical help desk has been planned in BRC's new HBL location.

### **SPECIAL SERVICE FACILITY**

BRC has been designated as a Specialized Service Facility (SSF) of the University and was approved by the DHHS Cognizant Audit Agency, effective July 1, 1981. The Center's SSF component, including all the laboratories presented earlier, provides equipment, space, and expertise for a wide variety of computational services in support of its mission as related to computer applications and research. This support consists of access to an extensive, high-speed network of hardware and software facilities, coupled with trained operators who can effectively apply the computational resources to research applications. These facilities have been selected/developed to specifically assist research areas that are in active need at the university. This selection is constantly changing to reflect the technical changes in the computing, communication, and software areas. Also provided are training and consulting services related to specialized computational environments and needs. In addition to the SSF services, BRC provides research space and related office and meeting resources. The research space/component is kept separate from the SSF accounting activity.

Uses of the SSF facilities must comply with federal guidelines. BRC develops laboratory facilities, hires and trains personnel (mostly graduate students) to use the facilities, and provides needed services to carry out various projects. Charges are made against a funded project for hours of usage of the facilities and services. For an employee working purely on research for a specific project without using, developing, or enhancing the facilities, the support should be a line item in the budget with fringe benefits and indirect costs separately calculated, as opposed to being integrated into the BRC cost structure for individual laboratories.

### **STAFFING AND THE STEERING COMMITTEE**

The Director of the Center reports to the Dean of Engineering. The support staff, responsible for providing the services necessary to carry out the mission of BRC, includes network, software and hardware specialists, programmers, facilities operators (usually graduate students), administration, secretarial support, etc., and is funded through internal and external sources. Staffing additions this year include Lan Shen who was hired full-time on October 1, 1998 in the position of Computer System Manager. Due to recent reorganization, the Electronics Shop now reports directly to the School of Engineering. Visiting scholars during this year include Osamu Matoba and Takanori Nomura, both working with Professor Bahram Javidi.

The BRC Steering Committee is to oversee BRC's operations. Members of the Committee include Reda Ammar, Yaakov Bar-Shalom, Nejat Olgac, Krishna Pattipati (Chair), Dong-Guk Shin, T.C. Ting, and Peter Willett. The committee's focuses are on high quality of service to undergraduate and graduate laboratories and on excellence in research.

# Engineering Diversity Program Annual Report Summary 1998-1999

## MISSION

In 1987 a Minority Engineering Program (MEP) was established at the University of Connecticut to address issues surrounding minority recruitment and retention within the School of Engineering. Today the Engineering Diversity Program (EDP) is comprised of activities, projects and services designed to recruit, retain and graduate women and underrepresented minorities in the field of engineering. In addition EDP seeks to provide programs that address K-12 engineering education and awareness.

## SUMMARY

Since 1988, the Pre-Engineering and BRIDGE programs have been operating with the goal of enhancing recruitment and retention. To date, approximately 450 middle school students have participated in the Pre-Engineering Program and 230 undergraduate students have participated in BRIDGE. In 1995 a one day conference called Multiply Your Options was created to increase the interest of middle school girls in careers in mathematics, science and engineering. Five conferences have been held at the University of Connecticut with over 700 participants.

## PRE-ENGINEERING

The 1998-99 Pre-Engineering program continued to provide hands-on enrichment activities involving mathematics, science and engineering projects for 14 Saturdays from September to April. Middle school participants from the 7th, 8th and 9th grades traveled to the University of Connecticut campus and engaged in projects during a three-hour time block. Sixty-eight middle school students participated in the program. 54% of the students were from the Bloomfield school system, 4% were from Windsor, and 41% were from the East Hartford school system. Of the participants, 61% of the middle school students were males and 49% were females. The ethnic breakdown represented 69% African-American, 12% Caucasian, 2% Hispanic, 4% Puerto Rican and 13% indicated multicultural or two or more categories for ethnicity.

In 1997-98, 96 students participated in the Pre-Engineering program. Fifty-seven % were from Bloomfield, 6% were from Windham and 12% were from the Windsor school system and 22% were from East Hartford. As an enhancement to further learning opportunities, participants of the 1998-99 Pre-Engineering program attended the Connecticut Invention Convention, which included 2000 attendees and 600 student competitors from schools throughout the state. In addition, at the closing session of the Pre-Engineering program family and parents were invited to an overview of the past year, which highlighted student activities and projects.

