

SCHOOL OF ENGINEERING ANNUAL REPORT 2002 - 2003



Lobby, Information Technologies Engineering Building



University of
Connecticut

School of Engineering

**UNIVERSITY OF CONNECTICUT
SCHOOL OF ENGINEERING ANNUAL REPORT
2002-2003**

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SCHOOL OF ENGINEERING

ANNUAL REPORT

2002-2003

The School of Engineering made great strides during the year, despite significant budget cuts affecting both the University and the School, precipitated by the State's economic downturn. Through careful planning and strategic decision making, the School was able to not only sustain – but also expand – tenure track faculty positions, research initiatives and outreach efforts.

STRATEGIC PRIORITIES

Research

During the year, the School continued to emphasize excellence in research, and to secure funding from major federal and corporate sources in support of cutting-edge research.

The Connecticut Global Fuel Cell Center (CGFCC) grew significantly in 2002-03. In addition to two endowed faculty, the Center hired five additional employees, including a program manager, research professors, research and program assistants, and a design technician. The CGFCC was awarded a second-phase Congressional earmark in the amount of \$3.5 million to continue development of micro-miniature portable fuel cells for the U.S. Army. Progress on this project was excellent, and a third phase is planned. In addition, the Center continued to negotiate collaborative agreements with industrial partners during the year, including a \$1 million contract with the Connecticut Clean Energy Fund (Connecticut Innovations) to support development of a state-of-the-art fuel cell stack testing laboratory. Under terms of this agreement, using standardized testing and evaluation techniques, the CGFCC will provide companies and developers with comparative data on the performance, operational characteristics and durability of fuel cells.

Cognizant of the evolving needs of the nation, in early 2003 the School established two major research centers, one in homeland security technologies and the second in bioinformatics. The Center for Optics, Sensing and Tracking in Homeland Security was initiated with startup support from General Electric and comprises a core research team of more than 30 faculty members from the engineering disciplines and other schools who are actively involved in various facets of homeland security, from bioterrorism detection to information security and public policy. In concert with creation of the Center, we are organizing a major International Conference on Advanced Technologies for Homeland Security that will transpire September 25-26, 2003 at the Storrs campus. Currently, Connecticut Governor John Rowland, NASA Administrator Sean O'Keefe, and Congressman Rob Simmons are slated to participate as speakers and/or members of the Executive Committee. In addition, dozens of other top officials from DARPA, the Department of Agriculture, various military and federal laboratories, the Department of Homeland Security, OSTP, NSF, leading universities and industry are slated to present workshops, plenary sessions and panel discussions. Interest is exceptionally high, and we anticipate attendance to approach 500 participants, from state, federal and local governments; private industry; federal laboratories and academia.

The Bioinformatics and Biocomputing Institute (BIBCI) unites researchers working in the medical and biosciences fields with computational researchers. Founded with initial partial seed support from the National Institutes of Health, BIBCI brings together faculty from the School of Engineering, Department of Molecular & Cell Biology, Department of Statistics, and UConn Health Center in Farmington, CT with the objective of helping to enhance biomedical and biological research using advanced computing techniques.

Outreach

The School continued its ambitious outreach program with the objectives of enhancing awareness of engineering as an important, versatile field of study and career. Our efforts involved continuation of our special workshops for top junior high and high school students and teachers, and various promotional items geared to expand awareness of the breadth of research activities and quality programs offered by the School of Engineering. During 2002-03, the School once again sponsored the following:

- **Engineering 2000** – this week-long residential summer camp for promising high school juniors and seniors took place June 23-28, 2002. Students examined core engineering and technological concepts and developed working models that demonstrate principles in action. As in past years, major financial support for participating students made this experience virtually cost-free for them. The 2002 event attracted 80 students, including 25 female students, representing 58 participating schools around Connecticut and Rhode Island.
- **Connecticut Invention Convention** – for the fourth consecutive year, on April 5, 2003, the School of Engineering hosted and sponsored this state-wide K-12 competition, held at Gampel Pavilion. The event is the culmination of invention fairs conducted throughout Connecticut. The 2003 event attracted more than 650 participants and a total attendance of more than 2,800. During the convention, engineering departments and centers host hands-on, interactive instructional displays.
- **da Vinci Workshop** – five-day residential short course introducing New England middle and high school math/science teachers to engineering and technology concepts and supplying them with academic units that may be readily infused into the preexisting curricula. The August 4-9 program attracted 40 teachers from Connecticut, Massachusetts and Rhode Island.

In addition, the School published two issues of its twice-yearly newsletter (circ. 20,000), *Frontiers*. *Frontiers* strives to satisfy the diverse interests of School of Engineering alumni, faculty and students; corporate executives; prospective students; peer-institution academics; Connecticut legislators and policy makers; and members of the University of Connecticut academic community.

During the year, we dramatically renovated our School of Engineering website (www.engr.uconn.edu), adding significant new portions highlighting our research prowess. We also completed major renovations to the websites devoted to our Electrical & Computer Engineering Department, Civil & Environmental Engineering Department, Mechanical Engineering Department, Connecticut Global Fuel Cell Center, and on-site Master of Engineering degree program (MENG). In the spring, we created web sites for the newly created Center for Optics, Sensing and Tracking in Homeland Security, Bioinformatics & Biocomputing Institute, and International Conference on Advanced Technologies in Homeland Security. We believe that, increasingly, our constituents look to the Internet for information concerning our research initiatives, undergraduate and graduate programs, educational philosophy and academic advantages. Maintaining and upgrading our array of websites is vital meeting this evolving need.

Another key facet of our program of outreach is the annual School of Engineering banquet. In four years, this yearly all-school event has grown three-fold in terms of attendance. The 2002 engineering banquet, held May 5, 2003, was attended by nearly 700 leading corporate executives, university officers, and School of Engineering alumni, faculty, student scholars and their families. This year, more than 30 companies sponsored the evening's events or provided scholarship support. In addition, during the 2003 banquet we inducted 23 alumni leaders into the nascent Academy of Distinguished Engineers and presented three awards for Distinguished Service, to Senator Chris Dodd, Congressman Rob

Simmons, and Dr. Frank Preli of UTC Fuel Cells. The Academy of Engineers honors our most outstanding graduates – leaders in their respective fields whose careers are characterized by exceptional achievements and lasting impact. The annual banquet is an important means of promoting our School and building stronger alliances with our engineering constituents, including industrial partners.

Undergraduate Enrollment

Undergraduate enrollment continued to climb, while the quality of incoming freshmen – based on SAT scores and class ranking – improved. For the fall 2002 term, the School received 1,470 applications, of which 790 students were admitted and 226 submitted paid deposits before the deadline. This reflects a continued upward trend, particularly in contrast with 1997 figures, when 855 applications were received, about 480 were admitted, and 179 submitted paid deposits. Additionally, for the fall 2002 term, we admitted 32 valedictorians and salutatorians to the School of Engineering

The School of Engineering received an unexpected, anonymous gift in the amount of \$500,000 early in 2003 from a distinguished alumnus. Paired with state endowment-matching funds, the gift totals \$750,000. The money was used to establish a new Engineering Learning Mentorship Program with the objective of combatting attrition among undergraduate students. The problem of attrition is common in engineering programs across the country and is particularly high among members of underrepresented populations, including women and minorities. This new program attacks the problem in a multi-faceted fashion that includes a corps of senior engineering students who will provide academic mentorship in fundamental coursework to targeted freshman and sophomore students. The program will also involve peer advisors/graduate students who will help guide participating students through proper sequencing of coursework, scheduling, development of good study skills, time management and the like.

Faculty/Staff Recognition & Awards

The faculty, staff and graduate student recognition awards and incentives were continued during the 2002-03 fiscal year. The awards were presented during the fall engineering reception in September 2002, when honorees were formally recognized and thanked for their contributions, before a large audience of their peers. The awards included the following:

- Distinguished Engineering Professor Award is presented for outstanding achievements in research, teaching and service. The award entails a \$10,000 annual professional development grant per faculty member for each of three years, and recipients retain the title throughout this three-year period. The 2002 award winners were Montgomery Shaw (ChE), Bahram Javidi (ECE) and Robert Weiss (ChE).
- Outstanding Junior Faculty Award is presented to an assistant or associate professor for scholarly achievements in research, teaching and service with the promise of sustained future professional growth. The award entails a \$2,000 cash award and a \$5,000 grant for professional development per faculty member. The 2002 award winners were Emmanouil Anagnostou (CEE) and Wilson K.S. Chiu (ME).
- Outstanding Staff Service Award is presented for superior achievements in teaching and entails a \$2,000 cash award. The 2002 award winner was Robert Weiner (Engineering Computer Services).
- Outstanding Engineering Doctoral Student Award is presented to one student, and the student's thesis advisor, yearly in recognition for superior thesis research. The award entails a \$2,000 award each, to the student and his/her advisor. The 2002 award winners were Fuzheng Yang and Ranga Pitchumani (ME).

- Outstanding Engineering Master's Student Award is presented to one student, and the student's master's advisor, yearly in recognition of quality master's work. It entails a \$1,000 award each, to the student and his/her faculty advisor. The 2002 award winners were Mohammed Azam and Krishna Pattipati (ECE).

RENOVATIONS AND OTHER SUPPORT TO FACULTY

The long-awaited 110,000 sq. ft. Information Technology Engineering (ITE) Building, constructed at \$34 million with UConn 2000 monies, was completed and furnished in April. Faculty from the Electrical & Computer Engineering and Computer Science & Engineering departments moved in during two weeks in May. This project constitutes a significant improvement in the quality of space available to our programs and will be a great asset in attracting and retaining quality students and faculty. In addition, an attached 350-seat auditorium is slated for completion in June 2003.

The addition of this new space has meant that existing space within the core engineering buildings (Castleman, Bronwell, United Technologies and Engineering II) has undergone a reallocation among the departments. With Electrical & Computer Engineering faculty and staff now reestablished in the ITE Building, the resulting vacancies in the Bronwell Building will be filled by the Biomedical Engineering (BME) and Environmental Engineering programs. Furthermore, because Computer Science & Engineering faculty and staff also now reside in the ITE Building, open space in the United Technologies Engineering Building (UTEB) permits both Mechanical and Chemical Engineering to expand their activities within UTEB.

PERSONNEL

With the start of the fall 2002 term, the School of Engineering welcomed 18 new tenure-track faculty members, including four endowed chairs. These individuals were profiled briefly in the 2001-02 Annual Report summary and include:

Endowed Chairs and Distinguished Faculty

- Kenneth Reifsnider* (Ph.D. Johns Hopkins University), Pratt & Whitney Chair of Design and Reliability
- Sanguthevar Rajasekaran* (Ph.D. Harvard), UTC Professor of Computer Science & Engineering and Director of the GE E-Engineering Clinic
- Nigel Sammes* (Ph.D. Imperial College, London), UTC Chair Professor of Fuel Cell Technology and Director of Operations, Connecticut Global Fuel Cell Center
- Dani Or* (Ph.D. Utah State University), Northeast Utilities Foundation Chair Professor of Environmental Engineering
- David "Ed" Crow* (Ph.D. '72, University of Missouri-Rolla), Distinguished Professor in Residence, Mechanical Engineering

Non-Endowed Tenure-Track Faculty

- Amvrossios Bagtzoglou* (Ph.D. '90, University of California, Irvine), Associate Professor, Civil & Environmental Engineering
- John Chandy* (Ph.D. '96, University of Illinois, Urbana-Champaign), Assistant Professor, Electrical & Computer Engineering
- Swapna Gokhale* (Ph.D. '98, Duke University), Assistant Professor, Computer Science & Engineering
- Aggelos Kiayias* (Ph.D. '02, City University of New York), Visiting Assistant Professor, Computer Science & Engineering

Hanho Lee (Ph.D. '00, University of Minnesota), Assistant Professor, Electrical & Computer Engineering
Laurent Michel (Ph.D. '99, Brown University), Assistant Professor, Computer Science & Engineering
Michael Renfro (Ph.D. '00, Purdue University), Assistant Professor, Mechanical Engineering
Ranjan Srivastava (Ph.D. '99, University of Maryland), Assistant Professor, Chemical Engineering
Jiong Tang (Ph.D. '01, Pennsylvania State University), Assistant Professor, Mechanical Engineering
Bing Wang (Ph.D. '02, Princeton University), Assistant Professor, Electrical & Computer Engineering
Guiling Wang (Ph.D. '00, Massachusetts Institute of Technology), Assistant Professor, Civil & Environmental Engineering
Mei Wei (Ph.D. '97, University of New South Wales, Sydney), Assistant Professor, Metallurgy & Materials Engineering
Peng Zhang (Ph.D. '02, University of Illinois, Urbana-Champaign), Assistant Professor, Mechanical Engineering
Lei Zhu (Ph.D. '00, University of Akron), Assistant Professor, Chemical Engineering

Retirements

In early 2003, the State of Connecticut announced an early retirement incentive program intended to help reduce the State's financial crisis. A number of faculty and staff within the School of Engineering elected to take advantage of this offer. Retiring faculty members include John Morral (Department Head), professor Norbert Greene, and professor-in-residence Maurice Gell, all of Metallurgy & Materials Engineering; associate professor (Hartford) of Civil & Environmental Engineering Ernest Uthgenannt; professors Lee Langston and Herb Koenig of Mechanical Engineering; and Chemical Engineering professors Mike Cutlip and Bob Coughlin. Staff retirements include Tom Marcellino, Machine Shop Manager; Academic Assistant (MMAT) Charles Koch; Administrative Assistant (MMAT) Terry Provost; and Secretary II (CEE) Anne Tambornini.

ALUMNI

In early 2003, we launched the Academy of Distinguished Engineers to recognize and honor our most exceptional alumni, who will be elected and inducted into the Engineering Hall of Fame each year. In creating this Academy, we developed selection procedures and detailed governing bylaws. As discussed earlier in this summary, in 2003, we selected 23 Founding Fellows, who were inducted during the School of Engineering banquet. Included in this impressive group are two astronauts; a number of former and current CEOs, presidents and founders of major corporations; academicians and others whose contributions to the engineering profession have been exceptional.

Dean Faghri also maintained a periodic schedule of meetings with alumni at receptions held in various cities in the Northeast: Boston, New York City, Stamford and Washington, DC. These meetings produced a strong core of dedicated alumni and created a communications pipeline that will benefit the School for many years.

CHEMICAL ENGINEERING DEPARTMENT
ANNUAL REPORT SUMMARY
2002-2003

The growth observed in the research activities in the Department of Chemical Engineering continued during the 2002-2003 academic year. External sponsored research funding exceeded \$3 million, graduate Ph.D. program enrollments continued to grow, more than 50 refereed journal articles were published by departmental faculty, and the number of conference presentations, conference papers, and invited seminars contributed by departmental faculty all showed increases over last year's already high levels. Research funding and chemical engineering Ph.D. program enrollments reached all-time high levels for the second consecutive year. Three members of the faculty, Bob Weiss, Monty Shaw, and Doug Cooper, received major awards from the University of Connecticut for research and education.

The second year of the industry-funded "Frontiers in Chemical Engineering" Distinguished Lectureship, celebrating research and education in chemical engineering, was successfully held in late April. This year, the associated essay contest on the theme of the lecture attracted several essays on the ethics of biotechnology from local high school students. This event brought high school students and their teachers to the department, with the winner and the distinguished lecturer both recognized as part of the two day event. An Outstanding High School Math and Science Teacher award was also presented to a Connecticut teacher nominated and selected by our undergraduate students at this event.

Last summer, the Department successfully debuted its NSF-supported Research Experience for Undergraduates (REU) program in Chemical Engineering at the Nanoscale. During summer 2002, a total of 12 undergraduate students from U.S. universities (selected from nearly 40 applicants) participated in the intensive 10-week residential research experience in the Chemical Engineering Department. This summer, in the second year of the program, we have enrolled 11 students out of an applicant pool of more than 130. Our REU site is the first-ever REU site grant awarded to any engineering department or program at UConn, and is expected to foster the recruitment of talented domestic graduate students; one member of our initial REU class has already decided to join our Ph.D. program and will be enrolling this fall.

SCHOLARSHIP

A review of the scholarly activities of the faculty this past year indicates that we continue to make excellent progress toward our goal of becoming a top-ranked chemical engineering research department. The number of grants active in the department during the fiscal year reached record levels, with 88 active grants bringing in more than \$3.6 million in funding. Inclusion of faculty with joint appointments in the department brings the total to more than \$4.6 million. These numbers include nearly \$1 million in funding in the area of fuel cells provided through a block grant to the School of Engineering. Average funding per faculty member was more than \$310,000, a record level of per capita funding that is nearly 50% greater than levels four years ago. In addition to increased external funding, scholarly activity remained strong with 52 archival journal articles published, 45 papers published in conference proceedings, over 40 invited presentations and seminars, and 64 contributed presentations delivered.

Consistent with this, the number of Ph.D. students supervised by departmental faculty continued to climb. As noted above, the number of Ph.D. students supervised by departmental faculty reached record levels, with a total of 67 active Ph.D. students in June 2003. The table below, updated from last year's report, shows the recent growth clearly. Of these, 45 are full-time chemical engineering Ph.D. students,

with the balance from the interdisciplinary polymer science and environmental engineering programs. Because this increase in Ph.D. enrollments began in 1999, we expect to see a sharp increase in Ph.D. graduation rates beginning with the 2003-2004 academic year. Average graduation rates of 10 students per year are anticipated over the next several years, which will make us one of the top Ph.D. granting chemical engineering departments in the country on a per faculty member basis.

Table I. Ph.D. Students Supervised by Chemical Engineering Faculty

Year (June of)	Ph.D. students
2003	67
2002	59
2001	56
2000	48
1999	41
1998	27

With regard to graduate admissions, our program achieved a record level of selectivity. Fewer than 10% of the applications to our Ph.D. program were admitted. Overall applications, including applications to the part-time M.S. program, were 223, with 23 offered admission for overall selectivity of 10%.

Several of the faculty again received honors for their research and educational achievements this past year. In April 2003, Professor Robert Weiss was named a Board of Trustees Distinguished Professor, the highest scholarly honor bestowed by the University on its faculty. Professor Weiss also received a research excellence award from the AAUP, and was awarded the 2003 Engineering/Technology Award by the Society for Plastics Engineers (SPE). Also in April, Professor Doug Cooper was named a Teaching Fellow by the Institute of Teaching and Learning, the highest teaching honor awarded by the University. Professor Monty Shaw received a University of Connecticut Chancellor's Research Excellence Award in May of 2003. During the past year, Assistant Professor Patrick Mather received a "Best Paper" award for a contribution to SPE. Professor Mather also received the 2002-2003 Rogers Teaching Award for excellence in undergraduate teaching by vote of the senior class.

PERSONNEL

Assistant Professor Ranjan Srivastava, with expertise in the field of biochemical/biomedical engineering and Assistant Professor Lei Zhu, a specialist in nanostructured block co-polymers, joined the faculty in August 2002. Professors Robert Coughlin and Michael Cutlip announced their retirement from the faculty in June 2003.

STUDENTS

Our 2002-2003 graduating class consisted of 28 students. Current junior year enrollments indicate a comparably sized graduating class next year. Overall Honors Program enrollments continued to lead the university. During the past academic year, 32% of our undergraduates were participating in the Honors Program. An Honors track was developed and implemented, identifying specific chemical engineering honors courses each year and culminating with a for-credit independent research project during the senior year.

This level of Honors participation is again the highest level ever for the Department, and again places the Chemical Engineering Department first in Honors enrollment among accredited academic majors at the University of Connecticut. The University average is approximately 8%.

ENROLLMENTS, RECRUITING, AND OUTREACH

Increased undergraduate enrollments remain a departmental goal. The number of entering students declaring chemical engineering as a major rose for the second consecutive year to 20 for fall 2003, up from 17 enrolled entering freshmen in the fall 2002 class. While again an increase, it remains slightly below our target level. The challenge remains in increasing the number of applications while maintaining student quality. Aggressive recruitment of undecided engineering students and transfers from other programs within the University will again continue; this approach has typically boosted our sophomore class size by approximately 5 over the entering freshman class.

Undergraduate research remains a core strength of our Department. Sixteen of 25 students, or 65%, of the seniors surveyed, indicated that they participated in independent research at some time during their education at UConn, consistent with 60-70% participation levels noted in previous years.

OTHER ACTIVITIES

The departmental seminar series continued this year under the generous sponsorship of Uniroyal Chemical.

With a grant from Alstom Power Inc., the second *Frontiers in Chemical Engineering Distinguished Lectureship* was held in April 2003. This lectureship involves two lectures yearly by a prominent chemical engineering scholar, one of a general nature and one a specialized technical lecture. This year's lectures, "Genomics: New Opportunities for Engineers," and "Minimal Cell Models: Bioinformatics in Reverse?" were presented by Professor Michael Shuler, of Cornell University. The Frontiers Lectureship is intended to recognize outstanding accomplishments in chemical engineering and to share the excitement of engineering science and technology with a broad audience that includes high school teachers and students. Participating students from Connecticut high schools attended the general lecture by Professor Shuler and contributed essays on the subject of his general lecture. One high school student was chosen for special recognition during the Frontiers awards dinner based on her essay on ethical issues in genetic engineering.

The third edition of *Principles*, the full color annual departmental newsletter, was written and assembled and will be published in July 2003. *Principles* will again be sent to all departmental alumni, all chemical engineering Department Heads in the U.S., members of the Advisory Board, seminar speakers, and selected members of the University community.

Finally, during April 2003, an assessment team visited the Department as part of the University assessment process. Observations of ongoing changes in the Department were quite positive. The team made a few recommendations regarding the curriculum that will be reviewed by the faculty in the coming academic year.

CHEMICAL ENGINEERING DEPARTMENT
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2002-2003

Luke E. K. Achenie

“Optimization of Chemical Processes Under Uncertainty: the Case of Insufficient Process Data at the Operation Stage,” (with G.M. Ostrovski, I. Datskov and Y. Volin), *American Institute of Chemical Engineers Journal*, Vol. 49, pp. 1216-1232, 2003.

“A Reduced Dimension Branch-and-Bound Algorithm for Molecular Design,” (with G.M. Ostrovsky and M. Sinha), *Computers & Chemical Engineering*, Vol. 27, No. 4, pp. 551-567, 2003.

“Blanket Wash Solvent Blend Design Using Interval Analysis,” (with M. Sinha and R. Gani), *Industrial and Engineering Chemistry Research*, Vol. 42, pp. 516-527, 2003.

“Multiscale Gene Expression Profiling in a Differentially Susceptible Mouse Colon Cancer Model,” (with K.K. Guda, H. Cui, S. Garg, P. Nambiar and D.W. Rosenberg), *Cancer Letters*, Vol. 191, pp. 17-25, 2003.

“Interval Global Optimization in Solvent Design,” (with M. Sinha), *Reliable Computing*, Vol. 9, pp. 1-22, 2003.

“On the Solution of Mixed-Integer Nonlinear Programming Models for Computer Aided Molecular Design,” (with G.M Ostrovsky and M. Sinha), *Computers and Chemistry*, Vol. 26, No. 6, pp. 645-660, 2002.

“A Hybrid Global Optimization Approach for Solvent Design,” (with Y. Wang), *Computers and Chemical Engineering*, Vol. 26, No. 10, pp. 1415 – 1425, 2002.

Douglas J. Cooper

“Tuning Guidelines for DMC of Integrating (Non-Self Regulating) Processes,” (with D. Dougherty), *Industrial and Engineering Chemistry Research*, Vol. 42, pp. 1739, 2003.

“A Practical Multiple Model Adaptive Strategy for Multivariable Model Predictive Control,” (with D. Dougherty), *Control Engineering Practice*, Vol. 11, pp. 649, 2003.

“A Practical Multiple Model Adaptive Strategy for Single-Loop MPC,” (with D. Dougherty), *Control Engineering Practice*, Vol. 11, pp. 141, 2003.

Michael B. Cutlip

“An Exercise for Practicing Programming in the ChE Curriculum – Calculation of the Thermodynamic Properties Using the Redlich-Kwong Equation of State,” (with M. Shacham and N. Brauner), *Chemical Engineering Education*, Vol. 37, No. 2, pp. 148-152, 2003.

Can Erkey

“Synthesis of CuS Nanoparticles in Water in Carbon Dioxide Microemulsions,” (with X. Dong and D. Potter), *Industrial and Engineering Chemistry Research*, Vol. 41, pp. 4489, 2002.

James M. Fenton

“Development of New CO Tolerant Ternary Anode Catalysts for Proton Exchange Membrane Fuel Cells,” (with R. Venkataraman and H.R. Kunz), *Journal of the Electrochemical Society*, Vol. 150, No. 3, pp. A278-A284, 2003.

“Chemically-modified Nafion[®]/poly(Vinylidene Fluoride) Blend Ionomers for Proton Exchange Membrane Fuel Cells,” (with M.-K. Song, Y.-T. Kim, H.R. Kunz and H.-W. Rhee), *Journal of Power Sources*, Vol. 117, pp. 14-21, 2003.

“Electrooxidation of Hydrogen with Carbon Monoxide on Pt/Ru-Based Ternary Catalysts,” (with C. He and H.R. Kunz), *Journal of the Electrochemical Society*, Vol. 150, No. 8, pp. A1017-A1024, 2003.

Joseph J. Helble

“Effect of Precursor and Solvent on Morphology of Zirconia Nanoparticles Produced by Combustion Aerosol Synthesis,” (with A. Limaye), *Journal of the American Ceramic Society*, Vol. 86, No. 2, pp. 273-278, 2003.

“Gas-Solid Reaction of Arsenic Metal Vapors with Fly Ash,” (with R.O. Sterling), *Chemosphere*, Vol. 51, No. 10, pp. 1111-1119, 2003.

Patrick T. Mather

“Thermomechanical Characterization of a Tailored Series of Shape Memory Polymers,” (with C. Liu), *Journal of Applied Medical Plastics*, Vol. 6, No. 2, pp. 47-52, 2002.

“Effect of Methyl Methacrylate/Polyhedral Oligomeric Silsesquioxane Random Copolymers in Compatibilization of Polystyrene and Poly(methyl methacrylate) Blends,” (with W. Zhang, B.X. Fu, Y. Seo, E. Schrag, B. Hsiao, N.-L. Yang, D. Xu, H. Ade, M. Rafailovich and J. Sokolov), *Macromolecules*, Vol. 35, pp. 8029-8038, 2002.

“Chemically Crosslinked Polycyclooctene: Synthesis, Characterization, and Shape Memory Behavior,” (with C. Liu, S.B. Chun, L. Zheng, E.H. Haley and E.B. Coughlin), *Macromolecules*, Vol. 35, No. 27, pp. 9868-9874, 2002.

“Synthesis and Characterization of ABA Triblock Copolymers Containing Polyhedral Oligomeric Silsesquioxane Pendant Groups,” (with J. Pyun, K. Matyjaszewski, J. Wu, G.-M. Kim and S.B. Chun), *Polymer*, Vol. 44, pp. 2739-2750, 2002.

“Amphiphilic Telechelics Incorporating Polyhedral Oligosilsesquioxane (POSS): 1. Synthesis and Characterization,” (with B.-S. Kim), *Macromolecules*, Vol. 35, pp. 8378-8384, 2002.

“A New Hyperbranched Poly(arylene-ether-ketone-imide): Synthesis, Chain-end Functionalization, and Blending with a Bismaleimide,” (with J.-B. Baek, H. Qin and L.-S. Tan), *Macromolecules*, Vol. 35, pp. 4951-4959, 2002.

Richard S. Parnas

“Pore Network Modeling of Permeability for Textile Reinforcements,” (with J.-F. Delerue, S.V. Lomov, I. Verpoest and M. Wevers), *Polymer Composites*, Vol. 24, No. 3, pp. 344-357, 2003.

“Using Textile Topography to Analyze X-Ray CT Data of Composite Microstructure,” (with M. Wevers and I. Verpoest), *Polymer Composites*, Vol. 24, No. 2, pp. 212-220, 2003.

“Model Assisted Feedback Control for Liquid Composite Molding,” (with J.P. Dunkers, K.M. Flynn and D.D. Surlas), *Composites A*, Vol. 33, pp. 841-854, 2002.

“New Set-up for Measurement of Permeability Properties of Fibrous Reinforcements for RTM,” (with K. Hoes, D. Dinescu, H. Sol, M. Vanheule, Y. Luo and I. Verpoest), *Composites A*, Vol. 33, No. 7, pp. 959-69, 2002.

“Experimental and Theoretical Characterization of the Geometry of Flat Two- and Three-axial Braids,” (with S.V. Lomov, A. Nakai, S.B. Ghosh and I. Verpoest), *Textile Res. Journal*, Vol. 72, No. 8, pp. 705-712, 2002.

“Using a Localized Fluorescent Dye to Probe the Glass/Resin Interphase,” (with J.L. Lenhart, J.H. van Zanten and J.P. Dunkers), *Polymer Composites*, Vol. 23, pp. 555-563, 2002.

Montgomery T. Shaw

“Soft Gels with Ordered Iron Particles: Fabrication and Electrorheological Response,” (with Y. An and B. Liu), *International Journal of Modern Physics, Part B*, Vol. 16, pp. 2440-2446, 2002.

“Actuating Properties of Soft Gels with Ordered Iron Particles: Basis for a Shear Actuator,” (with Y. An), *Smart Materials and Structures*, Vol. 12, pp. 157-163, 2003.

“‘Plastic Deformation’ Mechanism and Phase Transformation in a Shear-induced Metastable Hexagonally Perforated Layer Phase of a Polystyrene-*b*-poly(ethylene oxide) Diblock Copolymer,” (with L. Zhu, P. Huang, W.Y. Chen, X. Weng, S.Z.D. Cheng, Q. Ge, R.P. Quirk, T. Senador, E.L. Thomas, B. Lotz, B.S. Hsiao, F. Yeh and L. Liu), *Macromolecules*, Vol. 36, pp. 3180-3188, 2003.

Ranjan Srivastava

“Stochastic Versus Deterministic Modeling of Intracellular Viral Kinetics,” (with L. You, J. Summers and J. Yin), *Journal of Theoretical Biology*, Vol. 218, No. 3, pp. 309-321, 2002.

Robert A. Weiss

“Neutron Reflectivity Studies of Ionomer Blends,” (with B.J. Gabrys, A.A. Bhutto, D.G. Bucknall, R. Braiewa and D. Vesely), *Applied Physics A*, Vol. 74/S1, S336, 2002.

“Compatibilizers for Thermotropic Liquid Crystalline Polymer/Polyethylene Blends Prepared by Reactive Mixing,” (with Y. Son), *Polymer Engineering Science*, Vol. 42, pp.1322-1332, 2002.

“Compatibilization of Syndiotactic Polystyrene and a Thermotropic Liquid Crystalline Polymer Blend With a Zinc Salt of a Sulfonated Polystyrene Ionomer,” (with Y. Son), *Journal of Applied Polymer Science*, Vol. 87, pp. 564-568, 2003.

“Conductive Polymer Foams as Sensors for Volatile Amines,” (with Y.-B. Wang and G. Sotzing), *Chemistry of Materials*, Vol. 15, pp. 375-377, 2003.

“Small Angle Neutron Scattering Analysis of Blends with Very Strong Intermolecular Interactions: Polyamide/Ionomer Blends,” (with R.T. Tucker, C.C. Han and A.V. Dobrynin), *Macromolecules*, 36: 4404-4410, 2003.

Thomas K. Wood

“Antimicrobial Properties of the *Escherichia coli* R1 Plasmid Host Killing Peptide,” (with D.C. Pecota, G. Osapay and M.E. Selsted), *Journal of Biotechnology*, Vol. 100, pp. 1-12, 2003.

“Pitting Corrosion Control Using of Aluminum 2024 Using Protective Biofilms That Secrete Corrosion Inhibitors,” (with D. Ornek, C.H. Hsu, Z. Sun and F. Mansfeld), *Corrosion*, Vol. 58, pp. 761-767, 2002.

“Active Expression of Soluble Methane Monooxygenase from *Methylosinus trichosporium* OB3b in Heterologous Hosts,” *Microbiology*, Vol. 148, pp. 2-3, 2002.

Lei Zhu

“Interrelationships of Nanometer and Sub-nanometer Structures in a Hyper-branched Liquid Crystalline Polynorbornene,” (with Z. Liu, S.Z.D. Cheng, V. Percec and G. Ungar), *Macromolecules*, Vol. 35, pp. 9426, 2002.

“‘Plastic Deformation’ Mechanism and Phase Transformation in a Shear-induced Metastable Hexagonally Perforated Layer Phase of a Polystyrene-b-poly(ethylene oxide) Diblock Copolymer,” (with P. Huang, W.Y. Chen, X. Weng, S.Z.D. Cheng, Q. Ge, R.P. Quirk, T. Senador, M.T. Shaw, E. L. Thomas, B. Lotz, B.S. Hsiao, F. Yeh and L. Liu), *Macromolecules*, Vol. 36, pp.3180-3188, 2003.

CHEMICAL ENGINEERING DEPARTMENT
BOOKS, BOOK CHAPTERS, BOOK SECTIONS AND EDITED VOLUMES
2002-2003

Luke E. K. Achenie

Computer Aided Molecular Design: Theory and Practice, (with R. Gani and V. Venkatasubramanian, eds.), Elsevier Publishers, 401 pages, 2002.

“Introduction to CAMD,” (with R. Gani and V. Venkatasubramanian), Chapter 1 in *Computer Aided Molecular Design: Theory and Practice*, Elsevier Publishers, pp. 3-22, 2002.

“Challenges and Opportunities for CAMD,” (with R. Gani and V. Venkatasubramanian), Chapter 16 in *Computer Aided Molecular Design: Theory and Practice*, Elsevier Publishers, pp. 357-378, 2002.

“Optimization Methods in CAMD – I,” (with M. Sinha and G.M. Ostrovsky), Chapter 3 in *Computer Aided Molecular Design: Theory and Practice*, Elsevier Publishers, pp. 43-62, 2002.

“Case Study in Optimal Solvent Design,” (with M. Sinha and G.M. Ostrovsky), Chapter 10 in *Computer Aided Molecular Design: Theory and Practice*, Elsevier Publishers, pp. 247-260, 2002.

“CAMD in Solvent Mixture Design,” (with M. Sinha), Chapter 11 in *Computer Aided Molecular Design: Theory and Practice*, Elsevier Publishers, pp. 261-288, 2002.

Douglas J. Cooper

Practical Process Control Using Control Station Version 3.5, 300 page textbook accompanying the Control Station™ software, published by Control Station, LLC, Storrs, CT, 2003.

James M. Fenton

“Membrane/Electrode Additives for Low-Humidification Operation,” (with J.-C. Lin and H.R. Kunz), *Handbook of Fuel Cell Technology*, Volume 3, Part 3, Chapter 36, (W. Vielstich, A. Lamm and H. Gasteiger, eds.), John Wiley & Sons Ltd., Chichester, UK, pp. 456-463, 2003.

CHEMICAL ENGINEERING DEPARTMENT
CONFERENCE PROCEEDINGS AND OTHER PUBLICATIONS
2002-2003

Luke E. K. Achenie

“A Hybrid Global Optimization Approach for Solving MINLP Models in Product Design,” (with Y. P. Wang), *Proceedings of the European Symposium on Computer Aided Process Engineering*, (Grievink and Van Schijndel, eds.), Elsevier Science, Vol. 12, pp. 997-1002, 2002.

“Systems Engineering Approaches for Gene Expression Profiling,” (with S. Garg), *Proceedings of the European Symposium on Computer Aided Process Engineering*, (Grievink and Van Schijndel, eds.), Elsevier Science, Vol. 12, pp. 883-888, 2002.

Douglas J. Cooper

“Design and Tuning of PID Controllers for Integrating (Non-Self Regulating) Processes,” *Proceedings of the ISA 2002 Annual Meeting*, Vol. 424, pp. 057, 2002.

Michael B. Cutlip

“Modular and Sequential Construction of Complex Process Models – Applications to Process Hazard Assessment,” (with M. Shacham and N. Brauner), *Proceedings of the Escape-13 Conference*, Lappeenranta, Finland, June 1-4, 2003.

“Departmental Advisory Boards – Their Creation, Operation, and Optimization,” Session 3413, *Proceedings of the ASEE Annual Conference*, Nashville, TN, June 22-25, 2003.

“Post Summer School Compilation of Materials,” (with S. Farrell), A Web Site and Two CD-ROM Set of Educational Materials, American Society for Engineering Education, Summer School for Chemical Engineering Faculty, University of Colorado, Boulder, CO, November 2002.

Can Erkey

“A Solvent-Free Process for Preparing Conductive Elastomeric Foams by an *In Situ* Polymerization of Pyrrole,” (with R.A. Weiss, D. Cohen and S. Shenoy), *Polymer Preprints*, Vol. 43, No. 2, pp. 928-929, 2002.

James M. Fenton

“The Fuel Cell – An Ideal Chemical Engineering Undergraduate Experiment,” (with J.-C. Chou Lin, H.R. Kunz and S.S. Fenton), *Proceedings of the 2003 American Society for Engineering Education Annual Conference*, June 2003.

Joseph J. Helble

“Development of an Improved Kinetic Model for Mercury Oxidation,” (with J. Qiu and R.O. Sterling), CD-ROM *Proceedings of the Clearwater Conference*, Tampa, FL, 2003.

“Modeling the Effects of Excluded Minerals on the Combustion-Derived Ash Particle Size Distribution,” (with A.C. Davila), CD-ROM *Fuel Chemistry Division Preprints*, American Chemical Society, 2002.

“A Dynamic Model of the Transformations of Arsenic During Coal Combustion,” (with R.O. Sterling), CD-ROM *Fuel Chemistry Division Preprints*, American Chemical Society, 2002.

Patrick T. Mather

“Acyclic Diene Metathesis (ADMET) Polymerization of Unsaturated Thermotropic Polyesters from Liquid Crystalline Dienes,” (with H. Qin, B.J. Chakulski, G.S. Constable and B.E. Coughlin), *Polymer Preprints* (American Chemical Society, Division of Polymer Chemistry), Vol. 44, No. 1, pp. 40-41, 2003.

“Modification of bisphenol-A BMI Resin (BPA-BMI) with Allyl-terminated Hyperbranched Polyimide (AT-PAEKI),” (with H. Qin, J.-B. Baek and L.-S. Tan), *Polymer Preprints* (American Chemical Society, Division of Polymer Chemistry), Vol. 44, No. 1, pp. 132-133, 2003.

“Thermomechanical Characterization of Blends of Poly(vinyl acetate) with Semicrystalline Polymers for Shape Memory Applications,” (with C. Liu), *SPE ANTEC 2003 Proceedings*, pp. 1962-1966, 2003.

“Tailored Shape Memory Polymers: Not all SMPs are Created Equal,” (with C. Liu, I. Rousseau and H. Qin), CD-ROM *Proceedings of the First World Congress on Biomimetics and Artificial Muscles*, 2003.

“Development of an Electrostatic Spinning Process for Molten Polymers,” (with J.-H. Lee, A.E. Senador, Jr., Y. An, X. Fang and M.T. Shaw), CD-ROM *TEXCOMP-6 Proceedings*, 2002.

“Influence of Ionic Strength on Build-Up of Multilayer Thin Films Using Spin Self-Assembly,” (with C.J. Lefaux and J.A. Zimmerman), *Polymer Preprints* (American Chemical Society, Division of Polymer Chemistry), Vol. 43, No. 2, pp. 356-357, 2002.

“Rheology and Morphology of Molecular Composites from Sulfonated Rigid Rods,” (with J. Wu, G.-M. Kim, N. Venkatasubramanian, T.D. Dang and F.E. Arnold), *Polymer Preprints* (American Chemical Society, Division of Polymer Chemistry), Vol. 43, No. 2, pp. 1051-1052, 2002.

“Two-Stage Electroactuation of Partially Neutralized Hydrogels,” (with I.A. Rousseau), *Polymer Preprints* (American Chemical Society, Division of Polymer Chemistry), Vol. 43, No. 2, pp. 1027-1029, 2002.

Richard S. Parnas

“Comparison of Optical Coherence Tomography, X-Ray Computed Tomography, and Confocal Microscopy Results from an Impact Damaged Epoxy/E-Glass Composite,” (with J.P. Dunkers, D.

P. Sanders, D.L. Hunston, M.J. Everett and W.H. Green), CD-ROM *ASNT 12th Annual Research Symposium*, Orlando, FL, March 12-14, 2003.

“Using Topological Rule Based Algorithms to Analyze X-Ray CT Data of Composite Microstructure,” (with M. Wevers and I. Verpoest), CD-ROM *ASNT 12th Annual Research Symposium*, Orlando, FL, March 12-14, 2003.

Montgomery T. Shaw

“Zero-shear-rate Viscosity of HDPE Melts Using Plane-sphere Squeezing Flow,” (with E. Cua), *Proceedings of the 6th European Conference on Rheology*, (H. Münstedt, J. Kashta and A. Merten, eds.), pp. 475-476, 2002.

“Development of an Electrostatic Spinning Process for Molten Polymers,” (with J.-H. Lee, A.E. Senador, Jr., Y. An, X. Fang and P.T. Mather), *TEXCOMP-6 Proceedings*, 4 pages, 2002.

“Soft Gels with Ordered Iron Particles: Fabrication and Electrorheological Response,” (with Y. An and B. Liu), *Proceedings of the VIIth International Conference on ER/MR Suspensions* (G. Bossis, ed.), World Scientific Publishing Co., Singapore, pp. 500-506, 2002.

“Miscibility Enhancement of Polystyrene/poly(ethylene oxide) Blends by Sulfonation of Polystyrene,” (with R. Guan, J. Gupton and R.A. Weiss), *ACS Polymer Preprints*, Vol. 43, No. 2, pp. 1047-1048, 2002.

“Sulfonated Poly(ether ketone ketone) Membranes,” (with Y.S. Chun and R.A. Weiss), *Proceedings, Advances in Materials for PEM Fuel Cell Systems*, Polymer Division, American Chemical Society, Asilomar, CA, February 2003.

Robert A. Weiss

“Preparation of Conductive Polymer Foams and Their Application as Chemical Sensors,” (with Y. Wang and G.A. Sotzing), *Polymer Preprints*, Vol. 43, No. 2, pp. 946-947, 2002.

“Miscibility Enhancement of Polystyrene/Poly(ethylene oxide) Blends by Sulfonation of Polystyrene,” (with R. Guan, J. Gupton and M.T. Shaw), *ACS Polymer Preprints*, Vol. 43, No. 2, pp. 1047-1048, 2002.

“Crystallization Kinetics of Bisphenol A Polycarbonate in Polycarbonate/Ionomer Blends,” (with L. Xu), *Polymer Preprints*, Vol. 43, No. 2, pp. 1041-1042, 2002.

“A Solvent-Free Process for Preparing Conductive Elastomeric Foams by an *In-situ* Polymerization of Pyrrole,” (with C. Erkey, D. Cohen and S. Shenoy), *Polymer Preprints*, Vol. 43, No. 2, pp. 928-929, 2002.

“Evolution of Golf Ball Design and Materials,” (with T.J. Kennedy), *Polymer Preprints*, Vol. 44, No. 1, pp. 229 (invited talk at the American Chemical Society Meeting), 2003.

“Sulfonated Poly(ether ketone ketone) Membranes,” (with Y.S. Chun and M.T. Shaw), *Proceedings, Advances in Materials for PEM Fuel Cell Systems*, Polymer Division, American Chemical Society, Asilomar, CA, February 2003.

Thomas K. Wood

“Field Evaluation of Corrosion Control Using Regenerative Biofilms (CCURB),” (with P.J. Arps, L.-C. Xu, F. Mansfeld, B.C. Syrett and J.C. Earthman), *NACE International Annual Conference, CORROSION/2003*, San Diego, CA, March 16, 2003.

Lei Zhu

“Hard and Soft Confinement Effects on Nano-confined Polymer Crystallization in Cylindrical Mesophases,” (with B.R. Mimnaugh, P. Huang, W.Y. Chen, Q. Ge, R.P. Quirk, S.Z.D. Cheng, E.L. Thomas, B. Lotz, B.S. Hsiao, F. Yeh and L. Liu), *Proceedings of the NATAS Annual Conference on Thermal Analysis and Applications*, Vol. 30, pp. 77-81, 2002.

“Phase Morphology and Crystal Orientation Changes in Nano-confined Lamellae of PEO-b-PS Block Copolymer,” (with P. Huang, J. Jing, Y. Chen, S.Z.D. Cheng, Y. Guo, Q. Ge, R.P. Quirk, B.S. Hsiao, F. Yeh and L. Liu), *Proceedings of the NATAS Annual Conference on Thermal Analysis and Applications*, Vol. 30, pp. 225-230, 2002.

CHEMICAL ENGINEERING DEPARTMENT
ACTIVE RESEARCH GRANTS AND CONTRACTS
2002-2003

Luke E. K. Achenie

“Osteoprogenitor,” National Institutes of Health/UCCH, 9/30/02 - 9/29/03, \$79,015.

“Framework for Designing Flexible Steady State and Dynamic Chemical Processes,” National Science Foundation, 4/15/01 - 3/14/04, \$241,542.

“Solvent Design - A Computer Aided Product Design Approach,” National Science Foundation, 7/1/01 – 6/30/04, \$274,357.

“Simulation and Optimization of Materials Processing Under Uncertainties,” (with PI: R. Pitchumani and co-PI: E. Santos) National Science Foundation, 9/1/01 – 8/31/04, \$409,140.

“CFD and Neural Network Modeling and Optimization of Miniature Fuel Cells,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/22/03 - 1/21/04, \$45,000.

“Computer Aided Modeling and Analysis of Portable PEM Fuel Cells,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 6/1/02 - 5/31/03, \$53,343.

Thomas F. Anderson

“Graduate Fellows in K-12 Classrooms,” (with co-PIs: K. Kazerounian, R. Vieth, T. Reagan and M. Wood), National Science Foundation, June 2002 – June 2005, \$1,430,000.

James D. Bryers

“Mass Transfer Mechanisms in Bacterial Biofilms,” National Institutes of Health, 1999-2005, \$1,488,000.

“Development of Biomaterials that Promote Beneficial Mammalian Cell Response while Preventing Bacterial Infection,” Kirsch Foundation of California, Individual Investigator Fellowship, 2000-2003, \$375,000.

“GAANN Environmental Biotechnology Training Grants,” (with co-PIs: B. Smets and K. Noll), Department of Education, 2000-2005, \$800,000.

“Substrata Surface Chemistry, Conformation of Contaminant Upon Adsorption, and Availability for Biodegradation,” National Science Foundation, 2001-2003, \$313,000.

“Multiple Photon Microscopy for Bacterial Biofilm Plasmid Dynamics,” National Science Foundation, 2002-2005, \$567,000.

“Engineering Biomaterials to Biologically Prevent Bacterial Infection,” National Institutes of Health, 2002-2008, \$875,000.

Douglas J. Cooper

UConn’s Process Control™ Consortium:

Honeywell Corporation, 8/00-8/03, \$15,000.

Owens Corning, 8/99-8/03, \$12,500.

Westinghouse Savannah River, 5/97-5/03, \$144,000.

Pavilion Technologies, 3/99-3/03, \$23,500.

Aramco Corporation, 12/01-1/03, \$9,000.

OFS Fitel, 8/01-8/02, \$5,000.

Training Workshops, 7/02-6/03, \$17,750.

“Dynamics and Control of a Hydrogen Fed Fuel Cell,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 6/02-5/03, \$140,040.

“Process Control Simulation Studies of a Portable Direct Methanol Fuel Cell Process,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/03-1/04, \$40,000.

Robert W. Coughlin

“Directed Evolution of Hydrogenase Enzyme to Produce Hydrogen for a Portable Fuel Cell,” (with co-PI: T. Wood), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/03-1/04, \$110,000.

Can Erkey

“Processing of Inorganic Materials using Supercritical Fluids,” Norton/St. Gobain, 6/1/00 – 5/30/03, \$115,000.

“Synthesis of Aerogels Using Supercritical Carbon Dioxide,” International Component Advantage, Inc., 6/1/01 – 12/31/02, \$172,000.

“REU Site in Chemical Engineering at the Nanoscale,” (with co-PI: J. Helble), National Science Foundation, 2/1/02-12/31/05, \$199,608.

“Development of a Diesel Fuel Processor for Integration into a 1kW Portable Fuel Cell System,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 6/1/02 – 5/30/03, \$78,395.

“Aerogel Based Catalysts for Hydrodesulfurization of Diesel for PEM Fuel Cells,” (with co-PI: M. Aindow), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/1/03-12/31/03, \$85,000.

“Supercritical Solution Assisted Processing of Monodisperse PLGA Nanoparticles,” (with co-PIs: D. Burgess and A. Asendei), National Science Foundation, 1/1/03-12/31/04, \$75,000.

James M. Fenton

“Characterization of High Temperature Membrane Electrode Assemblies,” (with co-PI: H.R. Kunz), Department of Energy via Los Alamos National Laboratory/University of California, Contract No. 25686-001-01 2T, 10/01/2000-12/31/03, \$137,444.

“2001 Technology for a Sustainable Environment: Novel Hydrogen Reactor/Separator Design for a Fuel Cell Vehicle Infrastructure to Maintain a Sustainable Environment,” National Science Foundation, Contract No: CTS-0124648, 9/15/01-8/31/03, \$100,000.

“CO Testing of Ionomem High Temperature Membrane Electrode Assemblies,” Battelle Pacific Northwest National Laboratory, Contract No: 5535, 1/8/03-5/1/03, \$15,000.

“Development, Characterization, and Optimization of CO Tolerant Microscale Proton-Exchange Membrane Fuel Cell,” (with co-PI: L. Zhu), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/03-1/04, \$150,000.

“Direct Methanol PEM Fuel Cells for Soldier Systems,” (with co-PI: H.R. Kunz), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 6/1/02-5/31/03, \$468,336.

Joseph J. Helble

“Combustion Aerosol Synthesis of Nanoscale Ceramics,” National Science Foundation Early CAREER Award, 6/1/98-12/31/02, \$225,300.

“Development of a Prototype *In-situ* Monitor for Determining the Size and Composition of Ambient Particulate,” Connecticut Innovations, 8/1/99-10/31/02, \$223,143.

“Synthesis of Controlled Composition Particulate for Health Effects Study,” U.S. Environmental Protection Agency, 6/98-6/03, \$21,500.

“Development of a Novel Process for Mercury Emissions Control,” U.S. Environmental Protection Agency, 7/1/00-6/30/03, \$224,900.

“Ash Formation Under High Pressure Conditions,” U.S. Department of Energy, (subcontract to Fluent), 6/1/01 - 5/31/04, \$149,000.

Conference on Nanoparticles and Nanostructures, National Science Foundation, 5/1/02-11/30/02, \$15,000.

“REU Site in Chemical Engineering at the Nanoscale,” (with co-PI: C. Erkey), National Science Foundation, 2/1/02-12/31/05, \$199,608.

“EPA Hazardous Substance Research Center,” U.S. Environmental Protection Agency (subcontract to Johns Hopkins), 10/1/01-9/30/03, \$87,000.

“High Capacity Thermally Regenerated Amines for CO₂ Capture,” NASA (subcontract to University of Florida), 6/15/02-6/14/04, \$139,009.

“Development of Novel Ceramic Nanoparticle – Nafion Nanocomposite Membranes for Fuel Cell Applications,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 3/03-12/03, \$40,000.

“Novel Support Materials for CO₂ Capture,” NASA (Connecticut Space Grant Consortium), 6/1/03-5/31/04, \$10,000.

Patrick T. Mather

“Electrospun Nanocomposites for Next-Generation Microwave Circuit Materials,” (with co-PI: M. T. Shaw), Connecticut Innovations, 7/1/00-12/31/02, \$230,773.

“Material and Process Development of Shape Memory Polymers for Biomedical Devices,” Boston Scientific Corporation, 1/03-1/04, \$191,951.

“CAREER: Orientational Dynamics in Flows of Thermotropic Polymers,” National Science Foundation Early CAREER Award (CTS Division), 2/1/2001-2/1/2006, \$369,206.

“Advanced Reinforced Thermoplastics for Dental Applications,” (with co-PIs: J. Goldberg and R.A. Weiss), Connecticut Innovations, 6/1/01-5/31/03, \$298,925.