## BRIDGE

BRIDGE seeks to expose students to the engineering curriculum by preparing them with classes in mathematics, chemistry, physics and computers for six-weeks during the summer. BRIDGE has had 230 participants since the start of the program in the summer of 1988. To date 30% of the participants have been female and 70% have been males. Of the 230 participants, 55 students have graduated from the University of Connecticut. Thirty-six % (20) of the graduates received engineering degrees and 64% (35) received degrees in other areas. Seventy-nine undergraduates or 76% still remain in the School of Engineering. Another 25 students or 24% are enrolled in other degree programs making a total of 104 active students who participated in BRIDGE. Seventy-one students or 30% are inactive by way of withdrawals or dismissals from the University.

The most recent participants during the summer of 1998 consisted of 24 participants. Eleven (46%) participants were female and 13 (54%) were males. The ethnic backgrounds of the students included 4 (17%) African American students, 3 (13%) Asian female students, 3 (13%) Puerto Rican students, 5 (20%) Caucasian female students, 6 (24%) Hispanic students and 3 (13%) students who indicated multi-ethnic categories. BRIDGE 1997 consisted of 28 students, 13 (46%) of which were female and 15 (54%) of which were male. The ethnic breakdown consisted of 10 (36%) African-Americans, 3 (11%) Hispanic, 8 (28%) Caucasian females, 2 (7%) Asian students and 5 (18%) Puerto-Rican students. An analysis of the past two years of BRIDGE participants (1997 and 1998) indicates that of the 52 participants, 45 (87%) are still actively enrolled in the University of Connecticut, 7 (13%) have departed due to withdrawals or dismissals. Of the actively enrolled participants 3 (6%) are currently pursuing degrees other than engineering and 42 (81%) are still actively pursuing engineering degrees.

## **MULTIPLY YOUR OPTIONS**

Multiply Your Options (MYO) was developed to address the problem of females not entering into careers in mathematics, science and engineering at the same rate as their male counterparts. Most of this gap is due to females self-selecting not to take the necessary preparatory classes in mathematics and science at the high school level. What developed was a one-day conference involving professional women in education and industry who presented hands-on workshop activities and acted as role models and mentors for a target group of middle school eighth grade girls. For the fifth year, MYO has been held at the University of Connecticut and has included the participation of over 700 middle school girls.

Over 174, eighth grade girls were invited to the 1999 conference. Of the 174 participants, 145 completed the pretest and post-test questionnaire. Preliminary results show that when asked to select a possible career choice participants who selected "engineer" rose from 12% to 27% (an increase of 15%) on the post test questionnaire. In addition, those girls who said "absolutely no" to a possible career choice in engineering in the pre-test decreased from 55% to 42% on the post-test questionnaire. Based on a national survey of over 2,250 students between 14-18 years of age (*State of the Nation*, Alger Associates 1998), the responses from the participants of the MYO conference offer promising results because results of the larger Alger survey indicated that only 0.9 females (less than 1%) selected engineering as a possible career choice.

## **ADDITIONAL ACTIVITIES**

The General Electric Mini-Professorship was designed in 1996 to encourage women and underrepresented students to engage in three major responsibilities as undergraduates that are typical activities of faculty members, namely teaching, research and professional service. Funds provided by GE were used to support these activities. In the first year, three students chose to participate in the program, representing the Electrical, Chemical, and Civil engineering departments. Based on the suggestions of the Academic Council, the program name was changed to the Faculty of the Future program. In 1997-98, two more students from the Civil and Chemical engineering departments took part in the program. Presently, two more students, representing Mechanical and Civil engineering, are participating in the Faculty of the Future program. The total number of participants during the period from 1998-1999 was thus seven.

Other activities include Project Elevate, which for the past three years has been sponsored by the Otis Elevator Company. Project Elevate provides supplemental instruction, tutoring, skills building, and community activities in order to enhance the retention of freshman first year students. Twenty-two freshman participated in Project Elevate during the 1998-1999 academic year. To date a total of 62 students have taken part in Project Elevate activities.

## **ENROLLMENT**

The ethnic and cultural diversity of our society offers a unique opportunity for institutions like the University of Connecticut to seek out future engineers in groups other than the traditional majority male and present predictions demand that we must diversify in order to fulfill projected needs. Fewer women and minorities are going into science and engineering, but proportionally even fewer majority males are entering the engineering professions based on 1995 data from the Engineering Workforce Commission, AAES. According to the U.S. Department of Labor, the country's engineering workforce is expected to grow 23% (306,000) from 1992-2005.