“Molecular Composite Membranes (MCMs) for Portable Fuel Cells,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 6/1/02 – 5/31/03, \$36,910.

“Microfluid Strip Fuel Cells for Portable Devices and Sensors,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/03-1/04, \$75,000.

“Reactive Hyperbranched Polymers as Toughening Processing Aids for Composite Matrices,” Air Force Office of Scientific Research, 1/03-12/05, \$286,765.

“Structure-Property Elucidation in POSS-Based Thermoplastics,” Air Force Research Laboratory, AFRL/PRSM, 1/03-12/03, \$40,000.

“Development of New Rheological Tools for Asphalt,” (with co-PI: M.T. Shaw), Connecticut Cooperative Highway Research Program, 6/1/03-5/31/04, \$41,075.

Richard S. Parnas

“Acquiring and Using the Reinforcement Micro-Geometry to Predict Composite Properties,” University of Connecticut Research Foundation, 1/1/02 – 12/31/02, \$22,000.

“Statistical Distribution of the Permeability Tensor via High-Throughput Techniques,” Oak Ridge National Laboratory, 11/26/02 - 11/25/03, \$97,772.

“Proposal to Measure Fuel Cell Membrane Operation with Fiber Optic Sensors,” (with co-PI: T. Seery), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/03 - 1/04, \$80,000.

Montgomery T. Shaw

“Long-Term Aging of Nuclear Plant Cables,” Electric Power Research Institute, 3/1/99-12/31/03, \$161,000.

“Electrospun Nanocomposites for Next-Generation Microwave Circuit Materials,” (with co-PI: P. Mather), Connecticut Innovations, 7/1/00-12/31/02, \$230,773.

“Development of Proton Exchange Membranes Based on PEKK for Fuel Cell Applications,” (with co-PI: R.A. Weiss), Connecticut Innovations, 7/1/01-6/30/03, \$299,570.

“Corona-Resistant Insulation for Random-Wound Motor Systems,” (with co-PI: S.E. Boggs), General Electric, through Advanced Technology Institute, 3/16/01-5/31/03, \$92,392.

“Development of New Rheological Tools for Asphalt,” (with co-PI: P.T. Mather), Joint Highway Research Advisory Council, 6/1/02-5/31/04, \$41,075.

“Development of Proton Exchange Membranes,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 6/1/02-5/31/03, \$130,220.

“Development of Proton Exchange Membranes,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/03-1/04, \$75,000.

Ranjan Srivastava

“Development of a Plasmid Construct for Studying the Impact of Primary and Secondary Mutations on Ampicillin Selection Dynamics in *E. coli*,” University of Connecticut Research Foundation, 6/1/03-8/31/03, \$1,000.

Robert A. Weiss

“Ionomer Containing Binary Polymer Blends,” National Science Foundation (DMR 97-12194), 9/1/97-12/31/02, \$491,022.

“Fracture Toughening of Polypropylene with Liquid Crystalline Polymers,” National Science Foundation (International), 1/1/01-12/31/03, \$16,700.

“Structure of Hydrophobically-Associating Hydrogels,” Petroleum Research Fund, American Chemical Society, 9/1/01-8/31/03, \$60,000.

“Development of Proton Exchange Membranes Based on Poly(ether ketone ketone) for Fuel Cell Applications,” (with co-PI: M.T. Shaw), Connecticut Innovations, 6/1/01-5/31/03, \$299,579.

“Advanced Reinforced Thermoplastics for Dental Applications,” (with co-PIs: J. Goldberg and P.T. Mather), Connecticut Innovations, 6/1/01-5/31/03, \$298,925.

“Phosphonated Polystyrene Ionomer Proton Exchange Membranes,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/03-1/04, \$75,000.

“Polymer Blends as High Temperature PEM Materials,” U.S. Department of Energy, 3/03-2/04, \$96,000.

“Control of the Wetting Behavior of Thin Polymeric Films on Inorganic Substrates,” National Science Foundation, 2003-2006, \$330,000.

“NER: Nano-composites Derived from Melt Reaction of a Thermotropic Liquid Crystalline Polyester and an Ionomer,” National Science Foundation, 6/1/03 – 5/31/04, \$90,000.

Thomas K. Wood

“Directed Evolution of Hydrogenase Enzyme to Produce Hydrogen for a Portable Fuel Cell,” (with co-PI: R.W. Coughlin), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/03-1/04, \$110,000.

“Molecular Evolution of Oxygenases for Biosensor Arrays,” (with co-PI: Wan), The Korean Ministry of Environment, 2/03-2/06, \$75,000.

Equipment Donation, Pfizer, December 2002, \$50,000.

“Directed Evolution for Bioprocess Intensified Low-Carbon Biofuels Generation,” (with co-PI: P. Wright), Carbon Trust (United Kingdom), 1/03-1/05, \$241,114.

“DNA Microarrays for Forensics,” (with 25 co-investigators), National Science Foundation Major Research Instrumentation Award, 2003-2004, \$415,554.

“Control of Biofouling Using Natural Furanones to Eliminate Biofilms,” Electric Power Research Institute, 2001-2003, \$65,000.

“Corrosion Control Using Protective Biofilms Which Secrete Antimicrobials and Corrosion Inhibitors,” Electric Power Research Institute, 2001-2004, \$444,800.

“Metabolic Engineering of Monooxygenases for 1-Naphthol and Styrene Epoxide Formation,” National Science Foundation/U.S. Environmental Protection Agency, 2001-2004, \$693,048.

“Redirecting Cellular Metabolism for the Biodegradation of Mixtures of Chlorinated Solvents,” (with co-PI: K. Reardon, Colorado State University), National Science Foundation, 9/15/00-9/15/03, \$714,932.

“Directed Evolution for Trinitrotoluene and Diaminotoluene Degradation,” (with co-PI: B. Smets), National Science Foundation, 8/1/01-8/1/04, \$600,000.

“Training Grant, Enhancing Biological Degreasing,” BioClean USA, 2001-2003, \$66,273.

“Directed Evolution of Toluene-*o*-Xylene Monooxygenase for Rhizoremediation of Tetrachloroethylene,” U.S. Army Research Office, 9/15/00-9/15/03, \$270,000.

“A Graduate Fellowship Program in Environmental Biotechnology at the University of Connecticut,” (with co-PIs: B. Smets, K. Noll, J. Bryers, D. Gage, J. Gogarten, R. Vinopal) U.S. Department of Education, 8/15/00 - 8/14/03, \$776,855.

Lei Zhu

“Development, Characterization and Optimization of a CO Tolerant Microscale Proton-Exchange Membrane Fuel Cell,” (with co-PI: J. Fenton), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/03-1/04, \$150,000.

“A New Bicontinuous Cubic Morphology in Diblock Copolymers as Photonic Bandgap Materials,” University of Connecticut Research Foundation, 01/01/03 - 12/31/03, \$17,992.

**CHEMICAL ENGINEERING DEPARTMENT
AWARDS, HONORS, PATENTS
2002-2003**

Douglas J. Cooper

University Teaching Fellow, University of Connecticut, 2003-2004.

Robert W. Coughlin

Fellow, American Institute of Chemical Engineers.

Michael B. Cutlip

“Membranes, Membranes Electrode Assemblies and Fuel Cells Employing Same, and Process for Preparing,” (with J.M. Fenton, H.R. Kunz and J.-C. Lin), October 15, 2002, U.S. Patent #6,465,136 B1.

James M. Fenton

“Membranes, Membranes Electrode Assemblies and Fuel Cells Employing Same, and Process for Preparing,” (with H.R. Kunz, M.B. Cutlip and J.-C. Lin), October 15, 2002, U.S. Patent #6,465,136 B1.

Joseph J. Helble

Early CAREER Award, National Science Foundation, 1998-2002.

Patrick T. Mather

Early CAREER Award, National Science Foundation, 2001-2005.

ANTEC 2002 Best Paper Award, Society of Plastics Engineers Medical Plastics Division.

Member, Air Force Office of Scientific Research Start Team, “Lightweight Low-Cost Membranes Structures,” 2002.

Montgomery T. Shaw

Chancellor’s Research Award, University of Connecticut, 2003.

Robert A. Weiss

“Golf Ball Cover Compositions,” (with M.J. Sullivan and M. Bellinger), Assigned to Spaulding Sports Worldwide, Inc., U.S. Patent #6,469,102, 2002.

2003 Engineering/Technology Award, Society of Plastics Engineers.

2003 AAUP Research Excellence Award, University of Connecticut.

Board of Trustees Distinguished Professorship, University of Connecticut, 2003.

Thomas K. Wood

“Inhibition of Sulfate Reducing Bacteria Mediated Degradation Using Bacteria Which Secrete Antimicrobials,” (with A. Jayaraman and J.C. Earthman), New Zealand Patent # 502111, June 14, 2001.

CHEMICAL ENGINEERING DEPARTMENT
MAJOR PROFESSIONAL ACTIVITIES
2002-2003

Luke E. K. Achenie

Chair, American Institute of Chemical Engineers (AIChE), Area 10a Coordinating Body.

Vice Chair, American Institute of Chemical Engineers (AIChE) Minority Affairs Committee.

Chair, Session 244 – “Current Issues in Design and Synthesis,” and Session 246 – “Poster Session: Topics in Systems and Process Design,” AIChE Annual Meeting, Indianapolis, IN, November 2002.

Vice Chair, Session 248 – “Obtaining Physical and Chemical Properties for Process Design by Computational Chemistry,” American Institute of Chemical Engineering Annual Meeting, Indianapolis, IN, November 2002.

Member, AIChE Minority Faculty Forum.

Presentations

“Uncertainty Analysis in the Case of Incomplete Information about Uncertain Parameters at the Operation Stage,” (with I. Datskov and G.M. Ostrovsky), American Institute of Chemical Engineering Annual Meeting, Indianapolis, IN, 2002.

“Optimal Solvent Mixture Design through an Extended CAMD Technique,” (with I. Stanescu and R. Gani), American Institute of Chemical Engineering Annual Meeting, Indianapolis, IN, 2002.

“Design and Analysis of Solvents in Reaction Media,” (with Y. Wang and A. Karunanithi), American Institute of Chemical Engineering Annual Meeting, Indianapolis, IN, 2002.

“Optimization of a Chemical Process and its Control System under Uncertainty,” (with I. Datskov and G.M. Ostrovsky), American Institute of Chemical Engineering Annual Meeting, Indianapolis, IN, 2002.

“An Adaptive Strategy for Multi Cluster Gene Assignment,” (with S. Garg), American Institute of Chemical Engineering Annual Meeting, Indianapolis, IN, 2002.

“Some Issues in the Design of Solvents for a Reaction,” American Institute of Chemical Engineering Spring Meeting, New Orleans, LA, 2003.

“Consideration of Parametric Uncertainty at Both the Design and Operation Stages of Chemical Processes,” (with G.M. Ostrovsky and I. Datskov), MOPTA Conference, Hamilton, Ontario, Canada, 2002.

“From Molecular Design to Flowsheet Synthesis Design via the Group Contribution Approach,” (L.E.K. Achenie presented on behalf of the authors: L. Anterrosches and R. Gani), American Institute of Chemical Engineering Spring Meeting, New Orleans, LA, 2003.

Thomas F. Anderson

Treasurer, University of Connecticut Chapter of Sigma Xi.

James D. Bryers

Associate Editor, *Biotechnology & Bioengineering*, J. Wiley & Sons.

Associate Editor, *Journal of Biomedical Materials Research*, J. Wiley & Sons.

Presentations

“Inflammation and Bacterial Adhesion at Biomaterial Interfaces,” Society of Biomaterials National Meeting, Reno, NV, April 29–May 4, 2003.

“Interaction of Macrophage and Bacteria at Polymer Surfaces Designed to Attract Macrophage,” An American Chemical Society Specialized Symposium, Division of Polymer Chemistry, “Polymers in Medicine & Biology: 2002,” Rohnert Park, CA, November 13–16, 2002.

Douglas J. Cooper

Chair, “Demonstration of Software for Chemical Engineering Education,” AIChE 2002 Annual Meeting, Indianapolis, IN, November 4, 2002.

Presentations

“Using the Control Station Software for Process Control Education, Training and Analysis,” AIChE 2002 Annual Meeting, Indianapolis, IN, November 21, 2002.

“Process Control Education is Enhanced with the Control Station Training Simulator,” AIChE 2002 Annual Meeting, Indianapolis, IN, November 21, 2002.

“Integrating the Control Station Training Simulator into the Undergraduate Chemical Engineering Curriculum,” ASEE Summer School, Boulder, CO, July 28, 2002.

Robert W. Coughlin

Presentation

The Eurotech Program at the University of Connecticut, Engineering Foundation Conference on Global Perspectives for Engineering Students, Tmoor, Portugal, April 2003.

Michael B. Cutlip

Co-chair, 13th Summer School for Chemical Engineering Faculty, American Society for Engineering Education, Chemical Engineering Division, University of Colorado, Boulder, CO, August 2002.

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

Academic Trustee, CACHE Corporation (Computer Aids for Chemical Engineering Education).

Presentations

“Integration of Numerical Problem Solving into the Chemical Engineering Curriculum,” (with M. Shacham), Session 2793, ASEE Annual Conference, Nashville, TN, June 22-25, 2003.

“The ASEE Chemical Engineering Summer School for New Faculty – A Model for Other Disciplines to Consider,” (with H.S. Fogler and C.S. Slater), Session 3413, ASEE Annual Conference, Nashville, TN, June 22-25, 2003.

“A Collection of Representative Problems in Chemical Engineering for Solution by Numerical Method,” (with M. Shacham), American Society for Engineering Education, Summer School for Chemical Engineering Faculty, University of Colorado, Boulder, CO, August 2002.

Can Erkey

Session Chair, “Reactions in Supercritical Fluids,” AIChE 2003 Annual Meeting, Indianapolis, IN, November 2002.

Presentations

“Use of Supercritical Fluids in Materials Processing,” *invited*, Norton/St. Gobain, Worcester, MA, April 7, 2003.

“Carbon Aerogel Based Nanocomposites for Fuel Cells,” Knowledge Foundation Conference on Small Fuel Cells for Portable Power Applications, New Orleans, LA, May 7 – 9, 2003.

“High Performance Carbon Aerogel Based Electrocatalysts for Polymer Electrolyte Membrane Fuel Cells,” (with C. Saquing, Y. Zhang and H. Hara), AIChE 2003 Spring Meeting, New Orleans, LA, March 30-April 2, 2003.

“Catalysis in Water-In-Carbon Dioxide Microemulsions,” AIChE 2003 Spring Meeting, New Orleans, LA, March 30-April 2, 2003.

“Selective Extraction of Pore Inducers from Green Ceramics Using Supercritical Carbon Dioxide,” (with T. Davis), AIChE 2003 Annual Meeting, Indianapolis, IN, November 2002.

“Water-in-Carbon Dioxide Microemulsions with Fluorinated Analogs of AOT,” (with X. Dong), AIChE 2003 Annual Meeting, Indianapolis, IN, November 2002.

James M. Fenton

Session Chair, Small Fuel Cells 2003 Conference, Hyatt Regency, New Orleans, LA, May 7-9, 2003.

Co-Chair, “Topics on Proton Exchange Membrane Fuel Cells,” and “Fuel Cell Applications and Components,” sessions, The Electrochemical Society Meeting, Paris, France, April 27-May 2, 2003.

Member, New Technology Subcommittee and Technical Affairs Committee, The Electrochemical Society.

Advisor, The Energy Technology Division, The Electrochemical Society.

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

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

Presentations

“Effect of Temperature and Cathode Composition on PEMFC Performance,” (with V. Ramani, A. Smirnova and H.R. Kunz), *poster presentation*, Gordon Conference on Fuel Cells, Roger Williams University, Bristol, RI, July 28 – August 2, 2002.

“Application of Heteropolyacids in High Temperature PEMFCs,” (with V. Ramani, A. Smirnova and H.R. Kunz), *poster presentation*, Gordon Conference on Fuel Cells, Roger Williams University, July 28 – August 2, 2002.

“Effect of Gas Diffusion Layer on the Mass Transport Limitation on the Cathode Side of a PEM Fuel Cell,” (with M. Vatanathan, A. Peracchio, E. Begg and H.R. Kunz), *poster presentation*, Gordon Conference on Fuel Cells, Roger Williams University, July 28 – August 2, 2002.

“Effect of Composite Membrane Composition on High Temperature PEMFC Performance and Endurance.” (with V. Ramani, A. Smirnova, E. Begg and H.R. Kunz), International Society of Electrochemistry 53rd ISE Meeting, Symposium 8 Fuel Cells, Batteries and Supercapacitors, Dusseldorf, Germany, September 16 -20, 2002.

“PEMFC CO-Tolerance in Elevated Temperature and Pressure Conditions,” (with R. Jiang, Y. Si and H.R. Kunz), *poster presentation*, The Electrochemical Society Meeting, Electrochemical Society Extended Abstracts 02-2, Abstract Number 20, Salt Lake City, UT, October 20-25, 2002.

“Performance of High Temperature Proton Exchange Membrane Fuel Cells Under Off-Design Conditions,” (with V. Ramani, A. Smirnova and H.R. Kunz), The Electrochemical Society Meeting, Electrochemical Society Extended Abstracts 02-2, Abstract Number 867, Salt Lake City, UT, October 20-25, 2002.

“Investigation of CO-Tolerance of PEMFC at Elevated Temperature and Ambient Pressure Conditions,” (with R. Jiang, Y. Si, J.-C. Lin and H.R. Kunz), The Electrochemical Society Meeting, Electrochemical Society Extended Abstracts 03-1, Abstract Number 176, Paris, France, April 27 – May 2, 2003.

“Modified Heteropolyacid-Nafion[®] Composite Membranes for High Temperature PEMFCs,” (with V. Ramani and H.R. Kunz), The Electrochemical Society Meeting, Electrochemical Society Extended Abstracts 03-1, Abstract Number 1177, Paris, France, April 27 – May 2, 2003.

“Supported Heteropolyacid-Nafion[®] Composite Membranes for High Temperature PEMFCs,” (with V. Ramani, A. Smirnova and H.R. Kunz), The Electrochemical Society Meeting, Electrochemical Society Extended Abstracts 030-1, Abstract Number 1180, Paris, France, April 27 – May 2, 2003.

“Improvement of High Temperature Performance and Endurance with NTPA Membrane,” (with H.R. Kunz, Y. Song, L. Bonville, R. Carley, P. Farris, M. Trahiotis, Y. Wei and J. Li), The Electrochemical Society Meeting, Electrochemical Society Extended Abstracts 03-1, Abstract Number 1181, Paris, France, April 27 – May 2, 2003.

“Nanostructured Organic-Inorganic Hybrid Membranes for Polymer Electrolyte Fuel Cells,” (with M.-K. Song, Y.-T. Kim, J.-S. Hwang and H.-W. Rhee (Sogang University) and H.R. Kunz), *poster presentation*, The Electrochemical Society Meeting, Electrochemical Society Extended Abstracts 03-1, Abstract Number 1217, Paris, France, April 27 – May 2, 2003.

“Two-Layer Model of Diffusional Resistance in the Non-Reacting Gas Diffusion Layer of Elevated Temperature PEMFCs,” (with M. Williams, E. Begg, A. Peracchio and H.R. Kunz), The Electrochemical Society Meeting, Electrochemical Society Extended Abstracts 03-1, Abstract Number 1245, Paris, France, April 27 – May 2, 2003.

“Convection Considerations in PEMFC Flow Field Design,” (with M. Williams, E. Begg, A. Peracchio and H.R. Kunz), The Electrochemical Society Meeting, Electrochemical Society Extended Abstracts 03-1, Abstract Number 1246, Paris, France, April 27 – May 2, 2003.

“Non-Humidified Hydrogen/Air, High Temperature and Direct Methanol MEA Development for PEM Fuel Cells,” (with Y. Si, H.R. Kunz and L.J. Bonville), *invited*, Fuel Cell R&D Workshop, H-Power at Princeton University, September 24, 2002.

“Suggested Conditions for Standardized High Temperature Proton Exchange Membrane Fuel Cell (PEMFC) Testing,” (with V. Ramani, M. Williams, E. Begg and H.R. Kunz), *invited*, U.S. Department of Energy Working Group on High Temperature Membranes, Salt Lake City, UT, October 25, 2002.

“High Temperature Membrane Electrode Assembly Development for Proton Exchange Membrane Fuel Cells,” (with H.R. Kunz and L.J. Bonville), *invited*, Advances in Materials for Proton Exchange Membrane Fuel Cell Systems, Pacific Grove, CA, February 23-27, 2002.

“High Temperature Membrane Electrode Assembly Development for Proton Exchange Membrane Fuel Cells,” (with H.R. Kunz and L.J. Bonville), *invited*, Fuel Cells 2003 – The Third Annual BCC Conference, Stamford, CT, March 30-April 1, 2003.

“High Temperature Membrane Electrode Assembly Development for Proton Exchange Membrane Fuel Cells,” (with H.R. Kunz and L.J. Bonville), *invited*, Small Fuel Cell Conference, New Orleans, LA, May 7-9, 2003.

“High Temperature Membrane Electrode Assembly Development for Proton Exchange Membrane Fuel Cells,” (with H.R. Kunz and L.J. Bonville), *invited*, DuPont Fuel Cells, Wilmington, DE, May 15, 2003.

“Polymer Membrane with a Methanol Barrier for Direct Methanol Fuel Cells (DMFCs),” (with Y. Si and H.R. Kunz), *invited*, DuPont Fuel Cells, Wilmington, DE, May 15, 2003.

“Nafion[®]-Zr(HPO₄)₂ Composite Membrane for High-temperature Direct Methanol Fuel Cells (DMFCs),” (with Y. Si and H.R. Kunz), *invited*, DuPont Fuel Cells, Chestnut Run Plaza, Wilmington, DE, May 15, 2003.

Joseph J. Helble

Editorial Board, *Fuel Processing Technology* (Elsevier).

Co-organizer, Fuel Chemistry Division, ACS National Meeting, August 2002.

Presentations

Seminar, Illinois Institute of Technology, Department of Chemical and Environmental Engineering, September 2002.

Seminar, University of Florida, Department of Environmental Engineering, October 2002.

Environmental Research Seminar/Colloquium, EPA Region I Headquarters, Boston, MA, November 2002.

Seminar, EPA Region 3 Headquarters, Chicago, IL, February 2003.

Seminar, University of California, Los Angeles, Department of Chemical Engineering, February 2003.

“Effect of the Precursor on Compositional Uniformity and Crystallinity of Nanoparticles Formed by Droplet Combustion Synthesis,” (with A.U. Limaye), *poster presentation*, Annual Meeting of the AIChE, Indianapolis, IN, November 2002.

“Effect of Droplet Characteristics on Nanoparticle Morphology in Droplet Combustion Nanoparticle Synthesis,” (with A.U. Limaye), *poster presentation*, Annual Meeting of the AIChE, Indianapolis, IN, November 2002.

“Structural Characterization of Ambient Fine Particulate Matter at an Urban Site,” (with R.M. Mamani), *poster*, 21st Annual Meeting of the American Association for Aerosol Research, Charlotte, NC, October 2002.

Patrick T. Mather

Member, Editorial Advisory Board, *Polymer Engineering and Science*.

Symposium Chair, “Hybrid Materials,” American Chemical Society 2003 Spring Meeting, New Orleans, LA.

Session Chair, “General Papers – Polymer Characterization,” American Chemical Society 2002 Fall Meeting, Boston, MA.

Member, Board of Directors and Chairman (2002-2003 term), Polymer Analysis Division, Society of Plastics Engineers.

Best Paper Committee, Polymer Analysis Division, Society of Plastics Engineers.

International Research Award Selection Committee, Society of Plastics Engineers.

Member, Membership Committee, Society of Rheology.

Presentations

Department Seminar, "Shape Memory Polymers," *invited*, University of Southern Mississippi, April 23, 2003.

"Applied Polymer Science at UConn: New Polymers for Large Strain Actuation," *invited*, Naval Under Sea Warfare Center, Transducer Materials Branch, March 20, 2003.

"Hybrid Polymers Incorporating POSS: Unique Microstructures for Unique Properties," *invited*, MIT, Program in Polymer Science and Technology, March 12, 2003.

"Nano 101: Since When is Smaller Better?" *invited*, Society of Plastics Engineers, Western New England Section, December 4, 2002.

"Modifications to Polymer Microstructure and Physical Properties via Polyhedral Oligosilsesquioxane (POSS) Incorporation," *invited*, Linsay Lecture, Texas A&M, Department of Chemical Engineering, Nov. 12, 2002.

"POSS-Based Telechelics," *invited*, 3rd Annual Nanostructured Chemicals Workshop, Huntington Beach, CA, September 2002.

"A Novel Building Block for the Construction of Inorganic-Organic Materials," *invited*, European MRS Meeting, Nano- and Micro-Composite Symposium, Strasbourg, France, June 20, 2002.

"Rheology of Liquid Crystalline Polymers: An Experimental View of Theoretical Needs," *invited*, Institute for Theoretical Physics at University of California, Santa Barbara, May 15, 2002.

"Polyhedral Oligosilsesquioxane (POSS) Endcapped Polyethylene Oxide (PEO) Telechelics: Block Copolymer Behavior," ACS National Meeting, Materials Chemistry Secretariat, New Orleans, LA, March 2003.

"Isotherm Studies of Telechelic POSS-PEO Polymers," American Physical Society, Austin, TX, 2003.

"Hot Compaction of PET Fibers," American Physical Society, Austin, TX, March 2003.

"Hot Compaction of PET Fibers: Influence of Processing on Crystallinity and Mechanical Properties," Annual Technical Conference - The Fiber Society, Natick, MA, October 2002.

"Design, Synthesis, and Thermomechanical Characterization of a New Triblock Copolymer with Shape Memory effects," 74th Annual Meeting of The Society of Rheology, Minneapolis, MN, October 2002.

"Association Behavior of Nonionic Polyhedral Oligosilsesquioxane (POSS) Telechelics," 74th Annual Meeting of The Society of Rheology, Minneapolis, MN, October 2002.