Presently the School of Engineering includes a representation of 10.2% underrepresented minorities (9.8% in 1997-1998) and 15.8% women (16.2% in 1997-1998). In the Fall of 1998, 14.4% of the freshmen were women and 10.7% were underrepresented minorities. On a national level in the fall of 1996 underrepresented minorities comprised 16.2% of the freshmen enrollments. This suggests that the University of Connecticut is slightly behind the pace of other institutions, thereby justifying the need to continue to offer services. According to data comprised from the National Action Council on Minorities in Engineering (NACME) 10% of all engineering institutions (31 schools) are responsible for almost half of the minority graduates (49%) while half of all institutions produced eight or fewer minority graduates and 38 schools produced none at all.

## **CLOSING**

Women and minorities are key in replenishing the engineering pipeline as they are expected to comprise approximately 68% of new workers by the year 2000. The strategies used in the Engineering Diversity Program to attract and retain women and minorities to the field of engineering are crucial mainly because the demand for U.S. engineers currently outnumbers the supply. By focusing on efforts to increase the number of women and minorities in engineering, the University of Connecticut's School of Engineering can assist in the efforts to assure that the next generation of engineers maintains the U.S. global competitive edge



needed to compete in today's increasingly diverse and technological educated society.

# Environmental Engineering Program

## Annual Report Summary

### 1998-1999

The Environmental Engineering Program continues to be one of the strongest academic units within the School of Engineering.

#### STUDENTS AND GRADUATES

The Environmental Engineering Graduate Program presently has approximately 19 M.S. and 13 Ph.D. students enrolled in our program. This past year we received 54 applicants and accepted 24 (acceptance rate = 45%). Student quality continues to improve. Mr. Lucas Hellerich was awarded one of the Outstanding Scholar Awards from the Graduate School for the 1999-2002 academic years. This year our Program graduated eight MS students and three Ph.D. students. In addition, two additional Ph.D. students are nearing completion (expected graduation August 1999). Of the 5 Ph.D. students, four are searching for positions in academic institutions. All of them have been short-listed and interviewed in various Universities such as University of Missouri-Rolla, New Jersey Institute of Technology, Akron University and WPI. Usually, searches in Environmental Engineering result in more than 100 applicants. The fact that our students are being interviewed by other universities for faculty positions is clear evidence of the progress we have made to achieve national and international prominence. This year, the Environmental Engineering Program initiated a Minor Degree in Environmental Engineering. Eight undergraduate students enrolled in the program and three of them graduated. The Minor Degree is expected to be a very popular option for the students in the Departments of Civil and Environmental Engineering and Chemical Engineering.

#### FACULTY

Detailed activities of the 23 Environmental Engineering faculty members may be found in their home department annual reports. Some notable accomplishments follow. Professor Fred Ogden continues as Associate Editor of the *Journal of Irrigation and Drainage*, ASCE. Dr. Ogden was also awarded the prestigious U.S. Army Research Office Young Investigator Grant and the Outstanding Journal Paper Award, from the American Society of Civil Engineers. Professor Barth Smets received the prestigious NSF CAREER Award (one of only two environmental scientists in the United States). Professor Grasso continues as Editor-in-Chief of *Environmental Engineering Science*. Professor Grasso was selected to serve on a panel of experts funded through the World Bank to travel to Argentina to assist in establishing the first Environmental Engineering Program in that country. Professor Grasso was named as a consultant to the U.S.E.P.A. Science Advisory Board. He was also appointed to the Science Advisory Committee of Sea Change, an environmental advocacy group. Professor Grasso was also elected as a fellow to the Connecticut Academy for Education in Mathematics, Science and Technology. Professor Grasso assumed the position of Department Head for Civil and Environmental Engineering. Dr. Emmanouil Anagnostou joined the Environmental Engineering Program and the Department of Civil and Environmental Engineering this year. He is a graduate of the University of Iowa with a Ph.D. in Civil and Environmental Engineering and was a post-doctoral research associate at NASA. His area of expertise is hydrology, hydraulics and water resources. During 1998, Dr. Anagnostou was awarded a two-year *Marie Curie* Research Grant from the Environment and Climate Programme of the Commission of the European Community and received NASA's prestigious Young Investigator award. Dr. Thomas Wood joined the Chemical Engineering Department and the Environmental Engineering Program this year. Dr. Wood came from the University of California-Irvine. His area of expertise is environmental biotechnology. The Department of Civil Engineering also filled an additional vacancy in environmental engineering. Professor Nikos Nikolaidis completed a three-year term as Associate Editor of *Groundwater*. He also traveled to Greece where he served as a Member of the Scientific Council of the National Centre for Marine Research, Athens, Greece and participated in a European Commission LIFE project for the rehabilitation of the ancient silver and lead mines near Athens. Professor Nikolaidis also received the *Klewin Award for Excellence in Teaching* and the *LIDA Foundation Award for Excellence in Graduate Research Direction*. Dr. Allison McKay will be joining our Program as of September of 1999. She received her Ph.D. from M.I.T. and she is currently completing a post-doctoral position at the Connecticut Agricultural Experiment Station. Her area of expertise is in aquatic chemistry and hazardous waste site remediation. Some accomplishments of Dr. Joseph J. Pignatello, Adjunct Associate Professor of Environmental Engineering, follow (Dr. Pignatello holds an appointment directly with the Environmental Engineering Program and does not have a home department).