"Interfacial Tension in an Immiscible Blend Containing a Thermotropic Liquid-crystalline Polymer," 74th Annual Meeting of The Society of Rheology, Minneapolis, MN, October 2002.

"Influence of Ionic Strength on Build-Up of Multilayer Thin Films Using Spin Self-Assembly," ACS National Meeting, Boston, MA, August 2002.

"Rheology and Morphology of Molecular Composites from Sulfonated Rigid Rods," ACS National Meeting, Boston, MA, August 2002.

“Two-Stage Electroactuation of Partially Neutralized Hydrogels,” ACS National Meeting, Boston, MA, August 2002.

Richard S. Parnas

Editorial Advisory Board, *Polymer Composites*.

Guest Editor, *Polymer Composites, Composites A*.

Presentations

“Sophomore Design by Mixing a Bit of Felder & Rousseau with a Bit of Smith & Van Ness,” *poster*, ASEE Summer School for Chemical Engineering Faculty, Boulder, CO, July 28, 2002.

“Stochastic Process Parameters in Liquid Composite Molding,” *invited*, Michigan Technological University, February 28, 2003.

“Stochastic Process Parameters in Liquid Composite Moulding,” *invited*, Vrije Universiteit Brussels, Belgium, January 31, 2003.

“Comparison of Imaging Results and Image Analysis for Microstructure and Damage Analysis in Composites,” *invited*, General Electric Corporate R&D, Schenectady, NY, November 12, 2002.

“Controlling the Liquid Moulding Process by Noticing the 3-D Fibre Architecture,” *invited*, Symposium on The Past, Present and Future of Polymer Composites, Katholieke Universiteit, Leuven, Belgium, November 6-7, 2002.

“Length Scales in Heterogeneous Media,” *invited*, Olin Materials Research Laboratory, New Haven, CT, July 9, 2002.

Montgomery T. Shaw

Associate Editor, *IEEE Transaction on Dielectrics and Electrical Insulation*.

Treasurer, Society of Rheology.

Member, Executive Committee, Society of Rheology.

Session Chair and Organizer, Award Symposium of L. M. Robeson, ACS National Meeting, March 26, 2003.

Session Chair, SPE Annual Technical Conference, May 6, 2003.

Society Treasurers Committee, American Institute of Physics.

Presentations

“Preparation of Hydroxyapatite/Polymer Nano-composites,” (with M. Wei), *invited*, Pentron, Inc., July 10, 2002.

“Proton Exchange Membranes for Fuel Cells,” (with R.A. Weiss), *invited presentation*, Connecticut Innovations, November 20, 2002 and Pratt & Whitney, February 6, 2003.

“Measurement of Low-frequency Viscoelastic Properties of Polymers,” (with E. Cua), *invited*, award symposium honoring L.M. Robeson, ACS Annual Meeting, Boston, MA, August 20, 2002.

“Significant and Useful Electric-Field Effects in Rheology and Polymer Processing,” Levich Institute, CUNY, November 16, 2002.

“Conductivity Enhancement of Sulfonated Polystyrene Blends Using Electric Field Structuring Effects,” (with J. Gasa) ACS Annual Meeting, New Orleans, LA, March 26, 2003.

“Flow Curves and Kinks,” Annual Technical Conference, Society of Plastics Engineers, May 6, 2003.

“The Structurization and Rheology of Diblock Copolymer/hydrocarbon Solutions,” (with Z. Liu and S. Chattopadhyay), Annual Meeting, Society of Rheology, Minneapolis, MN, October 16, 2002.

Robert A. Weiss

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

Editor-in-Chief, *Polymer Composites*.

International Advisory Board, *Polymers and Polymer Composites*.

Editorial Advisory Board, *Journal of Applied Polymer Science*.

Fellow, North American Thermal Analysis Society.

Fellow, American Physical Society.

Fellow, Society of Plastics Engineers.

Member, Connecticut Academy of Sciences and Engineering.

Publications Committee, Society of Plastics Engineers.

Intersociety Committee, Division of Polymer Chemistry, American Chemical Society.

Presentations

“Hot Compaction of PET Fibers: Influence of Processing on Crystallinity and Mechanical Properties,” (with P. Rojanapitayakkorn, P.T. Mather and A.J. Goldberg), An. Tech. Conf. Fiber Society, Natick, MA, October 2002.

“Hot Compaction of PET Fibers: Influence of Processing on Crystallinity and Mechanical Properties,” (with P. Rojanapitayakkorn and P.T. Mather), American Physical Society, Austin, TX, 2003.

“Unusual Phenomena in Ionomer Blends,” *invited*, American Chemical Society Meeting, New Orleans, LA, March 2003.

“Preparation of Electrically Conductive Elastomeric Foams by an *In Situ* Polymerization of Pyrrole,” *invited*, Polymer Chemistry: Past, Present and Future, Amherst, MA, August 2002.

“The Effect of Strong Interactions on the Phase Behavior of Polymer Blends,” *invited*, Air Force Materials Lab, Wright Patterson Air Force Base, Dayton, OH, February 2003.

“Structure and Properties of Ionomer-Polyamide Blends,” *invited*, Biennial Meeting, Polymer Div., American Chemical Society, Sonoma, CA, November 2002.

“The Effect of Strong Interactions on the Phase Behavior of Polymer Blends,” *invited*, Georgia Tech., October 2002.

“The Effect of Strong Interactions on the Phase Behavior of Polymer Blends,” *invited*, Rensselaer Polytechnic Institute, Troy, NY, February 2003.

“Polymers: Flubber to Star Trek,” *invited*, Lebanon Valley College, Annville, PA, February 2003.

Thomas K. Wood

Editorial Board, *Applied and Environmental Microbiology*.

Presentations

“Rhizosphere Degradation of Chlorinated Solvents Using GFP-tagged Microorganisms,” (with A.W. Gilbertson, J.G. Burken and M.W. Fitch), American Society for Microbiology National Meeting, Washington, DC, May 19, 2003.

“A Proteomic Investigation of the Physiological Effects of Metabolic Engineering For Trichloroethylene Degradation,” (with V. Pferdeort and K.F. Reardon), American Institute for Chemical Engineering National Meeting, Indianapolis, IN, November 3, 2002.

“Mineralization of Chlorinated Aliphatic Compounds by Zero-Valent Iron and Genetically-Engineered, Immobilized Microorganisms,” (with W. Bae, H. Shim, J. Kim and E. Shin), 1st ASEM Conference on Bioremediation, Hanoi, Vietnam, September 24, 2002.

“Proteomic Changes In *Escherichia coli* TG1 After Metabolic Engineering For Enhanced Trichloroethylene Biodegradation,” (with V. Pferdeort and K.F. Reardon), 5th Siena Meeting from Genome to Proteome: Functional Proteomics, Siena, Italy, September 3, 2002.

“Inhibiting Corrosion from Sulfate-Reducing Bacteria Using Gramicidin S-Producing Biofilms in Three Mile Island Process Water,” (with R. Zuo, D. Ornek and F. Mansfeld), American Chemical Society National Meeting, Boston, MA, August 21, 2002.

“Saturation Mutagenesis of Toluene ortho-Monooxygenase and Toluene para-Monooxygenase for Naphthalene Oxidation and Chloroform Degradation,” (with Y.M. Kwon, L. Rui and K.F. Reardon), American Chemical Society National Meeting, Boston, MA, August 21, 2002.

“Directed Evolution of Toluene o-Monooxygenase of *Pseudomonas stutzeri* OX1 for the Degradation of Chlorinated Aliphatics,” (with G. Vardar), American Chemical Society National Meeting, Boston, MA, August 21, 2002.

“Identifying Bacterial Biofilm Formation Genes and Beneficial Biofilms for Inhibiting Corrosion,” *invited*, Montana State University, April 17, 2003.

“Metabolic Engineering to Reduce the Toxicity of Aerobic Degradation of *cis*-DCE Using Toluene *ortho*-Monooxygenase,” (with L. Rui, Y.-M. Kwon and K.F. Reardon), *invited*, University of Colorado, Boulder, CO, November 19, 2002.

“Metabolic Engineering to Reduce the Toxicity of Aerobic Degradation of *cis*-DCE Using Toluene *ortho*-Monooxygenase,” (with L. Rui, Y.-M. Kwon and K.F. Reardon), *invited*, American Institute for Chemical Engineering National Meeting, Indianapolis, IN, November 4, 2002.

“Biofilms that Control Corrosion,” (with B.C. Syrett), *invited*, International Water Conference, Pittsburgh, PA, October 23, 2002.

“Biofilms that Control Corrosion,” *invited*, EPRI Water Resources Sustainability Workshop, Milwaukee, WI, September 25, 2002.

“Saturation Mutagenesis of Toluene *ortho*-Monooxygenase for Naphthalene Oxidation and Chloroform Degradation,” (with Y.M. Kwon, L. Rui, and K.F. Reardon), *invited*, Engineering Enzymes, Pasteur Institute, Paris, France, September 18, 2002.

“Evolving Toluene Monooxygenases for Green Chemistry and Remediation,” (with Y.M. Kwon, L. Rui and K.F. Reardon), *invited*, Society for Industrial Microbiology, Philadelphia, PA, August 12, 2002.

“Use of Proteomics to Determine the Physiological Effects of Metabolic Engineering for TCE Biodegradation,” (with K.F. Reardon and V.A. Pferdeort), *invited*, Society for Industrial Microbiology, Philadelphia, PA, August 12, 2002.

Lei Zhu

Membership Chairman, North American Thermal Analysis Society.

Presentation

“Comparison of Crystallization Kinetics in Various Nano-confinement Environments,” *contributed oral presentation*, APS Meeting, Austin, TX, March 3-7, 2003.

CIVIL & ENVIRONMENTAL ENGINEERING DEPARTMENT
ANNUAL REPORT SUMMARY
2002-2003

Three faculty members joined the Department at the beginning of the year. One search was close to completion by the end of 2002, and one retirement was received at the close of the academic year. The Department experienced vigorous research and scholarship programs, and received a successful external assessment for the university “five-year review.” Enrollment trends in the department appear to be responding to active outreach and recruitment activities.

PERSONNEL CHANGES

This academic year, we were joined by three new faculty members: Drs. Or, Bagtzoglou and Wang. Professor Dani Or, from Utah State University, joined us as the Northeast Utilities Foundation Endowed Professor of Environmental Engineering. His expertise is in soil physics, and Professor Or provides senior leadership to environmental and water resources faculty in the department. Professor Or was also appointed Director of the graduate Environmental Engineering Program. Associate Professor Amvrossios “Ross” Bagtzoglou joined us from Columbia University with expertise in the area of groundwater remediation and hydrologic modeling. Assistant Professor Guiling Wang, an expert in water resources, joined us in January 2003 from NASA Goddard. With the addition of Dr. Wang, the department will rank first nationally in percent of female faculty compared with all CEE departments ranked by the National Science Foundation. During the year, we conducted a faculty search in structural engineering and applied mechanics; we anticipate we will fill the position in 2004.

Associate Professor John Ivan was on a full-year sabbatical leave that included extended visits to Germany and Texas. Associate Professor Abboud was appointed Director of the undergraduate program in Environmental Engineering and charged with responsibilities for recruiting and high school outreach throughout the region. Professor George Hoag rejoined the faculty full-time following 15 years as Director of the Environmental Research Institute. Associate Professor Ernie Uthgenannt announced his retirement effective the end of the academic year.

ENROLLMENT

Undergraduate enrollment has been growing with 140 Civil Engineering & Environmental Engineering majors. More than 25% of our undergraduates are female. Meanwhile graduate enrollment is at 52 full-time and 24 part-time students. The Department offered 61 courses in 78 sections, of which 36 courses and 51 sections were at the undergraduate level.

RESEARCH AND SCHOLARSHIP

Faculty continued to sustain a robust research program, with over \$3 million in expenditures supporting more than 50 graduate assistants and 6 post-doctoral fellows. In addition, the faculty has approximately \$7 million in awards. Scholarly production is growing, with over 100 journal articles, books, book chapters and conference proceedings published – an average of more than one publication per graduate student per year and over four publications per faculty member per year.

5-YEAR ASSESSMENT

During the year, our Department was comprehensively reviewed by external visitors in conjunction with the University’s five-year review of the CEE departmental programs. Two of the external reviewers

were selected from peer CEE departments at other universities, and the third reviewer was a Head of another UConn department. The reviewers' findings were strongly positive and consistent with the self-study of the department.

FACILITIES AND INFRASTRUCTURE

We continue to make steady progress with respect to our five-year facilities plan. Following renovation and the re-furnishing of Castleman Building rooms 117 and 136, there has been a marked improvement in ratings of our facilities by our graduating seniors. Detailed planning was completed for new space earmarked for environmental engineering faculty in the Bronwell building. That space is currently undergoing renovation and will become available early fall 2003. This additional space in Bronwell will relieve the current office space shortage.

RECRUITMENT

The Department continues several recruiting activities. Associate Professor Abboud continues to recruit for the new undergraduate Environmental Engineering program but also for the Civil Engineering and all SoE programs. She has sent out mailings and made several high school visits. Similarly, Associate Head Malla coordinates many outreach activities, including several high school groups visiting our facilities. We continue to make follow-up phone calls to all students admitted to our programs, answering their questions and letting them know of our particular strengths. Meanwhile, our graduating class has remained steady, with influx from within the School and external transfer students.

CIVIL & ENVIRONMENTAL ENGINEERING DEPARTMENT
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2002-2003

Emmanouil N. Anagnostou

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Fred L. Ogden

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Barth F. Smets

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John T. DeWolf

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Barth F. Smets

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Rusk Y. Masih

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Fred Ogden

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“Time Domain Reflectometry Measurement of Bulk Permittivity of Porous Mixtures Containing Bound Water,” (with S.B. Jones), *Proceedings of the Fifth International Conference on Electrical Transport and Optical Properties of Inhomogeneous Media ETOPIM6*, Snowbird, UT, July 15-19, 2002.

“Invasion Percolation of Single Component, Multiphase Fluids with Lattice Boltzmann Models,” (with M.C. Sukop), *Proceedings of the Fifth International Conference on Electrical Transport and Optical Properties of Inhomogeneous Media ETOPIM6*, Snowbird, UT, July 15-19, 2002.

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“A Comparative Study of Nitrification Inhibition by Heavy Metals: The Influence of Metal Exposure Time on Biological Effect,” (with Z. Hu, K. Chandran and D. Grasso), *Proceedings of the 8th Annual Industrial Waste Technical and Regulatory Conference*, Atlantic City, NJ, 2002.

“High Diversity of Environmental Escherichia Coli Isolates From a Test Bovine Feedlot, Q-490,” (with H.-H. Yang, R. Vinopal and D. Grasso), *Proceedings of the 103^d General Meeting of the American Society for Microbiology*, Washington, DC, May 18-22, 2003.

“Characterization of Complete Denitration of GTN by Three Arthrobacter sp. Isolates Able to Use GTN as Their Sole Nitrogen Source, Q-074,” (with M.A. Panciera, J.V. Accashian, R.G. Riefler and H.-H. Yang), *Proceedings of the 103^d General Meeting of the American Society for Microbiology*, Washington, DC, May 18-22, 2003.

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ACTIVE RESEARCH GRANTS & CONTRACTS
2002-2003

Michael L. Accorsi

“Advanced Structural Modeling for Fully-Coupled Parachute Dynamics,” (with co-PI: J.W. Leonard), U.S. Army Research Office, 6/1/99-8/31/02, \$223,998.

“Analytical Determination and Optimization of the Mechanical Properties of Lattice Block Materials,” Office of Naval Research, 6/1/00-5/31/04, \$109,905.

“IPA 2002 on Advanced Parachute Simulations,” U.S. Army Natick RD&E Center, 1/02/02-8/31/02, \$26,851.

“Transition of Lattice Block Material Research to Electric Boat Corporation,” Electric Boat Corporation, 9/1/00-8/31/03, \$33,000.

“IPA 2003 on Advanced Parachute Simulations,” U.S. Army Natick RD&E Center, 5/19/03-8/22/03, \$12,350.

“Computational Modeling of Ceramic Matrix Composites, Part 1,” Pratt & Whitney, 02/01/03-01/31/04, \$20,677.

Emmanouil N. Anagnostou

“Investigating the Adequacy of TRMM Precipitation Radar Observations for Calibrating Ground-Based Weather Radar Reflectivity Measurements,” NASA, 6/1/00-11/30/03, \$392,207.

“Deployment of a Mobile Polarimetric X-Band Radar and *In-situ* Instrumentation to Support QPE and Microphysical Studies of Tropical Systems in CAMEX-4,” NASA, 8/1/01-7/31/04, \$360,231.

“Investigation of Thunderstorm Monitoring from an Experimental Sferics Receiver Network,” NASA, 9/1/01-8/31/04, \$76,000.

“Investigation of Flood Prediction from Satellite Data,” NASA, 9/1/02-8/31/05, \$76,000.

“Multi-Sensor Precipitation Estimation and Investigating Improvements on Weather and Climate Analysis,” NASA, 2/1/02-1/30/05, \$242,000.

“CAREER: Improved Knowledge on Precipitation Microphysics for Advancing Radar Rainfall Estimation and Quantitative Precipitation Forecasting,” National Science Foundation-Geosciences, 2/1/02-1/31/06, \$420,000.

“Continuous and High-Resolution Thunderstorm Monitoring in Africa and Beyond to Support Water Cycle Research,” National Science Foundation-Geosciences, 3/1/03-3/14/06, \$331,234.

“Understanding the Error Characteristics of Precipitation Estimates from Space-Based Observing Systems,” NASA, 7/1/99-9/30/02, \$326,864.

“Experimental Investigation of X-Band Polarimetric-Radar Rainfall Estimation,” National Science Foundation, 10/15/00-9/30/02, \$75,724.

Lisa Aultman-Hall

“Incorporating Truck Flows into the State-wide Planning Traffic Model,” Connecticut Cooperative Highway Research Program, 6/1/02-5/31/04, \$100,000.

“Developing a Methodology to Evaluate the Safety of Shared-use Paths,” Connecticut Cooperative Highway Research Program, 6/1/02-8/31/03, \$25,000.

“Factors Affecting Young Drivers Safety,” Connecticut Cooperative Highway Research Program, 6/1/03-5/31/04, \$31,540.

“Lateral Variation in Pavement Smoothness,” (with co-PI: C. Dougan, (88%)), Connecticut Department of Transportation, 9/01-12/03, \$80,125.

“Route Choice Behavior in Transportation Networks,” University of Connecticut Research Foundation, 1/1/02-12/31/02, \$20,234.

“Route Behavior Analysis from a System Efficiency Perspective,” (with co-PIs: E. Parkany (15%) and W. ElDessouki (15%)), New England University Transportation Center, 9/1/02-8/31/03, \$57,250.

“Program Development for the Connecticut Transportation Institute,” (with co-PI: C. Dougan (62%)), Connecticut Department of Transportation, 1/03-12/03, \$105,240.

Christian F. Davis

“Technology Transfer Center,” (with co-PI: D. Shea (90%)), Connecticut Department of Transportation, 1/1/02-12/31/02, \$148,642.

“Technology Transfer Center,” (with co-PI: D. Shea (50%)), Connecticut Department of Transportation, 1/1/03-12/31/03, \$97,126.

“Continuation of the Cooperative Highway Research Program,” Connecticut Department of Transportation, 6/1/02-5/31/03, \$223,686.

“Management of the New England Transportation Consortium,” (with co-PI: G.M. McCarthy (50%)), Connecticut Department of Transportation, 1/1/03-12/31/03, \$47,932.

“Development and Implementation of a Highway Construction Quality Assurance Program for the Connecticut Department of Transportation,” Connecticut Department of Transportation, 1/4/03-12/31/03, \$48,758.

“Establishment of the Connecticut Advanced Pavement Laboratory – FY03,” (with co-PIs: J. Mahoney and J.E. Stephens), Connecticut Department of Transportation, 7/1/02-6/30/03, \$120,300.

Kenneth R. Demars

“Determination of Moisture Content of De-Icing Salt at Point of Delivery,” (with co-PI: R.P. Long (50%)), New England Transportation Consortium, 5/1/02- 12/31/03), \$60,000.

John T. DeWolf

“Network of Continuous Computer-Based Bridge-Monitoring Systems in the State of Connecticut,” Connecticut Department of Transportation, 6/1/94-indefinite, \$1,255,636.

“Monitoring of Washington Bridge, Providence, Rhode Island,” Vanasse Hangen Brustlin/Rhode Island Department of Transportation, 5/1/97-12/31/05, \$10,350.

“Evaluation of Sign Support Structures,” Connecticut Department of Transportation, 7/1/01-8/31/02, \$65,663.

Wael ElDessouki

“A Real-Time Risk-Based Highway Accident Prevention System (RiskHAPS): A Proactive Safety Approach,” (with co-PIs: E.N. Anagnostou (25%); J.N. Ivan (25%) and A. Sadek (25%)), MIT-New England University Transportation Center (U.S. Department of Transportation), 9/1/01-8/31/02, \$63,390.

“An Automated Detection for Highway Geometry using Image Recognition Model,” (with co-PIs: C. Dougan (40%) and N.W. Garrick (40%)), Joint Highway Cooperative Research Program (JHRAC), 6/01-8/03, \$90,000.

“Route Behavior Analysis from a System Efficiency Perspective,” (with co-PIs: E. Parkany (15%) and L.A. Aultman-Hall (70%)) New England University Transportation Center, 9/1/02- 8/31/03, \$57,250.

“Validating Traffic Simulation Models to Inclement Weather Travel Conditions with Applications to Arterial Coordinated Signal Systems,” (with co-PI: A.W. Sadek), New England Transportation Consortium, 9/02- 8/04, \$70,000.

Howard I. Epstein

“Eccentricity Effects on the Capacity of Tension Members: Testing of Channels and Wide Flange Sections,” University of Connecticut Research Foundation, 2/00-6/03, \$11,344.

Norman W. Garrick

“A Best Practice Guide for the Design of Context Sensitive Roadway Cross-Sections,” (with co-PI: P. Miniutti (50%)), Joint Highway Cooperative Research Program (JHRAC), 6/1/01-5/31/03, \$105,832.

“Complex Systems: Cities in Their Environment (Bio-Complexity Incubation Activity),” (with co-PI: R. Rockwell (20%) and R. Gilmore (20%)), National Science Foundation, 9/1/01-5/31/03, \$100,000.

“An Automated Detection for Highway Geometry using Image Recognition Model,” (with co-PI: C. Dougan (40%) and W. ElDessouki (20%)), Joint Highway Cooperative Research Program (JHRAC), 6/01-8/03, \$90,000.

“Effective Visualization Techniques for the Public Presentation of Transportation Projects,” (with co-PIs: P. Miniutti and M. Westa), New England Transportation Consortium, 6/1/01-12/31/02, \$74,929.

“A Guide for Municipals to the Use and Performance of Permeable Pavements,” Non-point Education for Municipal Officials (NEMO), 9/02-5/04, \$30,000.

George Hoag

“Studies of Nutrient Loading to the Mansfield Hollow Reservoir, Connecticut,” (with co-PIs: F.L. Ogden (34%) and G. Warner (33%)), Willimantic Water Commission, 4/1/01-9/31/02, \$80,000.

“Long-Term Analysis of the University of Connecticut’s Fenton River Water Supply Wells on the Habitat of the Fenton River,” (co-PIs: F.L. Ogden, J. Starn and G. Warner), University of Connecticut, Storrs, 11/02-10/04, \$571,289.

“TOSC Outreach Program,” (with co-PI: C. Perkins (42%)), EPA Hazardous Substance Research Center, 10/2/02-9/30/03, \$70,000.

“TAB Program,” (with co-PI: C. Perkins (80%)), EPA Hazardous Substance Research Center, 10/2/02-9/30/03, \$70,000.

Britt A. Holmén

“Vehicle-derived Ultrafine Particles and Their Adsorbates: Formation and Aging Effects on Organic Composition and Size Distribution,” National Science Foundation Early CAREER Award, 2/1/02-1/31/07, \$375,000.

“Generation, Transport and Transformation of Pesticide Residues on Airborne Fine Particulate Matter Derived from Managed Soils,” U.S. Department of Agriculture, 5/1/02-4/30/04, \$158,384.

“Dynamometer Measurements of Nanoparticles with Simultaneous SMPS,” California Air Resources Board, 5/1/02-6/30/03, \$13,500.

“Exhaust Total Particulate Matter Mass Measurement for the CTTRANSIT Hybrid Diesel Electric Bus Evaluation Program,” Connecticut Transit, 6/1/03-5/31/05, \$82,679.

“Comparison of Ultrafine Particle Emissions of Hybrid-Electric and Particle-Trap Diesel Connecticut Transit Buses,” Joint Highway Cooperative Research Program (JHRAC), 6/1/03-5/31/05, \$120,000.

John N. Ivan

“University of Connecticut Graduate Fellowships,” New England University Transportation Center, 9/1/01-8/31/02, \$30,000.

“A Real-Time Risk-Based Highway Accident Prevention System (RiskHAPS): A Proactive Safety Approach,” (with co-PIs: W. ElDessouki (25%), E.N. Anagnostou (25%) and A. Sadek (25% - UVM)), New England University Transportation Center (USDOT), 9/1/01-8/31/02, \$63,390.

“The Effect of Segment Characteristics on the Severity of Head-on Crashes on Two-Lane Rural Highways,” New England University Transportation Center (USDOT), 9/02-5/04, \$60,990.

John W. Leonard

“Advanced Structural Modeling for Fully-Coupled Parachute Dynamics,” (with co-PI: M.L. Accorsi), U.S. Army Research Office, 6/1/99-8/31/02, \$223,998.

Richard P. Long

“Determination of Moisture Content of De-Icing Salt at Point of Delivery,” (with co-PI: K.R. Demars (50%)), New England Transportation Consortium, 5/1/02- 12/31/03), \$60,000.

Allison A. MacKay

“Geochemistry, Biochemistry, and Surface / Groundwater Interactions for As, Cr, Ni, Zn, and Cd with Applications to Contaminated Waterfronts,” (with co-PIs: B.F. Smets (50%) and A.T. Stone (Johns Hopkins)), U.S. EPA Hazardous Substances Research Centers, 2000-STAR-A1 (Johns Hopkins University, lead institution; total \$6 M for 01/01-12/05), 10/01/00-09/30/02, \$110,898.