#### PROGRAM ACTIVITIES

*The Environmental Scholars Colloquium* was active this year hosting external speakers (see attached list of speakers). A

**highlight of the series was the Geib Distinguished Environmental Lecture delivered by Dr. Fred Krupp, Director of the Environmental Defense Fund, entitled “*Environmentalism in the 21<sup>st</sup> Century: New Ways to Get Results.*” Proposals for a new minor in Environmental Engineering and a new B.S.E. degree in Environmental Engineering were initiated and the both programs have been approved.**

# **Eurotech Program Annual Report Summary 1998-1999**

The EUROTECH Program has completed its sixth year. It is designed to help prepare the engineering student for working in the world-wide marketplace by offering an opportunity to experience first-hand the practice of engineering in another industrialized country. This program has the following features: engineering coursework leading to a Bachelor of Science degree in engineering; German coursework leading to a Bachelor of Arts degree in German Studies; and a six-month engineering internship with a firm in Germany. The EUROTECH Program is open to students in each of the undergraduate engineering programs at UConn: Chemical, Civil, Computer Science, Electrical and Systems and Mechanical Engineering.

This past year four students completed their studies in the program. To date, EUROTECH has six graduates: three mechanical engineers, two chemical engineers and one from computer science and engineering. All have accepted jobs with firms that can use both their engineering and language abilities. Twenty-three freshmen enrolled in the EUROTECH German sections in fall 1998. Present enrollment in the program is about 45. Friedemann Weidauer, Assistant Professor of German, is the new Co-Director of EUROTECH in the Department of Modern and Classical Languages.

Two newsletters, one in the fall and one in the spring were published and distributed throughout the Northeast and abroad. Copies were sent to guidance counselors at all Connecticut high schools, as well as German teachers and students accepted by the School of Engineering.

EUROTECH advisors have been appointed in each department, so that each student in the program will have an advisor familiar with both the engineering and the German program.

The nominal year for the internship in Germany has been moved from the 5<sup>th</sup> to the 4<sup>th</sup> year to optimize language skills.

The EUROTECH Program received a grant from the German Academic Exchange Service (DAAD) to take a group of 16 students on a 10 day study trip to Germany. This visit began on May 16 and lasted to May 26, 1999. The group was accompanied by Prof. Long and Weidauer, and visited universities and industries in Baden-Württemberg and Bavaria. The students learned about the German engineering education system by visiting the University of Karlsruhe as well as the Fachhochschulen at Esslingen, Reutlingen, and Regensburg. The group also visited manufacturing plants belonging to Daimler-Chrysler, BMW, Index and Trumpf.

Four students received special scholarships from industries supporting the program: Chris. Halfmann - Bayer, Pal Posci - Sikorsky, Kris Noiseau - Rydz (Music Memories), and Brian Harris - UTC.

Operating funds for EUROTECH were provided by the Connecticut Department of Economic and Community Development.

A trademark is being sought for the EUROTECH program. The cost of obtaining the trademark is being provided by the Torrington, Co.

There has been some discussion with United Technology Corporation concerning the expansion of the EUROTECH program into other languages. The languages under consideration are Chinese and Russian.

# Engineering Development Office Annual Report Summary 1998-1999

This year, the School of Engineering began to reap the benefits of aggressive development efforts focused on increasing endowments to the School. The School's endowment market value on March 31, 1998 was \$3,375,128. The market value as of March 31, 1999 was \$5,144,610, a 52% increase in one year over the accumulated endowment over a 10 year period. All gifts to the School through April 30, 1999 totaled \$1,390,479, an increase of 70% over the corresponding period last year.