“Identifying New Strategies for the Biochemical Treatment of Pharmaceutical Wastewater Effluent,” (with co-PI: B.F. Smets (80%)), Pfizer, 08/15/01-08/14/03, \$171,620.

“Factors Controlling Veterinary Antibiotic Sorption to Soils,” (with co-PI: D. Vasudevan (50% - Duke University)), U.S. Department of Agriculture, 09/01/02-08/31/05, \$295,000.

“Occurrence and Fate of Pharmaceuticals in the Pomperaug River,” Connecticut Institute of Water Resources, 03/01/03-02/29/04, \$13,799.

“Pharmaceutical Sorption to Model Soil Components” (with co-PI: D. Vasudevan (50% - Duke University)), National Science Foundation-BES, 04/01/03-03/31/06, \$378,094.

Ramesh B. Malla

“On-Orbit Dynamics Response and Integrity of Space Station and Its Solar Arrays,” Connecticut EPSCoR Core Funding Program, Connecticut Space Grant Consortium, 6/1/02-5/31/03, \$10,000.

“Structural and Mechanical Studies of Water De-Ionizing Bed Structure for Space Applications,” Hamilton Sundstrand Space Systems International, Inc., 9/1/00-8/31/04, \$30,000.

“An Innovative Fiber Optic Weigh-in-Motion System,” University of Connecticut Research Foundation, 6/1/99-8/31/02, \$10,800.

“Establish Subgrade Support Values for Typical Soils in New England,” (with co-PI: V. Janoo (15%)), New England Transportation Consortium, 8/02-1/05, \$80,000.

“Finite Element Analysis of Structural and Mechanical Behavior of Proton Exchange Membrane Fuel Cells,” U.S. Army sponsored Research and Development of Miniature and Micro Fuel Cells Program, 1/03-1/04, \$37,500.

“Dynamic and Thermal Behavior of Solar Sails for Advanced Space Transportation,” Connecticut NASA Core Funding Program, Connecticut Space Grant Consortium, 3/03-3/04, \$10,000.

“Dynamic Failure of Frame Structures at High Temperature,” (with co-PI: E. Smith), University of Connecticut Research Foundation, 6/03-7/04, \$18,000.

Fred L. Ogden

“Addition of Lakes, Wetlands, and Detention Basins to CASD2D,” U.S. Army Engineers, Waterways Experiment Station, 8/18/99-12/30/02, \$221,000.

“2-Dimensional Hydrological Modeling of Large Watersheds with Uncertain Input,” U.S. Army Engineers, 3/6/98-12/30/02, \$224,111.

“Systems Dynamics of Stormwater Detention/Retention Ponds,” U.S. National Science Foundation, (with co-PIs: T. Torgersen - MARN, P. Rich – EEB and P. Visscher - MARN), 2/1/01-1/31/04, \$273,000.

“Watershed Monitoring and Model Development for Watershed with Diverse Runoff Production Mechanisms,” Department of Defense - U.S. Army Research Office, 6/1 /01- 4/30/04, \$183,000.

“Studies of Nutrient Loading to the Mansfield Hollow Reservoir, Connecticut,” (with co-PIs: G. Hoag (33%) and G. Warner – NMRE (33%)), Willimantic Water Commission, 10/1/01-9/30/02, \$80,000.

“Grid-Scale Description of Erosion Processes Within a Distributed Hydrologic Modeling Framework,” U.S. Army Engineers, 2/03-1/08, \$300,000.

“Long-Term Analysis of the University of Connecticut’s Fenton River Water Supply Wells on the Habitat of the Fenton River,” (with co-PIs: G. Hoag, J. Starn and G. Warner), University of Connecticut, Storrs, 11/02-10/04, \$571,289.

Dani Or

“New Thermodielectric Method to Determine Soil Specific Surface Area and Bound Water,” U.S. Department of Agriculture-NRI, 10/01-11/03, \$135,000.

“Flow and Distribution of Fluid Phases Through Porous Plant Growth Media in Microgravity,” (with co-PIs: S. Steinberg - JSC, I. Alexander and R. Lakshmi - KSU), NASA – Advanced Life Support, 2/02-4/05, \$1,554,554; UConn share \$281,805.

“Hydraulic Conductivity of Unsaturated Porous Media - Film and Corner Flows in Angular Pore Space,” U.S. Department of Agriculture-NRI, 9/02-12/03, \$229,000.

“Physical Processes Affecting Microbial Habitats and Activity in Unsaturated Agricultural Soils,” (with co-PIs: S.P. Friedman - Israel and J. Norton – Utah State University), U.S.-Israel Agricultural Research and Development Fund (BARD), 2/02-2/05, \$335,000.

Barth F. Smets

“Inhibition of Biological Nitrogen Removal: Microbiology, Physical Chemistry & Process Engineering,” (with co-PIs: D. Grasso (45%) and J. Semon-Brown — City of Stamford, CT (10%)), Long Island Sound Research Fund, Environmental Protection Agency Region 1, 03/15/99-11/30/02, \$187,079.

“Innovative Technology Development for Prevention of Pathogen Migration from Feedlots,” (with co-PIs: D. Grasso (33%) and R.T. Vinopal (34%)), U.S. Department of Agriculture, National Research Initiative Competitive Grants Program, 2/15/99-12/31/02, \$265,000.

“A Graduate Fellowship Program in Environmental Biotechnology at the University of Connecticut,” (with co-PI: K.M. Noll (50%)), U.S. Department of Education, 08/15/00-08/14/03, \$688,500.

“Inhibition of Biological Nitrogen Removal at POTWs - A Critical Investigation of Microbiology, Physical Chemistry and Process Engineering at a NY BNR Facility,” (with co-PIs: K. Chandran and R.R. Sharp - Manhattan College (90%)), Long Island Sound Study, U.S. Environmental Protection Agency Region 1, 08/15/00-11/30/02, \$69,945.

“Geochemistry, Biochemistry, and Surface/Groundwater Interactions for As, Cr, Ni, Zn, and Cd with Applications to Contaminated Waterfronts,” (with co-PIs: A.A. MacKay (50%) and A.T. Stone - (Johns Hopkins)), U.S. Environmental Protection Agency Hazardous Substances Research Centers, 2000-STAR-A1 (Johns Hopkins University, lead institution; total \$6 M for 01/01-12/05), 10/01/00-09/30/02, \$110,898.

“Mechanistic Role of Plant Root Exudates in the Phytoremediation of Persistent Organic Chemicals,” (with co-PIs: D. Gage (25%), J.C. White (40%), M.P.N. Gent (5%) and M.I. Mattina

(5%)), Connecticut Agricultural Experiment Station, EPA Joint Program on Phytoremediation 2001-STAR-C1, 12/15/01-08/14/04, \$191,214.

“Directed Evolution of Aromatic Dioxygenases for Trinitrotoluene and Aminodinitrotoluene Degradation,” (with co-PI: T.K. Wood (50%)), National Science Foundation - Division of Bioengineering & Environmental Systems, 08/01/01-07/31/02, \$197,919.

“Identifying New Strategies for the Biochemical Treatment of Pharmaceutical Wastewater Effluents,” (with co-PI: A.A. MacKay (50%)), Pfizer, Inc. Central Research Division, Groton, CT, 08/31/01-08/30/03, \$171,620.

Erling Smith

“Dynamic Failure of Frame Structures at High Temperature,” (with co-PI: R.B. Malla), University of Connecticut Research Foundation, 6/03-7/04, \$18,000.

Guling Wang

“Role of Soil Moisture and Vegetation Feedback in the Seasonal Prediction of Prediction Over the Mississippi River Basin,” National Oceanic and Atmospheric Administration (NOAA), 6/1/03-5/31/06, \$240,000.

**CIVIL & ENVIRONMENTAL ENGINEERING DEPARTMENT
AWARDS, HONORS, PATENTS
2002-2003**

Nelly M. Abboud

Outstanding Teaching Faculty Award, School of Engineering, University of Connecticut, Storrs, CT, 2003.

“Partners In Education,” Award, Woodstock Academy, Woodstock, CT, 2002.

Emmanouil N. Anagnostou

Nominee, the Alan T. Waterman Award, National Science Foundation.

Amvrossios C. Bagtzoglou

Elected member, Subject Matter Expert Panel, Pacific Northwest National Laboratory/U.S. Department of Energy.

Kenneth R. Demars

C.R. Klewin, Inc. Award for Excellence in Teaching, 2003.

George E. Hoag

“Chemical Oxidation of Volatile Organic Compounds,” (with P. Chheda, B.A. Woody, and G.M. Dobbs), U.S. Patent No. 6,474,908, Issued November 5, 2002

John N. Ivan

Senior Scholar, J. William Fulbright Foundation, Germany, 2002-2003.

Britt A. Holmén

Early CAREER Award, National Science Foundation, 2/1/02 - 1/31/07.

Ramesh B. Malla

Certificate of Appreciation, American Society of Civil Engineers (ASCE) for Outstanding Service as the Chair of the Executive Committee of the Aerospace Division, November 2002.

CIVIL & ENVIRONMENTAL ENGINEERING DEPARTMENT
MAJOR PROFESSIONAL ACTIVITIES
2002-2003

Nelly M. Abboud

Editorial Board Reviewer, *Fluid/Particle Separation Journal*.

Member, National Center for Environmental Research (NCER) Peer Review Panelist Information System (PRPIS), U.S. Environmental Protection Agency, Washington, DC, 2003.

Member, Civil & Environmental Engineering Industrial Advisory Council Committee, Three Rivers Community Technical College, Connecticut, January 2001- present.

Member, Organizing Committee, Natural Resources Council of Connecticut Conferences, "Non Lethal Methods of Controlling Deer Population," June 6, 2002 and "Connecticut Water Policy: Adopted or Orphaned," October 8, 2002, New Haven, CT.

Michael L. Accorsi

Technical Chair, 17th AIAA Aerodynamic Decelerator Systems Technology Conference and Seminar, Monterey, CA, May 19-22, 2003.

Chair, AIAA Aerodynamic Decelerator Systems Technical Committee, 5/03-5/05.

Emmanouil N. Anagnostou

Associate Editor, *Journal of Applied Meteorology*.

International Advisor, National Observatory of Athens, Greece.

Member, NASA's *Tropical Rainfall Measuring Mission* Science Team.

Organizer, Joint EGS/AGU Annual Assembly, "Global Precipitation and Hydrometeorological Extremes," session, Nice, France, April 2003.

Lisa Aultman-Hall

Chair, Committee on Bicycling, Transportation Research Board, National Academy of Science.

Amyrossios C. Bagtzoglou

Associate Editor, *Journal of Water Resources Research*.

Associate Editor, *Journal of the American Water Resources Association*.

Member, Editorial Board, *Journal of Environmental Forensics*.

Presentations

“Overview and Application of Inverse Groundwater Models for Contaminant Source Identification,” *keynote*, Environmental Forensics: Advanced Techniques, An International Society of Environmental Forensics Workshop, Santa Fe, NM, September 23, 2002.

“The Pont-Ventoux Tunnel Fiasco: Could Fracture Rock Hydrology Have Prevented It?,” Fractured Rock Hydrology Mini-Symposium, Department of Geology and Geophysics, University of Connecticut, Storrs, CT, March 8, 2003.

“Fractured Rock Contaminant Hydrology,” Department of Public Health Community Advisory Panel, Cheshire, CT, March 10, 2003.

“Hydrologic Inversion for Pollution Source Identification,” Environmental Scholars Colloquium, University of Connecticut, Storrs, CT, November 22, 2002.

Abstracts

“Chaotic Advection in Tidally-Dominated Estuarine Systems and its Potential for Water Quality Restoration,” (with A. Novikov), *Geophysical Research Abstracts*, Vol. 5, pp. 389, 2003.

“Improved Reconstruction of Two-Dimensional Resistivity Field Data Using Geostatistics,” (with J.W. Lane, D. Cornacchiulo and K. Ergun), *Geophysical Research Abstracts*, Vol. 5, pp. 176, 2003.

Kenneth R. Demars

Technical Co-Editor-in-Chief, *ASTM Geotechnical Testing Journal*, 8/95-12/02.

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

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

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

Member, ASTM Subcommittee on Awards.

Member, ASTM Subcommittee on Sampling and In-Place Testing.

Presentation

“Recycled Wood Materials for Erosion Control,” Regional Workshop on Recycled Materials, Massachusetts Department of Transportation, Walpole, MA, October 8, 2002.

John T. DeWolf

Associate Editor, *Structural Health Monitoring*.

Member, Proposal Review Panel, National Science Foundation.

Member, Board of Examiners, Professional Engineers and Land Surveyors (appointed by Governor).

Member, Administrative Committee, American Society of Civil Engineers Structures Congress.

Wael ElDessouki

Member, Board of Directors, Intelligent Transportation Society - Connecticut Chapter (ITS-CT).

Head, Technical Committee for ITS-CT.

Vice President, Board of Trustees, The American Arab Engineers and Scientist Society.

Member, Transportation Research Board/National Academy of Science: TRB-Committee on Network Modeling (A1C05).

Member, Transportation Research Board/National Academy of Science: TRB-Subcommittee on Emergency Evacuation (A3B01(4)).

Member, Transportation Research Board/National Academy of Science: TRB-subcommittee on Critical Infrastructure Systems (A5A201(3)).

Howard I. Epstein

Associate Editor, *ASCE Journal of Professional Issues in Engineering, Education and Practice*.

Presentations

“Residential Construction,” *invited*, the Torello Engineers Continuing Education Seminar Series, September 17, 2002, Storrs, CT; September 24, 2002, New Preston, CT; October 1, 2002, Westport, CT; October 8, 2002, New Haven, CT; October 15, 2002, Cromwell, CT; October 22, 2002, New London, CT.

“Timber Frames - Post and Beam Construction,” *invited*, the Torello Engineers Continuing Education Seminar Series, March 25, 2003, Storrs, CT; April 1, 2003, Westport, CT; April 8, 2003, New London, CT; April 15, 2003, New Haven, CT; April 22, 2003, New Preston, CT; April 29, 2003, Cromwell, CT; May 28, 2003, North Haven, CT.

Norman W. Garrick

Member, Organizing Committee and Session Chair, Urban Issues: South Asia Regional Conference on Transition Toward Sustainable Development, New Delhi, India, February 2003.

Member, Best Practices Manual Review Steering Committee, Connecticut Bureau of Water Management.

George E. Hoag

Member, Editorial Advisory Board, *Soil and Sediment Contamination Journal*.

Britt A. Holmén

Proposal Reviewer, National Science Foundation Research.

John N. Ivan

Visiting Lecturer, University of Karlsruhe, Germany, October 2002-February 2003.

Allison A. MacKay

Panel Reviewer, National Science Foundation, Environmental Technology.

Presentations

“Oxytetracycline Sorption to Clays,” (with R. Figueroa), Gordon Research Conference, Environmental Sciences: Water, Holderness, NH, June 23-28, 2002.

“Removal of Contaminant Candidate List and Other Anthropogenic Compounds by Coagulation,” (with W. Ballard), ACS 224th National Meeting, Boston, MA, August 18-22, 2002.

“Solid-Water Exchange of Antibiotics,” (with R. Figueroa and A. Leonard), NGWA 3rd International Conference on Pharmaceuticals and Endocrine Disrupting Chemicals in Water, Minneapolis, MN, March 19-20, 2003.

“Fate of Pesticides, Endocrine Disrupting and Pharmaceutical Compounds in Drinking Water Treatment Plants,” (with W. Ballard), NGWA 3rd International Conference on Pharmaceuticals and Endocrine Disrupting Chemicals in Water, Minneapolis, MN, March 19-20, 2003.

Ramesh B. Malla

International Organizing Committee, 5th International Conference on Space Structures, Guildford, Surrey, UK, August 19-21, 2002.

Member, Planning Committee, the 44th AIAA/ASME/ASCE/AHS/ACS Structures, Structural Dynamics and Materials Conference, VA, April 7-10, 2003.

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

Member, Editorial Board, *International Journal of Space Structures*, U.K.

Chair and Member, Executive Committee, Aerospace Division, American Society of Civil Engineers (ASCE).

Chair, ASCE SDM Conference Liaison Committee, 2001-present.

Member, Control Group, Dynamics and Controls Committee, ASCE Aerospace Division.

Member, Control Group, Advanced Composite Materials and Structures Committee, ASCE Aerospace Engineering.

Member, Space Engineering and Construction Committee, ASCE Aerospace Division.

Member, Structural Dynamics Technical Committee, American Institute of Aeronautics and Astronautics (AIAA).

Rusk Y. Masih

Editor, *The Point Research & Innovation Observer*.

Member, ASCE Committees for Design Loads on Structures During Construction, Minimum Design Loads for Buildings and Other Structures, and Structural Conditions Assessments and Rehabilitation of Buildings.

Member, ASCE Subcommittee on Seismic Rehabilitation of Buildings.

Member, ASCE Standards Committee, Wind Tunnel Testing of Buildings and Structures.

Fred L. Ogden

Associate Editor, *Journal of Hydrologic Engineering*, American Society of Civil Engineers, October 2002-present.

Conference Track Chair, EWRI World Water and Environmental Resources Congress, Philadelphia, PA, June 22-26, 2003.

Member, Surface Water Hydrology Committee, American Society of Civil Engineers (ASCE), Environmental and Water Resources Institute (EWRI).

Chair, ASCE-EWRI Task Committee, Distributed Hydrologic Modeling.

Moderator, EWRI World Water and Environmental Resources Congress, Philadelphia, PA, June 22-26, 2003.

Member, Board of Directors, Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) representing the interests of the University of Connecticut in the Consortium.

Co-Chair, Standing Committee, Hydrologic Observatories, Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI).

Member, Hydrologic Observatory Prototype Design Working Group, Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI).

Review Panel Member, Connecticut State Institute of Water Resources.

Reviewer, National Science Foundation, Research.

Invited colloquia: 2002, Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI).

Abstracts

“A Numerical Study of Hysteresis as Observed at the Watershed Scale,” (with J.M. Niedzialek), *Eos Transactions AGU*, 84(47), Fall Meeting Supplement, Abstract H11E-0896, San Francisco, CA, December 2002.

“Simple Scaling of Flood Quantiles and Individual Flood Peaks: Analysis of Data from a Small Hortonian Research Catchment,” (with D.R. Dawdy), *Eos Transactions AGU*, 83(47), Fall Meeting Supplement, Abstract H51B-0805, San Francisco, CA, December 2002.

“Two-Dimensional Modeling of Flood Events in Denver, Colorado,” (with H.O. Sharif, D. Yates and E. Brandes), *Eos Transactions AGU*, 83(47), Fall Meeting Supplement, Abstract H51B-0799, San Francisco, CA, December 2002.

Dani Or

Associate Editor, *Vadose Zone Journal*, Soil Science Society of America, 2001-present.

Editorial Board, *Irrigation Science*, 1997-present.

Reviewer, National Science Foundation.

Convener, European Geophysical Society/American Geophysical Union, Spring Meeting 2003, Soil Structure from Pore to Field Scale: Effects on Flow and Transport, Nice, France.

Chair, Soil Physics Division (S-1) and annual meeting program chair, Soil Science Society of America, 2002-2003.

Session Chair, Gordon Conference, Transport in Permeable Media, Andover, NH, August 2002.

Member, Rapid Response Team (SSSA-RRT), Soil Science Society American Committee S536.1, 2003-2006.

Member, Multi-state USDA Technical Committee W-188, Characterization of Flow and Transport Processes in Soils at Different Scales.

Presentations

“Microbial Processes in Unsaturated Porous Media,” invited keynote, International Conference on Soil and Groundwater Contamination and Cleanup in Arid Countries, January 20-23, 2003, Sultan Qaboos University, Muscat, Oman.

“Time Domain Reflectometry Measurement of Bulk Permittivity of Porous Mixtures Containing Bound Water,” *invited*, Electrical Transport and Optical Properties of Inhomogeneous Media Conference (ETOPIM 6), July 15, 2002, Snowbird, UT.

Abstracts

“Dielectric and Acoustic Monitoring of Water Content and Volume Changes in Ear Corn Drying Bins,” (with S.B. Jones), *Agronomy Abstracts*, ASA, Madison, WI, 2002.

“Physical Processes Affecting Microbial Habitats and Activity in Unsaturated Porous Media,” *Agronomy Abstracts*, ASA, Madison, WI, 2002.

“Modeling Bulk Soil Deformation Using Rheological Properties and Micro Scale Pore Closure,” (with M. Berli), Soil Science Society of America, Indianapolis, IN, *Agronomy Abstracts*, ASA, Madison, WI, 2002.

“Automated Gas Diffusion Measurements in Coarse-Textured Plant Growth Media for Microgravity Studies,” (with S.B. Jones), *Agronomy Abstracts*, ASA, Madison, WI, 2002.

“Pore Shape and Microscale Stress Distribution Effects on Soil Pore Closure Dynamics, (with M. Berli), American Geophysical Union (AGU) Fall Meeting 2002, San Francisco, CA (EOS 83: pp. F496, 2002).

“Liquid Vapor Interfacial Stability Under Slow Laminar Flow in Microchannels,” (with Y. Kapiluto), American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, December 6-10, 2002.

“Physical Processes Affecting Microbial Habitats and Activity in Unsaturated Porous Media,” International Conference on Soil and Groundwater Contamination and Cleanup in Arid Countries, Sultan Qaboos University, January 20-23, 2003, Muscat, Oman.

“Microscale Pore Shape and Stress Anisotropy Effects on Macroscopic Soil Structural Dynamics and Hydraulic Properties,” (with M. Berli), European Geophysical Society/American Geophysical Union, Spring Meeting 2003, Nice, France.

Barth F. Smets

Member, Editorial Board, *Biodegradation*.

Member, Biannual Conference Planning Committee, Association of Environmental Engineering and Science Professors.

Member, Project Subcommittee, Water Environment Federation.

Member, Research Committee, Water Environment Federation.

Panel Reviewer, National Science Foundation, Environmental Technology.

Member, National Research Council, Water Science & Technology Board, Committee on the Bioavailability of Contaminants in Soils and Sediments.

COMPUTER SCIENCE & ENGINEERING DEPARTMENT

ANNUAL REPORT SUMMARY

2002-2003

This has been an extremely productive and successful year for the Computer Science & Engineering Department. Our accomplishments include:

- Educational program highlights, including changes to our undergraduate and graduate programs.
- Successful faculty recruitment to build our program in the important areas of networking and bioinformatics.
- Enhanced research programs, with both sustained and new funding initiatives.
- Moving into the new state-of-the-art Information Technology Engineering Building (ITEB).

EDUCATIONAL PROGRAMS HIGHLIGHTS

During the year, we continued to revise and fine-tune our undergraduate programs. In particular, we (1) commenced a revision of our introductory programming sequence to emphasize object-oriented programming and algorithms, extending a two-semester sequence to a three-semester sequence, as is consistent with ACM/IEEE curriculum recommendations, and (2) merged our introductory digital design sequence into a single course. Note also that in the fall 2002 semester, we learned that our programs (Computer Science & Engineering and Computer Science) were fully accredited by the ABET/CSAB accreditation visit of the prior year. In addition, our graduate program continues to receive international recognition, as demonstrated by the number of applicants from top schools worldwide and the number of students joining the department who are subsidized by their governments (including the U.S.). Specifically, for the fall 2003 semester, we have received in excess of 250 applications from around the world. The popularity of our programs allows us to significantly raise our acceptance standards. Lastly, during the year we developed a new publication requirement for all Ph.D. students; this policy will mandate that their doctoral research pass the external peer review process, and it affords our graduates a very concrete competitive advantage in their careers.

FACULTY RECRUITING

The department recognizes that faculty are the heart of any department in a Research I University such as UConn. Therefore, we continue to search for the best faculty candidates from the top-ranked universities. We have succeeded in hiring two new tenure track assistant professors who will start in the fall 2003 semester. Dr. Jun-Hong Cui, a researcher in the networking area, graduated from UCLA in Computer Science in July 2003. Dr. Ion Mandoiu, a researcher in the area of algorithms, computer architecture, and bioinformatics, received his Ph.D. from the Georgia Institute of Technology in 2000 and has experience as a postdoctoral researcher at UCLA and as a researcher at UCSD. We are extremely proud of our departmental growth in tenured and tenure track faculty: we have added a total of eight faculty members in the last three years (seven assistant professors as well as Sanguthevar Rajasekaran, UTC Professor of Computer Science and Engineering and the Director of the General Electric e-Engineering Clinic).

RESEARCH HIGHLIGHTS

Our research productivity, both in terms of funding and publications, continues to improve with both ongoing and new funding efforts. In the ongoing area: Dong-Guk Shin (in collaboration with researchers from the UConn Health Center) has a National Institutes of Health (NIH) grant in the

amount of \$1,103,813 for “Integrated Bioinformatic Center of Cellular Biology”; Alex Russell and Alex Shvartsman, in collaboration with faculty members at MIT, have a National Science Foundation-ITR grant totaling \$463,000 for UConn; Eugene Santos has a proposal as Principal Investigator for another NSF-ITR grant, totaling \$409,000 (with Mechanical Engineering); Thomas Peters has an NSF grant for \$700,000 in collaboration with peers at MIT, Purdue and the University of Montreal; and Steven Demurjian and Dong-Guk Shin continued to receive more than \$350,000/year in funding from the State of Connecticut Insurance Department. New funding efforts include: five additional NSF grants totaling \$626,000 for Thomas Peters, Sanguthevar Rajasekaran, Alex Russell, Eugene Santos and Alex Shvartsman; three National Institutes of Health grants totaling \$304,000 for Dong-Guk Shin and Eugene Santos; and two grants from the U.S. Air Force and ARPA totaling \$566,000 for Eugene Santos. A complete list is given in the enclosed faculty reports.

Our faculty have increased their participation as officers of professional societies, as members of editorial boards, and as members of steering committees and program chairs for international conferences. Faculty members have also been invited to present their research directions and results, including keynote addresses in several major international and national conferences, Air Force centers and prestigious institutes such as MIT and SUNY.

THE INFORMATION TECHNOLOGY ENGINEERING BUILDING (ITEB)

In May 2003, along with faculty and staff affiliated with the ECE department, we moved into the new state-of-the-art Information Technologies Engineering Building (ITEB), which is located between the School of Business and the Homer Babbidge Library in the center of the campus. ITEB has high quality research and educational facilities, with the majority of the departmental space centralized on the second floor. In addition to the new furniture for faculty offices and educational laboratories and classrooms, we obtained a donation of high-quality furniture from Otis Elevator, Inc., for research laboratories.

CONCLUDING REMARK

The Computer Science & Engineering Department is in an impressive growth path. The addition of eight high quality faculty in the last three years has increased our tenured/tenure track faculty to a total of 18. Our undergraduate and graduate educational programs are well developed, but we continue to fine-tune them, to serve the State and the nation. Research is growing at a very rapid pace in terms of research funding, publications, and national and international service and recognition. We continue to excel in both teaching and research.

COMPUTER SCIENCE & ENGINEERING
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2002-2003

Swapna Gokhale

“Using Statistical Data for Reliable Mobile Communications,” (with J. Jobin, S.K. Tripathi and M. Faloutsos), *Journal of Wireless Communications and Mobile Computing*, Special Issue in *Reliable Transport Protocols for Mobile Computing*, vol. 2, issue 1, pp. 101-111, February 2002.

Dina Goldin

“Computation Beyond Turing Machines,” (with P. Wegner), *Communications of the Association for Computing Machinery*, pp. 100-102, April 2003.

Chun-Hsi Huang

“Parallel Pattern Identification in Biological Sequences on Clusters,” (with S. Rajasekaran), *IEEE Transactions on NanoBioscience (IEEE TNB)*, Vol. 2, Issue 1, pp. 29-34, March 2003.

Lester Lipsky

“Energy Levels and Classifications of Triply Excited States of Li, Be⁺, B⁺⁺ and C⁺⁺⁺,” (with M.J. Conneely), *Atomic Data and Nuclear Data Tables*, Vol. 82, Number 1, pp. 115-190, September 2002.

“Availability Versus Performance,” (with P. Fiorini), *Computing International Scientific Journal*, Vol. 2, No. 1, June 2003.

Robert McCartney

“Diagram Processing: Computing With Diagrams,” (with M. Anderson), *Artificial Intelligence*, 145:1-2, pps. 181-226, 2003.

Sanguthevar Rajasekaran

“Efficient Selection and Sorting Schemes Using Corteries for Processing Large Distributed Files,” (with D.S.L. Wei, Z. Cheng, K. Naik and S.-Y. Kuo), *Journal of Parallel and Distributed Computing* 62(8), pps. 1295-1313, 2002.

“Parallel Pattern Identification in Biological Sequences on Clusters,” (with C.-H. Huang), *IEEE Transactions on NanoBioscience (IEEE TNB)*, Vol. 2, Issue 1, pps. 29-34, March 2003.

“Efficient Parallel Algorithms for Template Matching,” *Parallel Processing Letters*, 12(3&4), pps. 359-364, 2002.

Alexander Russell

“The Computational Complexity of Solving Equations Over Finite Groups,” (with M. Goldmann), *Information and Computation*, 178:253-262, 2002.

“Lower Bounds for Leader Election and Collective Coin-Flipping in the Perfect Information Model,” (with M. Saks and D. Zuckerman), *SAIM Journal on Computing*, 37(6):1645-1662, 2003.

Eugene Santos, Jr.

“Implicitly Preserving Semantics During Incremental Knowledge Base Acquisition Under Uncertainty,” (with E.S. Santos and S.E. Shimony), *International Journal of Approximate Reasoning*, 33(1), pps. 71-94, 2003.

“Designing Optimal Algorithms for Solving Banded Triangular Systems on Rings,” (with E.E. Santos and E.S. Santos), *Journal of Mathematical Modelling & Algorithms* 1(3), pps. 169-180, 2002.

“Intent Inference for Users, Teams, and Adversaries,” (with B. Bell), *AI Magazine* 24(1), pps. 97-98, AAAI Press, 2003.

Alexander Shvartsman

“Cooperative Computing with Fragmentable and Mergeable Groups,” (with C. Georgiou), *Journal of Discrete Algorithms*, Vol. 2(2), pp. 219-242, 2002.

COMPUTER SCIENCE & ENGINEERING DEPARTMENT
BOOKS, BOOK CHAPTERS, BOOK SECTIONS & EDITED VOLUMES
2002-2003

Reda A. Ammar

“Real-Time Recognition of Rail Structures in the Presence of Interference,” (with H. Sholl and D. Pagano), Volume 5, TONE book series on *Nondestructive Testing and Evaluation for the Railroad Industry*, pps. 61-73, ASNT, 2002.

Steven Demurjian

“Role Delegation for a Resource-Based Security Model,” (with M. Liebrand, H. Ellis, C. Phillips, T.C. Ting and J. Ellis), *Data and Applications Security: Developments and Directions II*, (E. Gudes and S. Sheno, eds.), Kluwer, 2003.

Aggelos Kiayias

“Robust Verifiable Non-Interactive Zero-Sharing: A Voting Utility for Enhanced Privacy,” (with M. Yung), Chapter 9, *Secure Electronic Voting, Advances in Information Security*, Vol. 7, Kluwer Academic Publishers, Boston, ISBN 1-4020-7301-1, pps. 139-152, 2002.

Eugene Santos, Jr.

“Analyzing the Impact of Knowledge on Algorithm Performance in Discrete Optimization,” (with X. Zhong), *Computational Modeling and Problem Solving in the Networked World: Interfaces in Computing and Optimization*, (H.K. Bhargava and N. Ye, eds.), pps. 139-153, Kluwer Academic, 2003.

Alexander Shvartsman

“Communication and Data Sharing for Dynamic Distributed Systems,” (with N. Lynch), *Future Directions in Distributed Computing*, (A. Schiper, chapter ed.), *Lecture Notes in Computer Science*, Vol. 2584, 2003.

Future Directions in Distributed Computing, (with A. Scheiper, H. Weatherspoon and B. Zhao), Springer Verlag, p. 219, 2003.

**COMPUTER SCIENCE & ENGINEERING DEPARTMENT
CONFERENCE PROCEEDINGS & OTHER PUBLICATIONS
2002-2003**

Reda A. Ammar

“Scheduling Real-Time Parallel Structures on Cluster Computing,” (with A. Alhamdan), *Proceedings of the Seventh IEEE Symposium on Computers and Communications*, pps. 69-74, Taormina–Giardini Naxos, Italy, July 1-4, 2002.

“Scheduling Real-Time Conditional and Loop Structures on Cluster Computing,” (with A. Alhamdan and A. El-Desouky), *Proceedings of the 15th International Conference on Parallel and Distributed Computing Systems*, pps. 431-436, Louisville, KY, September 19-21, 2002.

“A Heuristic Scheduling Algorithm for Stochastic Tasks in Distributed Multiprocessor Systems,” (with E.A. Maksoud), *Proceedings of the 15th International Conference on Parallel and Distributed Computing Systems*, pps. 277-282, Louisville, KY, September 19-21, 2002.

“Performance Analysis of Textile Fault Detection System,” (with S. Nassar), *Proceedings of the 15th International Conference on Computer Applications in Industry and Engineering*, pps. 266-269, San Diego, CA, November 7-9, 2002,

“Performance Modeling of Power Management/Control System,” (with H. Sholl and A. Mohamed), *Proceedings of the International Conference on Computer Applications in Industry and Engineering*, pps. 261-265, San Diego, CA, November 7-9, 2002.

“An Efficient Scheduling Algorithm for Stochastic Tasks with Deadlines,” (with E.A. Maksoud and N. Debnath), *Proceedings of the 2nd IEEE International Symposium on Signal Processing and Information Technology*, pps. 62-67, Marrakesh, Morocco, December 18-21, 2002.

“Reliable Scheduling of Tandem Task Graphs in a Cluster Computing Environment,” (with A. Amin), *Proceedings of the 2nd IEEE International Symposium on Signal Processing and Information Technology*, pps. 157-162, Marrakesh, Morocco, December 18-21, 2002.

“An Object Oriented Software Engineering Tool: Design and Implementation,” (with N. Debnath, E. Thiemann and R. Lee), *Proceedings of the 2nd IEEE International Symposium on Signal Processing and Information Technology*, pps. 255-260, Marrakesh, Morocco, December 18-21, 2002.

“Analysis of Software Remaining Execution Time,” (with S. Tasneem and H. Sholl), *Proceedings of the 18th International Conference on Computers and Their Applications*, Honolulu, Hawaii, pps. 219-223, March 26-28, 2003.

“Performance Modeling of a Cluster of Workstations,” (with A.A. Mohamed and L. Lipsky), The 4th International Conference on Communications in Computing (CIC-2003), Las Vegas, NV, June 2003.

Steven Demurjian

“Role Delegation for a Distributed, Unified RBAC/MAC,” (with M. Liebrand, H. Ellis, C. Phillips and T.C. Ting), *Proceedings of 16th IFIP WG 11.3 Working Conference on Database Security*, Cambridge, England, July 2002.

“Analyzing the Reusability of XML Components,” (with D. Needham, M. Price, T. Rando and T. Daggett), *Proceedings of 6th International Conference on Business Information Systems (BIS 2003)*, pps. 258-262, Colorado Springs, CO, June 2003.

“Security Assurance for an RBAC/MAC Security Model,” (with C. Phillips and T.C. Ting), *Proceedings of the 2003 IEEE Information Assurance Workshop*, pps. 250-257, West Point, NY, June 2003.

Swapna Gokhale

“Measuring Distance Between Program Features,” (with W.E. Wong and J.R. Horgan), *Proceedings of COMPSAC*, pps. 307-312, Oxford, England, August 2002.

“Routing Metrics for Best Effort Traffic,” (with S.K. Tripathi), *Proceedings of the International Conference on Computer Communications and Networks (ICCCN, 03)*, pps. 595-598, Miami, FL, October 2002.

Dina Goldin

“Paraconsistency of Interactive Computation,” (with P. Wegner), *Proceedings of the Paraconsistent Computational Logic Workshop (PCL)*, pps. 109-119, Denmark, July 2002.

“The Constraint Database Framework: Lessons Learned from CQA;/CDB,” (with A. Kutlu, M. Song and F. Yang), *Proceedings of the International Conference of Data Engineering (ICDE)*, pps. 735-737, Bangalore, India, March 2003.

“Modeling Indirect Interaction In Open Computational Systems,” (with D. Keil), *Proceedings of Theory and Practice of Open Computational Systems (TAPOCS)*, Linz, Austria, June 9-11, 2003.

“Extending the Constraint Database Framework,” (with A. Kutlu and M. Song), *Proceedings of PCK50 ACM Workshop*, pps. 42-54, June 2003.

Ian Greenshields

“Adaptive, Multi-resolution Visualization of Large Scale Sequential Images in Computational Grids,” (with M. Kerasha), *Proceedings of the High Performance Computing Symposium (HPC 2003)*, pps. 125-130, Orlando, FL, 2003.

“A High Performance Dynamic Scheduler for Grid Applications,” (with G. El-Sayed), *Proceedings of the High Performance Computing Symposium (HPC 2003)*, pps. 84-94, Orlando, FL, 2003.

“Archived Information and Knowledge Discovery for Knowledge-Based Grid Resource Management and Scheduling,” (with A. Ibrahim), *Proceedings of the High Performance Computing Symposium 2003 (HPC 2003)*, pps. 76-83, Orlando, FL, 2003.

“An Intelligent Approach for Multicriteria Resource Management and Scheduling in Grid Computing Environments,” (with A. Ibrahim), *Proceedings of the International Conference on Computational Intelligence for Modeling, Control and Automation, CIMC 2003*, pps. 205-213, Vienna, Austria, February 2003.

“Anatomically-based Algorithmic Segmentation of Kidney Cryosection Imagery,” (with X. Lui and J. Rosiene), *Proceedings of the Proceedings of the Fourth Visible Human Project Conference (CDROM)*, CO, November 2002.

“Integrating Intelligent Methods for Resource Management and Scheduling in Computational Grid Systems,” (with A. Ibrahim), *Proceedings of the Second IEEE Annual Symposium ISSPIT*, pps. 152-156, Marrakesh, Morocco, December 2002.

“Using Past Data to Predict Application Run Times in Heterogeneous Clusters of Workstations,” (with A. Ibrahim), *Proceedings of the Second IEEE Annual Symposium, ISSPIT*, pps. 77-81, Marrakesh, Morocco, December 2002.

“Migrating Dependent/Messaging Tasks in a High-Performance Dynamic Scheduler for Grid Applications,” (with G. El-Sayed), *Proceedings of the Second IEEE Annual Symposium, ISSPIT*, pps. 68-72, Marrakesh, Morocco, December 2002.

“A Vectorial Rotation-Invariant 3D Shape Descriptor,” *Proceedings of the 16th IEEE International Symposium on Computer-Based Medical Systems*, pps. 62-67, New, York, NY, June 2003.

Chun-Hsi Huang

“Parallel Pattern Identification in Biological Sequences on Clusters,” *Proceedings of the 4th IEEE International Conference on Cluster Computing (IEEE Cluster)*, pps. 127-134, Chicago, IL, September 24-26, 2002.

“Average-Case Communication-Optimal Parallel Parenthesis Matching,” (with X. He), *Proceedings of the 13th International Symposium on Algorithms and Computation (ISAAC)*, LNCS 2518, pps. 308-319, Springer Verlag, November 2002.

Aggelos Kiayias

“Extracting Group Signatures from Traitor Tracing Schemes,” (with M. Yung), *Proceedings of Advances in Cryptology – Eurocrypt 2003, Lecture Notes in Computer Science*, Vol. 2656, pps. 630-648, 2003.

“Cryptographic Hardness Based on the Decoding of Reed-Solomon Codes,” (with M. Yung), *Proceedings of the International Colloquium in Automata Languages and Programming – ICALP 2002*, Lecture Notes in Computer Science, Vol. 2380, pps. 232-243, 2002.

“Non-Interactive Zero-Sharing With Applications to Private Distributed Decision Making,” (with M. Yung), *Pre-proceedings of the Financial Cryptography Conference*, Guadeloupe, FWI, 2003.

“Breaking and Repairing Asymmetric Public-Key Traitor Tracing,” (with M. Yung), *Pre-Proceedings of the 2002 ACM Workshop on Digital Rights Management*, Washington, DC, 2002.

Lester Lipsky

“A Performance Model for User Delay in ON/OFF Heavy-Tailed Traffic,” (with I. Antonios), *Proceedings of the 2002 International Symposium on Performance Evaluation of Computer and Telecommunication Systems*, (SPECTS 2002), San Diego, CA, July 15-19, 2002.

“An Analytic Approach to Assess the Performability of Parallel & Distributed Systems,” (with P.M. Fiorini and C. Campbell), *Proceedings of the 15th International Conference on Parallel and Distributed Computing Systems* (PDCS02), Louisville, KY, September 2002.

“Theoretical and Experimental Results of Processing N Tasks in the Presence of Processor Failures,” (with G. Weerasinghe), *Proceedings of the 15th International Conference on Parallel and Distributed Computing Systems* (PDCS02), Louisville, KY, September 2002.

“A Performance Model and Analysis of Heterogeneous Traffic with Heavy Tails,” (with I. Antonios), *Proceedings of the 2nd IEEE International Symposium on Network Computing and Applications* (NCA03), pp. 367-373, Cambridge, MA, April 2003.

“Availability Versus Performance,” (with P. Fiorini), *Proceedings of the 2003 International Conference on Parallel and Distributed Processing Techniques and Applications*, (IDAACS’ 2003) pp. 1352-1357, Las Vegas, NV, June 23-26, 2003.

“Analytic Performance Model of P Fault-Prone Parallel Processors Running N Deterministically Distributed Tasks,” (with S. Kazmi), *Proceedings of the 2003 International Conference on Parallel and Distributed Processing Techniques and Applications* (IDAACS’ 2003), pp. 1339-1345, Las Vegas, NV, June 23-26, 2003.

“Performance Modeling of a Cluster of Workstations,” (with A.A. Mohamed and R.A. Ammar), *Proceedings of the 4th International Conference on Communications in Computing* (CIC-2003), pp. 227-233, Las Vegas, NV, June 23-26, 2003.

“A Matrix Analytic Approach to Assess the Performance of Computing Systems Subject to Failure and Repair with non-Exponential Task Time Distributions,” (with R.W. Rowen and P.M. Fiorini), *Proceedings of the 2003 International Conference on Parallel and Distributed Processing Techniques and Applications*, pp. 1363-1369, Las Vegas, NV, June 23-26, 2003.

Robert McCartney

“Program Assessment Tools in Computer Science: A Report From the Trenches,” (with K. Sanders), *Proceedings of SIGCSE '03*, pps. 31-35, Reno, NV, February 2003.

Laurent Michel

“A Constrained Based Architecture for Local Search,” (with P. Van Hentenryck), *Proceedings of the 17th Annual ACM Conference on Object-Oriented Programming, Systems, Languages and Applications*, pps. 101-110, Seattle, WA, November 2002.

“A Simulated Annealing Approach to the Traveling Tournament Problem,” (with A. Anagnostopoulos, P. Van Hentenryck and Y. Vergados), *Proceedings of the Fifth International Workshop on Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimization Problems*, pps. 80-91, Montreal, Canada, May 8-10, 2003.

“Comet in Context,” *Principles of Computing and Knowledge: Paris C. Kanellakis Memorial Workshop*, FCRC 2003, ACM SIGMOD Anthology, pps. 95-107, San Diego, CA, June 7-14, 2003.

Thomas Peters

“Ambient Isotopic Approximations for Surface Reconstruction and Interval Solids,” *Proceedings of the ACM Solid Modeling Symposium*, pps. 96-105, Seattle, WA, June 16-20, 2003.

Sanguthevar Rajasekaran

“Directly Selected and Limited Look up Cache Algorithm for Dynamic Web Contents,” (with J. Lim), *Proceedings of the 9th International Conference on Networks, Parallel and Distributed Processing, and Applications*, pps. 107-112, Tsukuba, Japan, October 2002.

“Parallel Cache Management Protocol for Static and Dynamic Web Contents,” (with J. Lim), *Proceedings of the IADIS International WWW/Internet 2002 Conference*, pps. 20-28, Lisbon, Portugal, November 2002.

“Distributed Cache Content Management Protocol for Cooperative Web Servers,” (with J. Lim), *Proceedings of the 14th International Conference on Parallel and Distributed Computing and Systems*, pps. 667-672, Cambridge, MA, November 2002.

“Parallel Cache Management Protocol and Algorithm for Cooperative Web Servers,” (with J. Lim), *Proceedings of the IEEE International Conference on Communications (ICC)*, pps. 918-922, Alaska, May 2003.

Alexander Russell

“Failure-Sensitive Analysis of Parallel Algorithms with Controlled Memory Access Concurrency,” (with C. Georgiou and A. Shvartsman), *Proceedings of the 6th International Conference on Principles of Distributed Systems (OPODIS 2002)*, pps. 127-138, France, 2002.

“Optimally Work-Competitive Scheduling for Cooperative Computing With Merging Groups,” (with C. Georgiou and A. Shvartsman), *Proceedings of the 21st Annual ACM Symposium on the Principles of Distributed Computing (PODC)*, pps. 132, Monterey, CA, July 2002.

“Inapproximability Results for Equations Over Finite Groups,” (with L. Engebretsen and J. Holmerin), *Proceedings of the 29th International Colloquium on Automata, Languages, and*

Computation (ICALP), Vol. 2380 of Lecture Notes in Computer Science, pps. 73-85, Springer, July 2002.

“Quantum Walks on the Hypercube,” (with C. Moore), *Proceedings of the 6th International Workshop on Randomization and Approximation Techniques on Computer Science*, Vol. 2483 of Lecture Notes in Computer Science, pps. 164-178, Cambridge, MA, Springer, September 2002.

“A Note on the Representational Incompatibility of Function Approximation and Factored Dynamics,” (with E. Allender, S. Arora, M. Kearns and C. Moore), *Proceedings of the 16th Annual Conference on Neural Information Processing Systems: Natural and Synthetic (NIPS)*, Vancouver, Canada, December 2002.

“A Note on the Set Systems Used for Broadcast Encryption,” (with S.R. Kumar), *Proceedings of the 14th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pps. 470-471, Baltimore, MD, January 2003.

“Distributed Cooperation and Adversity: Complexity Trade-Offs,” (with C. Georgiou and A. Shvartsman), *Proceedings of Principles of Computing and Knowledge: Paris C. Kannelakis Memorial Workshop (PK50)*, pps. 60-71, San Diego, CA, June 8, 2003.

“Work-Competitive Scheduling for Cooperative Computing With Dynamic Groups,” (with C. Georgiou and A. Shvartsman), *Proceedings of the 35th Annual ACM Symposium on the Theory of Computing (STOC)*, pps. 251-258, San Diego, CA, June 9-11, 2003.

Eugene Santos, Jr.

“On the Efficiency and Scalability of Abductive Reasoning with Linear Programming,” (with E. Santos and E.E. Santos), *Proceedings of the 2002 International Conference on Artificial Intelligence (IC-AI 2002)*, pps. 1001-1008, Las Vegas, NV, 2002.

“Solving Banded Triangular Linear Systems on 3-D Torus Networks,” (E.E. Santos and S. Santos), *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications*, pps. 1989-1994, Las Vegas, NV, 2002.

“General Tridiagonal Solver on Rings,” (with E.E. Santos and E. Santos), *Proceedings of the 14th International Conference on Parallel and Distributed Computing and Systems*, pps. 147-152, Cambridge, MA, 2002.

“Knowledge Acquisition for Adversary Course of Action Prediction Models,” (with S.M. Brown and B. Bell), *Proceedings of the AAAI 2002 Fall Symposium on Intent Inference for Users, Teams, and Adversaries*, pps. 7-14, Boston, MA, 2002

“Adversarial Inferencing for Generating Dynamic Adversary Behavior,” (with J. Surman and R. Hillman), *Proceedings of the SPIE 17th Annual International Symposium on Aerospace/Defense Sensing and Controls: AeroSense 2003*, Orlando, FL, 2003.

“A Cognitive Architecture for Adversary Intent Inferencing: Knowledge Structure and Computation,” *Proceedings of the SPIE 17th Annual International Symposium on Aerospace/Defense Sensing and Controls: AeroSense 2003*, Orlando, FL, 2003.

Dong-Guk Shin

“A Comparative Study for Mining Biological Data,” (with T. Soliman), *Proceedings of the ICIS-2002*, pp. 87-94, Boston, MA, July 2002.

“Interactive Data Analysis Pipeline Designed to Develop Non-redundant Clone Libraries for Microarray Experiments,” (with J. Bluis, W. Krueger, T. Peng, H.-S. Wang and D. Rowe), *Proceedings of Advanced Topics in Microarray Analysis*, p. 63, Bethesda, MD, January 22, 2003.

“Nodal Distance Algorithm: Calculating a Phylogenetic Tree Comparison Metric,” (with J. Bluis), *Proceedings of the 3rd IEEE International Symposium on Bioinformatics and Bioengineering*, pps. 87-94, Bethesda, MD, March 10-12, 2003.

“A Scalable Visual Data Analysis Pipeline Framework Supporting Large Scale Bioinformatics Research,” (with R. Nori, J.-G. Nam and J. Maddox), *Proceedings of DOE Geome10*, pp. 40, Santa Fe, NM, March 30-April 1, 2003.

Alexander Shvartsman

“Failure-Sensitive Analysis of Parallel Algorithms with Controlled Memory Access Concurrency,” (with C. Georgiou and A. Russell), *Proceedings of the 6th International Conference on Principles of Distributed Systems (OPODIS 2002)*, pps. 127-138, Reims, France, December 11-13, 2002.

“RAMBO: A Reconfigurable Atomic Memory Service,” (with N. Lynch), *Proceedings of the 16th International Symposium on Distributed Computing, DISC'2002*, pps. 173-190, Toulouse, France, October 28-30, 2002.

“Bounding Work and Communication in Robust Cooperative Computation,” (with B.S. Chlebus, L. Gasieniec and D.R. Kowalski), *Proceedings of the 16th International Symposium on Distributed Computing, DISC'2002*, pps. 295-310, Toulouse, France, October 28-30, 2002.

“Optimally Work-Competitive Scheduling for Cooperative Computing with Merging Groups,” (with C. Georgiou and A.C. Russell), *Proceedings of the 21st ACM Symposium on Principles of Distributed Computing (PODC 2002)*, p. 132, Monterey, CA, July 2002.

“Atomic Object Services for Mobile and Dynamic Networks,” (with S. Dolve, S. Gilbert, H. Lynch and P. Musial), *Proceedings of the 7th International Workshops on Interconnection Networks*, p. 15, Sweden, June 16-17, 2003.

“Performing Tasks in Asynchronous Environment,” (with D. Kowalski), *Proceedings of the 7th International Workshops on Interconnection Networks*, p. 9, Sweden, June 16-17, 2003.

“Work-Competitive Scheduling for Cooperative Computing with Dynamic Groups,” (with C. Georgiou and A. Russell), *Proceedings of the 38th Annual ACM Symposium on Theory of Computing (STOC'2003)*, pps. 251-258, San Diego, CA, June 9-11, 2003.

COMPUTER SCIENCE & ENGINEERING DEPARTMENT
ACTIVE RESEARCH GRANTS & CONTRACTS
2002-2003

Reda A. Ammar

“Integrate Bioinformatic Center of Cellular Biology,” (with co-PIs: D.-G. Shin and L. Loew), National Institutes of Health, May 2002 – May 2005, \$1,073,157.

“Academic Scholarship Program in Computer Engineering,” (with co-PI: M. Anwar), National Science Foundation, July 2001 – June 2004, \$197,988.

“Performance-Oriented Design of Real-time System,” National Science Foundation, September 2000 – August 2003, \$26,927.

“RAMSys: A Metacomputing System,” (with co-PIs: I. Greenshields and A. El-Desouki), National Science Foundation, (ERI, Egypt), April 2002-March 2004, \$29,700.

“Real-Time Scheduling of Task Graphs on Grid Computing,” (with co-PI: A. El-Desouki), National Science Foundation and Egypt-USA Fund, September 2002-August 2004, \$48,500.