Two pacesetting gifts from Connecticut industrial leaders were especially notable.

\$500,000 was received from Southern New England Telephone (SNET) to establish a new named professorship and encourage more high school students to pursue careers in communications technologies. Under the UConn 2000 Matching Grant program, the state will provide \$250,000 in matching funds, making the total value of SNET's contribution \$750,000. The gift gives the School of Engineering the impetus to recruit a top faculty member to conduct state-of-the-art research in information technology and to train undergraduate and graduate research assistants. The new professor will also direct the new SNET Program for Future Focus, a new initiative to recruit young scholars to information technology and UConn's School of Engineering.

A gift from Northeast Utilities Foundation, along with funding from the existing Al Geib Endowment, combined to establish the first endowed chair at the School of Engineering in Environmental Engineering this year with a \$1 million endowment. The NU Foundation Chair will conduct advanced research in the field of environmental engineering, while training graduate and undergraduate students as researchers. The individual also will be responsible for recruiting talented high school students from across the state to participate in week-long summer workshops on environmental issues.

Several more endowed chairs and professorships are in the proposal stage this spring.

The annual School of Engineering awards banquet took place on April 27 in the new South Campus facility on the Storrs campus. The event drew nearly 450 School of Engineering students, faculty, and alumni, and corporate executives from many Connecticut companies. Highlighting the evening was a keynote address by former Secretary of the Air Force, (1993-1997) Sheila Widnall, Ph.D., a professor at M.I.T. and one of America's most celebrated engineers. Two UConn engineering graduates received Distinguished Alumni Awards: construction magnate Charles F. Klewin and Michael Hartnett, Ph.D., president of Roller Bearing Company of America. The School also honored two outstanding supporters with Distinguished Service Awards: Hugh MacKenzie, President of Northeast Utilities Retail Business Group, and David (Ed) Crow, Ph.D., Senior Vice President at Pratt & Whitney. In addition, more than 80 awards and scholarships, totaling nearly \$150,000, were presented to current undergraduate engineering students in recognition of academic excellence.

# Management & Engineering for Manufacturing Annual Report Summary 1998-1999

The Management & Engineering for Manufacturing (MEM) program graduated seven students this past year. Two completed their work in the fall, and five finished in the spring. Companies that hired the graduates were Sikorsky Aircraft, General Electric Medical Systems (Milwaukee, WI), Spirol International (Danielson, CT), and Osram Sylvania. The average starting salary for graduates who have accepted offers was \$43,375.

Dr. Jeffrey Rummel assumed the role of Co-Director of the program in the fall of 1998 for the School of Business Administration, working with Dr. Robert Jeffers in Mechanical Engineering. Dr. Rummel continues to coordinate the placement and internship activities of the program. He and Dr. Jeffers visited the Ensign Bickford Company. The meeting explored opportunities for projects, internships, and permanent positions for students in the program. There were also meetings on campus with the Pratt & Whitney Supply Chain Management group, Caval Tools, and Dresser Industries. All made offers to interns for the summer, along with Pitney Bowes, Highway Safety Company, Hartford Compressors, and Northeast Utilities. The program is also listed in *CBIA Employers' Guide to Training Resources*.

The web site for the program ([www.sba.uconn.edu/mem](http://www.sba.uconn.edu/mem)) is working. It maintains current links to our alumni and students, in addition to providing general information about the program, and links to the specific MEM classes.

During the spring semester, seven students participated in the final design course of the program, MEM 215W. They worked on one of two projects under the supervision of Marty Wood and Jeff Rummel. One of the projects was supported by Caval Industries of Newington, CT.

Three new instructors joined the MEM team. Drs. Bi Zhang and Lakshman Thakur jointly taught MEM 211, Introduction to Manufacturing Systems in the spring semester. Dr. Krishna Pattipati joined Dr. Rummel in teaching MEM 231, Computers in Manufacturing.

There were 31 students associated with the program this year. There were 12 students in the freshman class, though not all were in the program.

A major task remains to be addressed in the next year: the recruitment of students into the program. The Co-Directors participated in the three open house opportunities in the fall and the spring. Also, Dr. Jeffers visited all of the Engr. 150 sections before registration for the spring term.

If you have recommendations, comments or suggestions regarding this Annual Report, please contact Nan Cooper at (860) 486-2297 or nrcooper@engr.uconn.edu.

**University of Connecticut  
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