“Efficient Query Processing in Heterogeneous Distributed Database System,” Egypt, September 2002-August 2003, \$7,000.

“Very Fast Modeling Tools for Fuel Cells,” (with PI: S. Rajasekaran), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, January 2003-December 2004, \$68,471.

“Performance Models for PC Based and Embedded Software Applications,” (with co-PI: H. Sholl), ATI/GE, Fall 2002, \$8,628.

“Real-Time Architecture for High Speed Inspection,” (with co-PI: H. Sholl), DAPCO, September 1, 2001 – August 31, 2003, \$145,047.

Steven Demurjian

“Feasibility Study of Information System Reengineering, Part V,” (with co-PI: D.-G. Shin), State of Connecticut Insurance Department, March 15, 2002 – June 30, 2003, \$158,668.

“Feasibility Study of Information System Reengineering, Part VI,” (with co-PI: D.-G. Shin), State of Connecticut Insurance Department, January 1, 2003 – June 30, 2003, \$199,659.

Swapna Gokhale

“Network Auditing and Security,” Telcordia Technologies, September 2003 – September 2005, \$32,000.

Dina Goldin

“Towards Practical Constraint Query Algebra,” National Science Foundation, February 1, 2001 – May 31, 2003, \$150,491.

“Modeling Complex Systems with Persistent Turing Machines,” University of Connecticut Research Foundation, June 1, 2002 – May 31, 2003, \$18,459.

Ian Greenshields

“RAMSys: A Metacomputing System,” (with co-PIs: R. Ammar and A. El-Desouki), National Science Foundation, (ERI, Egypt), April 2002-March 2004, \$29,700.

“Real-Time Architecture for High Speed Inspection,” (with co-PIs: R. Ammar and H. Sholl), DAPCO, September 1, 2001 – August 31, 2003, \$145,047.

Chun-Hsi Huang

“Graph Algorithms on Coarse-Grained Parallel Computers,” University of Connecticut Research Foundation, June 1, 2002 – May 31, 2003, \$20,874.

Robert McCartney

“Academic Diversity in Computer Science,” National Science Foundation, July 1, 2000 – June 30, 2003, \$165,000.

Thomas Peters

“I-Tango: Intersections – Topology, Accuracy and Numerics for Geometric Objects (in Computer-Aided Design),” (with co-PIs: N.F. Stewart, UConn; C.M. Hoffman, Purdue University; N.M. Patrikalakis, T. Maekawa and T. Sakkalis, MIT), National Science Foundation, May 1, 2002 – April 30, 2005, \$700,000.

REU Supplement: “I-Tango: Intersections – Topology, Accuracy and Numerics for Geometric Objects (in Computer-Aided Design),” (with co-PIs: N.F. Stewart, UConn; C.M. Hoffman, Purdue University; N.M. Patrikalakis, T. Maekawa and T. Sakkalis, MIT), National Science Foundation, May 1, 2002 – April 30, 2005, \$15,000.

“Computational Topology for Surface Reconstruction,” (with co-PIs: K. Abe and A.C. Russell), National Science Foundation, October 1, 2002 – September 30, 2004, \$99,999.

Sanguthevar Rajasekaran

“Very Fast Modeling Tools for Fuel Cells,” (with co-PI: R. Ammar), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, January 2003 – December 2004, \$68,471.

“An Algorithmic Evaluation of Optical Architectures,” National Science Foundation, (subcontract from the University of Florida), May 2003 – August 2004, \$101,022.

Alexander Russell

“CAREER: Efficient Cryptography with Provable Security Guarantees,” National Science Foundation, September 1, 2001 – August 31, 2006, \$305,000.

“ITR: Communication and Data Sharing in Dynamic Distributed Systems,” (with co-PI: A. Shvartsman), National Science Foundation (subcontract through MIT), September 1, 2001 – August 31, 2006, \$463,421.

“ITR: Complexity-Theoretic Applications of Fourier Analysis,” National Science Foundation, September 2002 – August 2005, \$125,000.

“QuBIC: Quantum Monte-Carlo Algorithms and Quantum Circuit Complexity,” National Science Foundation, September 1, 2002 – August 31, 2005, \$150,000.

“Travel Research Grant,” Mathematical Sciences Research Center, September 1, 2002 – October 1, 2002, \$6,000.

“Computational Topology for Surface Reconstruction,” (with co-PIs: K. Abe and T. Peters), National Science Foundation, October 1, 2002 – September 30, 2004, \$99,999.

“Summer Research Conference: Graph Coloring and Symmetry,” (with co-PIs: K. Collins and D. Krizanc), American Mathematical Society in Conjunction with SIAM and the IMS, \$30,000.

Eugene Santos, Jr.

“Adversarial Intent Inference for Predictive Battlespace Awareness,” Air Force Research Labs, Information Directorate, August 2001 – July 2004, \$308,000.

“Deception Detection in Expert Source Information Through Fusion in Bayesian Knowledge-Base Modelling,” Air Force Office of Scientific Research, October 2002 – September, 2005, \$341,000.

“Intelligent Agents Support,” Air Force Research Labs, Human Effectiveness Directorate (subcontracted through Sytronics, Inc.), September 2001 – September 2002, \$25,000.

“Modelling Analysts Through Dynamic User Modeling for Novel Intelligence Form Massive Data,” National Imagery and Mapping Agency/ARDA, December 2002 – August 2004, \$225,000.

“Group Aware Agents for Collaboration: Empowering the Agile Enterprise,” DARPA/IAO (via GlobalInfoTek, Inc.), December 2002 – December 2003, \$25,000.

“ITR/AP: Simulation and Optimization of Thermal Manufacturing Materials Under Uncertainty: Application to Optical Fiber Drawing,” (with PI: R. Pitchumani and co-PI: L. Achenie), National Science Foundation, September 2001 – August 2004, \$409,000.

“Scheduling, Inventory Optimization, and Coordination of Maintenance Networks,” (with PI: P. Luh), National Science Foundation, August 2002 – March 2004, \$149,000.

Dong-Guk Shin

“Osteoprogenitor Lineage Study: Project 4,” (with PI: D. Rowe), National Institutes of Health, September 30, 2002 – September 29, 2005.

“Osteoprogenitor Lineage Study: Project 8,” (with PI: D. Rowe), National Institutes of Health, September 30, 2002 – September 29, 2005.

“Integrated Bioinformatics Center for Cellular Biology,” (with co-PI: L. Loew), National Institutes of Health, May 1, 2002 – April 30, 2005.

“Developing a Database Supporting Cell Biology Modeling,” (with co-PI: L. Loew), National Science Foundation, April 1, 1001 – March 31, 1004, \$450,000.

“A Graphical Ad Hoc Query Interface for GenBank,” National Institutes of Health, January 1, 1999 – December 31, 2003, \$555,011.

“Feasibility Study of Information System Reengineering, Part V,” (with co-PI: S. Demurjian), State of Connecticut Insurance Department, March 15, 2002 – June 30, 2003, \$158,668.

“Feasibility Study of Information System Reengineering, Part VI,” (with co-PI: S. Demurjian), State of Connecticut Insurance Department, January 1, 2003 – June 30, 2003, \$199,659.

“Data Mining Technique Analysis,” Egyptian Government, January 1, 2001 – March 31, 2003, \$10,000.

Alexander Shvartsman

“CAREER: Principles and Practices of Dependable Distributed Systems,” National Science Foundation, June 1, 2000 – May 31, 2004, \$200,000.

“Robust Building Blocks for Parallel Computing,” National Science Foundation, August 1, 2000 – July 31, 2003, \$133,500.

“ITR: Communication and Data Sharing for Dynamic Distributed Systems,” (with co-PI: A. Russell), National Science Foundation (subcontract through MIT), September 1, 2001 – August 31, 2006, \$463,421.

“NSF-NATO Post-Doctoral Fellowship,” National Science Foundation, September 15, 2002 – August 31, 2003, \$50,000.

**COMPUTER SCIENCE & ENGINEERING DEPARTMENT
AWARDS, HONORS, PATENTS
2002-2003**

Dina Goldin

Early CAREER Award, National Science Foundation, 1998-2003.

Gerald Engel

Fellow, IEEE.

Certificate of Appreciation, IEEE Computer Society, for contributions to society planning.

Certificate of Appreciation, Accreditation Board for Engineering & Technology (ABET), for service on the Strategic Planning Task Force.

Alexander Russell

Early CAREER Award, National Science Foundation, 2001-2006.

Best Paper Award, “Inapproximability Results of Equations Over Finite Groups,” (with L. Engebretsen and J. Holmerin), 29th International Colloquium on Automata, Languages, and Programming (ICALP).

Research Fellow, Mathematical Sciences Research Institute (MSRI), 2002-2003.

Alexander Shvartsman

Early CAREER Award, National Science Foundation, 2000-2004.

COMPUTER SCIENCE & ENGINEERING DEPARTMENT
MAJOR PROFESSIONAL ACTIVITIES
2002-2003

Reda A. Ammar

Editor-in-Chief, *International Journal of Computers and Their Applications*.

President, The American Middle Eastern Engineers and Scientists Society (AMEESS).

Registration & Finance Chair, IEEE Symposium on Computers and Communications, Italy, July 2002.

Organizer, General Chair and Session Chair, the 2nd IEEE International Symposium on Signal Processing and Information Technology, Marrakesh, Morocco, December 18-21, 2002.

Session Chair, the 15th International Conference on Computer Applications in Industry and Engineering, San Diego, CA, November 7-9, 2002.

Session Chair and Keynote Speaker, the International Conference on Artificial Intelligence, Cairo, Egypt, February 2, 2003.

Member, Steering Committee: the IEEE Symposium on Computers and Communications and the IEEE Symposium on Signal Processing and Information Technology.

Member, Program Committee, the International Conference on Parallel and Distributed Computing, Louisville, Kentucky, August 2002.

Member, Program Committee, the 2003 High Performance & Large Scale Computing Conference (HP&LSC 2003), Nottingham, UK, June 9-11, 2003.

Member, Program Committee, the 3rd IEEE/ACM International Symposium on Cluster Computing and the Grid (CCGrid 2003), Tokyo, Japan, May 12-15, 2003.

Member: Association of Computing Machinery (ACM); IEEE Computer Society; IEEE System, Man and Cybernetics Society; International Society on Computers and Their Applications (ISCA); Upsilon Pi Epsilon, the National Computer Science Honorary Society; IEEE Technical Committee on Simulation; IEEE Technical Committee on Parallel Processing; American Association of University Professors.

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

Steven Demurjian

Member, Program Committee, International Semantic Web Conference 2002 (ISCW2002).

Member, Program Committees, Special Track on Semantic Web and Special Track on Semantic Web, FLAIRS 2003, May 12-14, 2003.

Member, Program Committee, Iadis International Conference WWW/Internet 2003.

Member, Program Committee, Ontologies for Business Information Systems (OntoBIS), Colorado Springs, CO, June 4, 2003.

Member, Academic/Industrial Advisory Board, Department of Computer Science, Central Connecticut State University.

Member, Java IDE (Integrated Development Environment) Selection Subcommittee of the EWTA Application Development Domain, Department of Information Technology, State of Connecticut, October 2002 - May 2003.

Member, International Federation of Information Processing (IFIP), Working Group (WG11.3) on Database Security.

Member, American Association of University Professors, Association of Computing Machinery (ACM), IEEE Computer Society, IEEE Computer Society Technical Committees on Database Engineering and Software Engineering.

Gerald L. Engel

President, CSAB, Inc.

Vice President, IEEE Computer Society.

Member, Editorial Board, *Computer Science Education*.

Member, Board of Governors, IEEE Computer Society and IEEE Society on Social Implications of Technology.

Member, Executive Committee, IEEE Computer Society.

Member: ABET Board of Directors, ABET International Activities Committee, ABET Strategic Planning Committee and ABET International Committee.

Member, Technical Committee, International Federation for Information Processing (Social, Ethical, and Professional Issues in Information Processing).

Member: IEEE Computer Society Planning Committee, IEEE Computer Society Intersociety Cooperation Committee, and IEEE Computer Society Constitution and Bylaws Committee.

U.S. Representative, International Federation for Information Processing (IFIP).

Co-host, NSF/ABET Workshop in Information Technology skills at the National Academy of Engineering.

Swapna Gokhale

Member, Program Committee, International Symposium on Software Reliability Engineering (ISSRE), Annapolis, MD, November 2002.

Member, Program Committee, International Conference on Computer Communications and Network (ICCCN), Miami, FL, October 2002.

Member, Program Committee, International Performance and Dependability Symposium (IPDS), San Francisco, CA, June 2003.

Member, IEEE Computer Society.

Presentation, "Reliability Prediction and Sensitivity Analysis Based on Software Architecture," International Symposium on Software Reliability Engineering (ISSRE), Annapolis, MD, November 2002.

Dina Goldin

Editor, CoRR Version of the Proceedings, PCL '02 Workshop.

Program Chair and local organizer, NEPLS 8 (New England Programming Languages Symposium), February 2003.

Information Director and member of the Board, *ACM Computing Reviews*.

Panel Member, ACM SIGMOD New Database Faculty Symposium, San Diego, June 2003.

Member, CSAB/ABET Visiting Team for National Accreditation of Computer Science Programs, October 2002.

Member and Webmaster, New England Database Society (NEDS).

Member, NSF Panel for grant proposal review, November 2002, January 2003.

Member, Faculty Panel, Johns Hopkins College of Colloquium for Talented High School Students, Wesleyan University, November 2002.

Member, Organizing Committee, ACM PCK50 (Paris Kanellakis 50th anniversary workshop), June 2003.

Member, Program Committee, NEPLS 7 (New England Programming Languages Symposium), October 2002 and NEPLS 9, June 2003.

Member, Database Faculty Panel, ACM SIGMOD New Database Faculty Symposium, San Diego, CA, June 2003.

Member, ACM and IEEE Computer Society.

Presentations

“Paraconsistency of Interactive Computation,” Paraconsistent Computational Logic Workshop (PCL), Copenhagen, Denmark, July 2002.

“The Constraint Database Framework: Lessons Learned from CQA/CDB,” International Conference of Data Engineering (ICDE), Bangalore, India, March 2003.

“Sensor Network Querying,” *invited speaker*, IEEE Bangalore Chapter, India, March 2003.

“Expressiveness of Persistent Turing Machines,” *invited speaker*, IEEE Bangalore Chapter, India, March 2003

“Extending the Constraint Database Framework,” PCK50 ACM Workshop, San Diego, CA, June 2003.

Chun-Hsi Huang

Organizing Chair, First BioGrid Workshop at the 3rd IEEE/ACM Symposium on Cluster Computing and the Grid, May 12-15.

Member: IEEE, ACM and SIAM.

Presentations

“Parallel Pattern Identification in Biological Sequences on Clusters,” 4th IEEE International Conference on Cluster Computing (IEEE Cluster) Chicago, IL, September 2002.

“First Workshop on Biological Computings on the Grid (BioGrid),” 3rd IEEE/ACM Symposium on Cluster Computing and the Grid (CCGrid), Tokyo, Japan, May 2003.

Aggelos Kiayias

Keynote speaker, 9th ACM Conference on Computers and Communications Security, Washington, D.C., November 2002.

Member: ACM and IACR.

Presentations

“Noisy Polynomials and their Use in Cryptography,” *invited speaker*, New York University, New York, July 10, 2002.

“E-Voting,” *invited speaker*, New York University, New York, October 18, 2002.

“Fair-Group Signatures and their Applications,” *invited speaker*, New York University, New York, February 21, 2003.

“Settling the Traceability Question for the Kurosawa-Desmedt Scheme,” Rump Session Presentation, Advances in Cryptology -- CRYPTO 2002, Santa Barbara, CA, August 18-22, 2002.

“Breaking and Repairing Asymmetric Public-Key Traitor Tracing Schemes,” 2002 ACM

Workshop on Digital Rights Management, Washington D.C., November 18, 2002.

“Extracting Group Signatures From Traitor Tracing Schemes,” Advances in Cryptology — Eurocrypt 2003, Warsaw, Poland, May 4-8, 2003.

“Cryptanalysis of a Polynomial Reconstruction Based Public-Key Cryptosystem in the Optimal Parameters Setting,” Rump Session Presentation, Advances in Cryptology — Eurocrypt 2003, Warsaw, Poland, May 4-8, 2003.

Lester Lipsky

Session Chair, IEEE International Symposium on Network Computing and Applications, Cambridge, MA, April 16-18, 2003.

Session Chair, 15th International Conference on Parallel and Distributed Computing Systems, Louisville, KY, September 19-21, 2002.

Robert McCartney

Member, Editorial Board, Computer Science Education.

Member, Editorial Board, Diagrams.

Invited participant, NSF Scaffolding Workshop on Computer Science Education Research, June 13-18, 2003.

Laurent Michel

Local organizer, 8th New England Programming Language Symposium, University of Connecticut, Storrs, February 28, 2003.

Member, ACM.

Presentations

“Control Abstraction for Local Search,” *invited speaker*, 8th New England Programming Language and Systems Symposium (NEPLS), University of Connecticut, Storrs, February 28, 2003.

“A Constrained Based Architecture for Local Search,” 17th Annual ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA), Seattle, WA, November 2002.

Thomas Peters

Co-chair, Program Committee and Organizing Committee member, SIAM Conference, Mathematics in Industry, Toronto, Canada, June 23-25, 2003.

Member, SIAM, Special Interest Group on CAGD.

Member, ACM Solid Modeling Association.

Member, Peer Review Committee, National Science Foundation.

Entry, ACM Solid Modeling Association, “Who’s Who” in Solid Modeling.

Presentations

“Taylor’s Theorem & Computational Topology,” *invited speaker*, Department of Mathematics, University of Rhode Island, October 25, 2002.

“Ambient Isotopy for Topological Equivalence in Surface Reconstruction,” *invited speaker*, DIMACS Surface Reconstruction Workshop, Rutgers University, May 1, 2003.

“I-TANGO: Intersections, Topology, Accuracy and Numerics for Geometric Objects,” *invited speaker*, NSF-DARPA CARGO Annual Review Meeting, Santa Rosa, CA, May 12, 2003.

“I-TANGO: Intersections, Topology, Accuracy and Numerics for Geometric Objects,” presentation, NSF-DARPA CARGO Annual Review Meeting, Newport, RI, May 20, 2003.

Alexander Russell

Member, Phi Beta Kappa Committee on Graduate Members in Course.

Presentations

“Applications of Group Representation Theory to Hidden Subgroups Problems,” *invited speaker*, MSRI Quantum Computation Workshop.

“Quantum Computation,” *invited speaker*, Dartmouth Department of Mathematics Colloquium.

“Hidden Subgroup Reconstruction and Quantum Fourier Transforms,” *invited speaker*, University of Connecticut Computer Science & Engineering/Physics/Electrical & Computer Engineering Quantum Information Seminar Series.

“On the Set Systems Used for Broadcast Encryption,” *invited speaker*, ACM Symposium on Discrete Algorithms (SODA) 2003.

Sanguthevar Rajasekaran

Member, Editorial Board, *Journal of Parallel and Distributed Computing*.

Member, IASTED Technical Committee on Biomedical Engineering.

Member, Program Committee, International Conference on Biomedical Engineering (BioMED) 2003, Salzburg, Austria, June 25-27, 2003.

Member, Program Committee, International Conference on Parallel and Distributed Computing and Systems (PDCS), 2002.

Member, Advisory Board, Computer Science Department, University of New Haven, 2002-2005.

Member: ACM and IEEE Computer Society.

Eugene Santos, Jr.

Associate Editor, *IEEE Transactions on Systems, Man, and Cybernetics: Part B*.

Associate Editor, *International Journal of Image and Graphics*.

Co-Chair, AAAI Fall 2002 Symposium on Intent Inference for Users, Teams, and Adversaries, Boston, MA.

Member, Program Committees, The 16th International FLAIRS Conference and special tracks on Uncertainty and Artificial Intelligence in Medicine, St. Augustine, FL, May 12-14, 2003.

Member, Program Committee, International Workshop on Agents for Business Automation (ABA 2003), Las Vegas, NV, June 2003.

Member, Program Committee, SPIE AeroSense 2003, Applications and Science of Computational Intelligence V, Orlando, FL, April 21-25, 2003.

Member, International Program Committee, 2003 International Conference on Active Media Technology (ICAMT2003), May 29-31, 2003, Chongqing, China.

Presentations

“Active User Interfaces for Intelligent Information Retrieval,” *invited speaker*, Decision Science Working Group, Air Force Research Laboratory, Fairfax, VA, 2002.

“Adversary Intent Inferencing,” *invited speaker*, Information Institute Annual Workshop, Air Force Research Laboratories, Information Directorate, Rome, NY, 2002.

“Making Adversary Decision Modeling Tractable with Intent Inference and Information Fusion,” at 11th Conference on Computer Generated Forces and Behavioral Representation, Orlando, FL, 2002.

“On the Efficiency and Scalability of Abductive Reasoning with Linear Programming,” at 2002 International Conference on Artificial Intelligence (IC-AI 2002), Las Vegas, NV, 2002.

“Knowledge Acquisition for Adversary Course of Action Prediction Models,” at AAAI 2002 Fall Symposium on Intent Inference for Users, Teams, and Adversaries, Boston, MA, 2002.

Dong-Guk Shin

Organizer, 2002 Summer Bioinformatics Workshop, University of Connecticut, August 23, 2002.

Organizer, 1st Bioinformatics and Bio-Computing Workshop, University of Connecticut, March 31, 2003.

Member, Study Section Committee, NIH Neuroinformatics and Pre-NPEBC BISTI, Washington, D.C., July 11-12, 2002.

Member, Scientific Review Committee: NIH CSR, Washington, D.C., October 23-24, 2002; Bethesda, MD, November 12, 2002.

Member, Study Section Committee, NIH Pre-NPEBC BISTI, Bethesda, MD, March 12-13, 2003.

Member, NIH Human Brain Project Study Section Committee, Bethesda, MD, May 29-30, 2003.

Member: American Association of University Professors, IEEE Computer Society, Korean Scientists and Engineers in America.

Presentations

“A New Software Framework Integrating Diversified Bioinformatics Resources,” *invited speaker*, National Cancer Institute, NIH, Rockville, Maryland, October 31, 2002.

“Virtual Cell and Data Handling Issues,” *invited speaker*, Seoul Symposium on Systems Biology, Seoul National University, Seoul, Korea, April 4, 2003.

“Genomic Database Federation,” *invited speaker*, Sam Sung Technology Institute, Yong-In, Korea, April 7, 2003.

“Virtual Cell Project and Other Bioinformatics Projects,” *invited speaker*, Korea Research Institute of Biology and Biotechnology, Dae-Duck, Korea, April 8, 2003.

“A Scalable Visual Data Analysis Pipeline Framework Supporting Large Scale,” *invited speaker*, The 10th Annual Hewitt Symposium and Toxicology Scholars Colloquium, University of Connecticut, May 16, 2003.

Alexander Shvartsman

Editor, *Future Directions in Distributed Computing*, (with Schiper, Weatherspoon and Zhao), Springer Verlag LNCS 2584 State-of-the-Art Series, 2003.

Member, Editorial Board, *Studia Informatica Universalis*, International Journal of Information Technology, 2000 – to date.

Member, Editorial Board, *International Journal on Network Computing*, (proposed new journal), Kluwer Academic Publishers, USA.

Chair, Organizing Committee, ACM PCK 50, Principles of Computing and Knowledge, Paris C. Kanellakis Memorial Workshop, 2003.

Vice-Chair, Steering Committee, International Symposium on Distributed Computing (DISC), 2003 – 2004.

Member, Program Committee and Session Chair, 21st ACM Symposium on Principles of Distributed Computing, PODC’2002, 2002.

Member, Program Committee and Session Chair, 5th International Conference on Principles of Distributed Systems, OPODIS’2002.

Member, Program Committee and Session Chair, the IEEE International Symposium on Network Computing and Applications, NCA'2003, Cambridge, MA, April 16-18, 2003.

Member, IEEE TC on Enterprise Computing.

Invited talk, "Reconfigurable Atomic Memory Service for Dynamic Networks," Cornell University, April 2002.

ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT

ANNUAL REPORT SUMMARY

2002-2003

HIGHLIGHTS

In May 2003, the Electrical & Computer Engineering (ECE) department moved into its new home, the recently completed Information Technology Engineering Building located at the heart of campus. ECE administrative offices, faculty offices, and research labs are on the top two floors with additional research labs in the nearby Booth Engineering Center for Advanced Technology. The concourse level houses instructional labs, computer facilities, a student association office, and a grand 350-seat auditorium. A new learning center, classrooms, and an attractive foyer occupy the first floor. We share the building with our colleagues in the Computer Science & Engineering Department (CSE). This significant increase in both the quantity and quality of space will positively impact our ability to conduct the department's mission in education and research. Moving the department from the Bronwell Building, where it had resided since 1968, into these excellent facilities is, indeed, an historic event with long-term benefits for ECE faculty, staff, and students.

Other highlights include the hiring of three promising new faculty members as well as continued faculty distinction in research funding and dissemination. The year was the first in a new six-year ABET accreditation cycle which officially began in fall 2002. The ECE website was completely redesigned and is now attractive and easily navigable, with updated information.

RESEARCH AND SCHOLARSHIP

Excellence in research and scholarship continues as a hallmark of the ECE faculty. During the year, our faculty pursued funding in areas associated with systems and manufacturing, microelectronics, biomedical engineering, optoelectronics, electromagnetics and photonics, and VLSI computer engineering. Assisted by outstanding graduate students and visiting scholars, the faculty maintains high funding levels on a continuous basis. Associated scholarly productivity remains strong. The faculty published numerous scholarly papers, including 65 refereed journal articles, 18 book chapters, and around 100 full conference proceedings papers. They also published five books and four course manuals, and developed nine software packages. They offered numerous professional short courses, were keynote speakers at six international conferences, and delivered 29 invited talks. ECE faculty worked on 108 sponsored grants with annual expenditures of \$3.9 million and four awarded patents. They advised 133 graduate students, resulting in 12 awarded Ph.D. degrees and 18 M.S. degrees. During the year, ECE faculty held five major journal editorships, 22 associate editorships or conference chair posts, and 17 other editorial or conference-planning appointments.

FACULTY RECRUITMENT

Two new faculty members in Computer Engineering joined the ECE department in fall 2002. They are playing leading roles in establishing instructional and research activities in this new joint program, which has grown rapidly since its inception a few years ago. John Chandy, with degrees from MIT and the University of Illinois, is an expert in computer architecture, parallel systems, and distributed data storage. Hanho Lee, educated at the University of Minnesota, conducts research in VLSI circuits and systems design for applications such as digital signal processing, communications, and networks.

A third new faculty member, Bing Wang, joined the department, with expertise in the areas of optical communications and photonics. With degrees from Columbia and Princeton universities, Professor Wang's current research interests include ultra-fast optical switching, systems integration, and quantum-encrypted information transmission.

These new faculty appointments meet strategic departmental needs and will strengthen capabilities in research and teaching in these and related fields.

UNDERGRADUATE EDUCATION

High-quality undergraduate programs are emphasized in the department. Currently, we offer undergraduate degrees in Electrical Engineering, Computer Engineering (jointly with the Computer Science & Engineering Department), and Engineering Physics (jointly with the College of Liberal Arts & Sciences). Four ECE faculty members are major players in the rapidly growing interdisciplinary Biomedical Engineering Program. The core undergraduate laboratories and the Senior Design lab will have a new layout and refurbished lab benches due to the move to the Information Technology Engineering Building. Computer control in laboratory work and relevant software tools are increasingly applied throughout the curricula. In fall 2002, 132 students were enrolled in Electrical Engineering, 72 in Computer Engineering, and four in Engineering Physics. During the year, our department taught 40 undergraduate courses, conducted 15 independent studies, and awarded 40 B.S. degrees.

FACULTY HONORS

As world-renowned contributors and often pioneers in their fields, ECE professors receive prestigious awards from numerous sources. The major awards received during the year are summarized as follows: Krishna Pattipati won the ECE Excellence in Teaching Award, the AAUP Research Excellence Award, and the 2002 NASA Space Act Award for developing a comprehensive toolset for model-based health monitoring and diagnostics. Quing Zhu received the ECE Outstanding Research Achievement Award in fall 2002. Peter Willett was named a Fellow of the IEEE – The Institute of Electrical and Electronics Engineers. Yaakov Bar-Shalom received the 2002 J. Mignona Data Fusion Award from the U.S. Department of Defense. John Enderle was elected to the Connecticut Academy of Science and Engineering. Bahram Javidi received the School of Engineering Distinguished Engineering Professorship Award, was named IEEE Lasers and Electro-Optics Society (IEEE LEOS) Distinguished Lecturer and was an invited speaker at a National Academy of Engineering meeting. Additionally, the faculty continues to receive professional service appointments reflective of their contributions. John Enderle is Editor-In-Chief of the *IEEE EMB Magazine*; Peter Luh holds the Editor-In-Chief position for the *IEEE Transactions on Robotics and Automation* and is Founding Editor-In-Chief of the new *IEEE Transactions on Automation Science and Engineering*. Mehdi Anwar serves as an Editor of the *IEEE Transactions on Electron Devices*, and Eric Donkor is Editor of the *Journal of Nanoscience and Nanotechnology*.

STUDENT ACTIVITIES

ECE students contribute significantly to the department. The UConn student branches of IEEE and Eta Kappa Nu (HKN), the national Electrical Engineering honor society, were active during the year hosting two well-attended ECE social events. The IEEE president was Meghan Holbrook, with faculty advisor John Ayers; HKN president was David Keisch and advisor Martin Fox. Both organizations conducted membership drives and HKN had an initiation event. Additionally, IEEE organized the departmental spring picnic and HKN sponsored a well-attended field trip to the GE Research Center in Schenectady, NY. ECE multidisciplinary team senior design projects were sponsored by a number of industrial partners, including Electric Boat, Gerber Technology, Pfizer Corporation, Rogers Corporation, Northeast Utilities, NUWC/Seacorp, The Siemon Company, and Solar Dynamics.

Two of our ECE 291 senior design teams placed near the top in the 2003 Trinity Fire-Fighting Home Robot Contest, which is the world's largest public robotics competition and draws teams from all over the world. This year, 59 teams competed in the senior division, including our two robots, Backdraft and Jonathan 2.0. These robots and other senior-design projects were featured in Open House events and during the Connecticut Invention Convention.

INDUSTRIAL CONNECTIONS

The ECE Industrial Advisory Board (IAB) provides input on ECE curricula, courses, and strategies. Industrial feedback is essential in maintaining high-quality, relevant programs and is a major link in the ABET accreditation process. Additionally, these closely affiliated companies provide internship opportunities for our students and often hire them permanently. The ECE IAB met twice during the year, making sound suggestions for program enhancements. The growing list of companies represented currently includes SNET, ATMI, Naval Undersea Warfare Center, Pratt & Whitney, Pitney Bowes, Phonon Corporation, Sikorsky Aircraft Corporation, General Electric Company, JDS Uniphase, TRUMPF, Aptima, TranSwitch, and Hamilton Sundstrand.

ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2002-2003

Mehdi Anwar

“High Frequency GaN/AlGa_N HEMT Class-E Power Amplifier,” (with S.S. Islam), *Solid-State Electronics*, Vol. 46, pp.1621-1625, October 2002.

“Frequency Dependence of GaN/AlGa_N HEMT Amplifier using Time Domain Analysis,” (with S. S. Islam), *Solid-State Electronics*, Vol. 46, pp. 1507-1511, October 2002.

“Nonlinear Analysis of GaN MESFETs with Volterra Series using Large-Signal Models Including Trapping Effects,” (with S.S. Islam), *IEEE Transactions on Microwave Theory and Technology*, Vol. 50, No. 11, pp. 2474-2479, November 2002.

“A Self-Consistent Model for Small-Signal Parameters and Noise Performance of InAlAs/InGaAs/InAlAs/InP HEMTs,” (with K.-W. Liu), *Solid-State Electronics*, Vol. 47, pp. 763-768, 2003.

“Effects of Impurity Traps on Gate Current and Trapped Charge in MOSFETs,” (with S.S. Islam and M.R. Khan), *Solid-State Electronics*, No. 2, pp. 333-337, February 2003.

“A Self-Consistent Model for Temperature and Current Distribution in Abrupt Heterojunction Bipolar Transistor,” (with M.M. Jahan), *IEEE Transactions on Electronic Devices*, Vol. 50, No. 2, pp. 272-277, February 2003.

“Frequency and Temperature Dependence of Gain Compression in GaN/AlGa_N HEMT Amplifiers,” (with A. Ahmed and S.S. Islam), *Solid-State Electronics*, Vol. 47, No. 2, pp. 339-344, February 2003.

“Bias Dependence of High Frequency Noise in Heterojunction Bipolar Transistors,” (with M.M. Jahan and K.-W. Liu), *IEEE Transactions on Microwave Theory and Technology*, Vol. 51, No. 3, pp. 677-683, March 2003.

John E. Ayers

“Photoassisted MOVPE Grown (n)ZnSe/(p+)GaAs Heterojunction Solar Cells,” (with D.W. Parent, A. Rodriguez and F.C. Jain), *Solid State Electronics*, Vol. 47, pp. 595-599, 2003.

Rajeev Bansal

“Complex Resonant Frequencies of Biological Targets for Microwave Imaging Applications,” (with S. Dewald), *Electronics Letters*, Vol. 38, No. 25, pp. 1633-1634, December 5, 2002.

Yaakov Bar-Shalom

“Update with Out-of-Sequence Measurements in Tracking: Exact Solution,” *IEEE Transactions on Aerospace Electronic Systems*, Volume 38, No. 3, pp. 769-778, July 2002.

“3-D Track Initiation in Clutter Using 2-D Measurements,” (with L. Lin and T. Kirubarajan), *IEEE Transactions on Aerospace Electronic Systems*, Vol. 38, No. 4, pp. 1434-1441, October 2002.

“Performance Limits of Track-to-Track Fusion vs. Centralized Estimation,” (with H. Chen and T. Kirubarajan), *IEEE Transactions on Aerospace Electronic Systems*, Vol. 39, No. 2, pp. 386-400, April 2003.

“Radar Measurement Extraction in the Presence of Sea-Surface Multipath,” (with A. Sinha, W.D. Blair and T. Kirubarajan), *IEEE Transactions on Aerospace Electronic Systems*, Vol. AES-39, No. 2, pp. 550-567, April 2003.

“On the Correlation Between Horizontal and Vertical Monopulse Measurements,” (with P.K. Willett and W.D. Blair), *IEEE Transactions on Aerospace Electronic Systems*, Vol. AES-39, No. 2, pp. 533-549, April 2003.

Steven A. Boggs

“Guarded Needle for ‘Charge Injection’ Measurement,” (with Y. Cao and G.G. Jiang), *Review of Scientific Instruments*, Vol. 73, No. 8, pp. 3012-3017, August 2002.

“Effect of Semicon-Dielectric Interface on Conductivity and Electric Field Distribution,” (with J. Hjerrild, J. Holboll and M. Henriksen), *IEEE Transactions on Dielectrics and Electrical Insulation*, Vol. 9, No. 4, pp. 596-603, August 2002.

“Thermally-Induced Currents in Coaxial Signal Cables,” (with Y. Cao), *IEEE Transactions on Power Delivery*, Vol. 18, No. 2, pp. 351-358, April 2003.

“High Field Measurements with a Guarded Needle,” (with Y. Cao and G.G. Jiang), *IEEE Electrical Insulation Magazine*, Vol. 19, No. 3, May/June 2003.

Nan Guang Chen

“Time-resolved Optical Measurements with Spread Spectrum Excitations,” (with Q. Zhu), *Optics Letters*, Vol. 27, No. 20, pp. 1806-1808, 2002.

“Imaging Tumor Angiogenesis using Combined Near Infrared Diffusive Light and Ultrasound,” (with Q. Zhu and S. Kurtzman), *Optics Letters*, Vol. 28, No. 5, pp. 337-339, 2003.

Monty A. Escabi

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“Role of Optics and Photonics for Authentication, Verification and Security Systems,” (invited), *CD-ROM Proceedings of the Optics and Photonics in Homeland Security conference (SPIE) CDV 1202*, Alexandria, VA, December 11-12, 2002.

“Digital Three-Dimensional Object Reconstruction and Correlation Based on Integral Imaging,” (with Y. Frauel), *Proceedings of SPIE*, Vol. 5006, Electronic Imaging 2003, Santa Clara, CA, January 2003.

Hanho Lee

“An Area-Efficient Euclidean Algorithm Block for Reed-Solomon Decoder,” *Proceedings of the IEEE Computer Society Annual Symposium on VLSI*, pp. 209-210, Tampa, FL, February 20-21, 2003.

“High-Speed VLSI Architecture for Parallel Reed-Solomon Decoder,” *Proceedings of the IEEE International Symposium on Circuits and Systems*, Vol. 2, pp. 320-323, Bangkok, Thailand, May 25-28, 2003.

Peter B. Luh

“An Integrated Neural Network Method for Market Clearing Price Prediction and Confidence Interval Estimation,” (with L. Zhang), *Proceedings of the Fourth World Congress on Intelligent Control and Automation*, pp. 2045-2050, Shanghai, China, June 2002.

“An Optimization-Based Approach for Facility Energy Management,” (with J. Xu, E. Ni and R. Karanam), *Proceedings of the 15th IFAC World Congress*, Barcelona, Spain, July 2002.

“Scheduling Asset Overhaul and Repair Services,” (with S. Soorapanth, D. Yu and A.I. Khibnik), *Proceedings of the 2003 NSF Design, Service and Manufacturing Grantees and Research Conference*, pp. 3109-3118, Birmingham, AL, January 2003.

“Supply Chain Performance Evaluation: A Simulation Study,” (with Y. Tu, W. Feng and K. Narimatsu), *Proceedings of the 2003 IEEE International Conference on Robotics and Automation*, Taipei, Taiwan, May 2003.

“An Optimization-Based Approach for Distributed Project Design,” (with M. Ni and B. Moser), *Proceedings of the 2003 IEEE International Conference on Robotics and Automation*, Taipei, Taiwan, May 2003.

“From Manufacturing Scheduling to Supply Chain Coordination: The Control of Complexity and Uncertainty,” (with W. Feng), *Proceedings of the 2003 International Conference on Control and Automation*, Montreal, Canada, June 2003.

“Mobile Multi-Agent Based Scheduling and Coordination of Maintenance Networks,” (with F. Zhang and E. Santos, Jr.), *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications*, Las Vegas, NV, June 2003.

Robert Magnusson

“Method for High-Power Illumination of Silicon for Optically Configurable Microwave Circuits,” (with P.P. Young, T.A. Maldonado and T.R. Holzheimer), *Proceedings of the SPIE's 47th Annual Meeting: International Symposium on Optical Science and Technology, Illumination Engineering: Novel Optical System Design and Optimization*, Vol. 4768, pp. 74-81, Seattle, WA, July 7-11, 2002.

“Experiments with Cascaded Resonant Diffractive Filters,” (with P.S. Priambodo and D. Shin), *Technical Digest of the 3rd International Conference on Optics-Photonics Design & Fabrication (ODF 2002)*, pp. 181-182, Tokyo, Japan, October 30-November 1, 2002.

“Numerical Simulations of Resonant Periodic Waveguides using the FDTD Method,” (with Y. Ding), Connecticut Microelectronics and Optoelectronics Consortium, *Proceedings of the Twelfth Annual Symposium: Nanostructure Technologies*, pp. 48-50, University of Connecticut, Storrs, April 9, 2003.

“Photonic Bandpass Filter Concept Employing Frustrated Waveguide-mode Resonance,” (with K. J. Lee), Connecticut Microelectronics and Optoelectronics Consortium, *Proceedings of the Twelfth Annual Symposium: Nanostructure Technologies*, pp. 24-26, University of Connecticut, Storrs, April 9, 2003.

“Growth of Monolayered Organic Films for Nanostructured Nonlinear Photonic Devices,” (with F. Li, P.S. Priambodo, N. Dallas, M. Rege, M. Tao, T.A. Maldonado, M. Zhou and M. Pomerantz), *Proceedings of the Conference on Lasers and Electro-Optics*, Paper CTuS1 CD-ROM, Baltimore, MD, June 1-6, 2003.

Krishna R. Pattipati

“Rollout Strategies for Sequential Fault Diagnosis,” (with F. Tu), *IEEE AUTOTESTCON*, pp. 269-295, Huntsville, AL, October 2002.

“Intelligent Model-based Diagnostics for Vehicle Health Management,” (with J. Luo, F. Tu, M. Azam, P.K. Willett, L. Qiao and M. Kawamoto), *Proceedings of the 2003 SPIE AeroSense Conference*, Vol. 5107, Track: Signal and Image Processing, System Diagnosis and Prognosis: Security and Condition Monitoring Issues III, Orlando, FL, April 2003.

“Multi-phase Reliability Analysis of Complex Systems,” (with M. Azam and F. Tu), *Proceedings of the SPIE AeroSense Conference*, Vol. 5107, Track: Signal and Image Processing, System Diagnosis and Prognosis: Security and Condition Monitoring Issues III, Orlando, FL, April 2003.

“Branch-and-Bound-Based Fast Optimal Algorithm for Multiuser Detection in Synchronous CDMA,” (with J. Luo, P.K. Willett and L. Brunel), *Proceedings of the IEEE International Conference on Communications*, (ICC '03), Vol. 5, pp. 3336-3340, Anchorage, AK, May 2003.

“A Multi-Agent Decision Framework for DDD-III Environment,” (with C. Meirina and G.M. Levchuk), *Proceedings of the 8th International Command and Control Research and Technology Symposium*, Track 3: Modeling and Simulation, Washington, DC, June 2003.

“From Hierarchies to Heterarchies: Application of Network Optimization to Design of Organizational Structures,” (with G.M. Levchuk, F. Yu and Y.N. Levchuk), *Proceedings of the 8th International Command and Control Research and Technology Symposium*, Track 3: Modeling and Simulation, Washington, DC, June 2003.

“Congruence of Human Organizations and Missions: Theory versus Data,” (with G.M. Levchuk, S. Ruan, D.L. Kleinman and W. Kemple), *Proceedings of the 8th International Command and Control Research and Technology Symposium*, Track 2: C2 Experimentation, (Best Student Paper Award), Washington, DC, June 2003.

“Data Detection and Disjoint Channel Estimation in Asynchronous CDMA Flat Rayleigh Fading Channels,” (with D. Pham, P.K. Willett and J. Luo), *Proceedings of the IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC 03)*, Session M1.3: Multi-user Systems 1, Paper No. 432, Rome, Italy, June 15-18, 2003.

Bing C. Wang

“All-Optical Data Format Conversion between RZ and NRZ Based on Wavelength Converter,” (with L. Xu, V. Baby, D. Rand, I. Glesk and P.R. Prucnal), *Proceedings of the Laser and Electro-Optic Society 2002*, (invited), pp. 49-50, Glasgow, Scotland, 2002.

“Sub-Nanosecond Wavelength Switching of Four WDM Channels using an OTDM Channel Selector,” (with V. Baby, L. Xu, I. Glesk and P.R. Prucnal), *Proceedings of the IEEE Laser and Electro-Optics Society Summer Topical Meeting*, pp. 49-50, Quebec, Canada, July 2002.

“Wavelength Converters using SOAs: Simulations and Experiments,” (with P.R. Prucnal and I. Glesk), OSA Topical Meeting - Integrated Photonics Research, *invited*, # IthH5, Vancouver, Canada, July 2002.

Peter K. Willett

“Improved Target Detection Performance Using Multiple Waveform Fusion,” (with R. Lynch, T. Tran and J. Fay), *Proceedings of the 2002 Undersea Defense Technology European Conference*, La Spezia, Italy, June 2002.

“The Pedestrian PMHT,” (with M. Efe and Y. Ruan), *Proceedings of the 2002 International Conference on Information Fusion*, Annapolis, MD, July 2002.

“The Cramer-Rao Bound for Dynamic Target Tracking with Measurement Origin Uncertainty,” (with X. Zhang and Y. Bar-Shalom), *Proceedings of the Conference on Decision and Control*, Las Vegas, NV, December 2002.

“Bayesian Classification Results using Data Containing Missing Class Labels,” (with R. Lynch), *Proceedings of the IEEE Aerospace Conference*, Big Sky, MT, March 2003.

“Fusion of Quantized Measurements via Particle Filtering,” (with Y. Ruan and A. Marrs), *Proceedings of the IEEE Aerospace Conference*, Big Sky, MT, March 2003.

“Class-Specific Segmentation of Time Series,” (with Z. Wang and P. Baggenstoss), *Proceedings of the IEEE Aerospace Conference*, Big Sky, MT, March 2003.

“Intelligent Model-based Diagnostics for Vehicle Health Management,” (with J. Luo, L. Qiao, F. Tu and K.R. Pattipati), *Proceedings of the 2003 SPIE Aerosense Conference on System Diagnosis and Prognosis: Security and Condition Monitoring Issues*, April 2003.

“The VTP Test for Transients of Equal Detectability,” (with Z. Wang), *Proceedings of ICASSP 2003*, Hong Kong, April 2003.

“Adaptive Classification by Maximizing Class Separability with Respect to the Unlabeled Data,” (with R. Lynch), *Proceedings of the 2003 SPIE Aerosense Conference on System Diagnosis and Prognosis: Security and Condition Monitoring Issues*, April 2003.

“Real-Time System Diagnosis with Sensors of Uncertain Quality,” (with C. Raghavendra and T. Kirubarajan), *Proceedings of the 2003 SPIE Aerosense Conference on System Diagnosis and Prognosis: Security and Condition Monitoring Issues*, April 2003.

“Branch-and-Bound-Based Fast Optimal Algorithm for Multiuser Detection in Synchronous CDMA,” (with J. Luo, K.R. Pattipati and L. Brunel), *Proceedings of the IEEE International Communications Conference*, Anchorage, AK, May 2003.

“Monopulse Radar Detection and Localization of Multiple Targets via Joint Multiple-Bin Processing,” (with X. Zhang and Y. Bar-Shalom), *Proceedings of the IEEE Radar Conference*, Huntsville, AL, May 2003.

“Data and Channel Estimation in Asynchronous CDMA Flat Rayleigh Fading Channels,” (with D. Pham, K.R. Pattipati and J. Luo), *Proceedings of the Conference on Signal Processing in Wireless Applications (SPAWC)*, Rome, Italy, June 2003.

Quing Zhu

“2-D NIR Imaging Reconstruction with Ultrasound Guidance,” (with M.M. Huang, T.Q. Xie, N.G. Chen and D.Q. Piao), *IEEE International Symposium on Biomedical Imaging*, Vol. WP-P2.17, pp. 1031-1034, Washington, DC, July 7-10, 2002.

“Optical Doppler Coherent Tomography Algorithms: Quantitative Analysis,” (with D.Q. Piao and L. Otis), *IEEE International Symposium on Biomedical Imaging*, Vol. MP-P2.6, pp. 293-296, Washington, DC, July 7-10, 2002.

“Fluorescence Decay Profile Measured by Spread Spectrum Excitation Method,” (with N.G. Chen), *SPIE Photonics West*, Vol. 4963, No. 34, San Jose, CA, January 2003.

“Accurate Estimation of Doppler Angler using Conventional Single-Probing-Beam Optical Doppler Tomography,” (with D.Q. Piao), *SPIE Photonics West*, Vol. 4956, No. 39, San Jose, CA, January 2003.

“A DSP-based Optical Doppler Tomography System for Real-Time Signal Processing,” (with S.K. Yan and D.Q. Piao), *SPIE Photonics West*, Vol. 4956, Vol. 33, San Jose, CA, January 2003.

“Spread Spectrum Time-Resolved Photon Migration Imaging System: The Principle and Simulation Results,” (with N.G. Chen), *SPIE Photonics West*, Vol. 4955, No. 67, San Jose, CA, January 2003.

“Fast Scanning Confocal Microscopy with a Rotary Mirror Array,” (with N.G. Chen), *SPIE Photonics West*, Vol. 4964, No. 6, San Jose, CA, January 2003.

“Breast Lesion Diagnosis using Combined Near Infrared and Ultrasound,” (with S. Kurtzman, N.G. Chen, K. Zarfos, M.M. Huang and M. Kane), *SPIE Proceedings of Optical Tomography and Spectroscopy of Tissue*, Vol. 4955, No. 10, January 2003.

“Portable Multi-Channel, Multi-Wavelength Near Infrared Imager,” (with N.G. Chen, D.Q. Piao and H. Xia), *SPIE Proceedings of Optical Tomography and Spectroscopy of Tissue*, Vol. 4955, No. 25, January 2003.

“Three-Dimensional Near-Infrared Diffusive Wave Imaging with Ultrasound Localization,” (with M.M. Huang), *SPIE Proceedings of Optical Tomography and Spectroscopy of Tissue*, Vol. 4955, No. 8, January 2003.

“Three-Dimensional Simultaneous Ultrasound and Near-Infrared Imaging,” (with P.Y. Guo and S. K. Yan), *SPIE Proceedings of Optical Tomography and Spectroscopy of Tissue*, Vol. 4955, No. 53, January 2003.

ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT
ACTIVE RESEARCH GRANTS AND CONTRACTS
2002-2003

Mehdi Anwar

“Network Analyzer and Coupled DC Parameter Analyzer System with Software for OEIC Testing,” (with PI: G. Taylor (90%)), Office of Naval Research, April 30, 2000-April 30, 2003, \$199,204.

“Multilevel DC to DC and DC to AC Convertors for Fuel Cell Systems,” Connecticut Global Fuel Cell Center, June 4, 2002-June 3, 2003, \$51,484.

“Academic Scholarship Program in Computer Engineering,” (with PI: R. Ammar (50%)), National Research Foundation, July 1, 2001-June 30, 2003, \$97,988.

“Physical Model for Short Gate GaN HFET Devices,” Raytheon, September 1, 2002-August 31, 2003, \$56,000.

John Ayers

“Development of High Brightness Quantum Dot Based Nanophosphors for Electroluminescent Flat Panel Displays and Illuminators,” (with PI: F.C. Jain (34%) and co-PI: F. Papadimitrakopoulos (33%)), Ballistic Missile Defense Organization N00178-98-C-3035/E-Lite Technologies, Inc., April 15, 1999-December 31, 2002, \$518,158.

“Advanced SiGe Field-Effect Transistor Design and Processing Technology to Fabricate 10 Gb/s+Line Interface Circuits for Fiber Optic Communication,” (with PI: F. Jain (25%) and co-PIs: R. Bansal (25%) and F. Papadimitrakopoulos (25%)), TranSwitch, July 1, 2000-June 30, 2003, \$100,000.

“Advanced SiGe Field-Effect Transistor Design and Processing Technology to Fabricate 10 Gb/s+Line Interface Circuits for Fiber Optic Communication,” (with PI: F. Jain (25%) and co-PIs: R. Bansal (25%) and F. Papadimitrakopoulos (25%)), Connecticut Innovations, July 1, 2000-June 30, 2003, \$290,750.

“NER: Nano Channel FETs and Quantum Dot Based Non-Volatile Memory Cells Using Site Specific and Layer-by-Layer Self-Assembly,” (with PI: F. Jain (25%) and co-PIs: F. Papadimitrakopoulos (25%) and M. Aindow (25%)), National Science Foundation, July 1, 2002-June 30, 2003, \$93,609.

“Reconfigurable Interconnects, 200-500 GHz SiGe and InGaAs-InP Nanochannel FETs, and 1.55 m Quantum Well Lasers Modulators on Silicon for Advanced Systems,” (with PI: F.C. Jain (28%) and co-PIs: F. Papadimitrakopoulos (18%), R. Bansal (18%) and W. Huang (18%)), Office of Naval Research N000140210883, September 1, 2002-August 31, 2005, \$125,000.

Rajeev Bansal

“Advanced SiGe Field-Effect Transistor Design and Processing Technology to Fabricate 10 Gb/s+Line Interface Circuits for Fiber Optic Communication,” (with PI: F. Jain (25%) and co-PIs: J. Ayers, (25%) and F. Papadimitrakopoulos (25%)), TranSwitch, July 1, 2000-June 30, 2003, \$100,000.

“Advanced SiGe Field-Effect Transistor Design and Processing Technology to Fabricate 10 Gb/s+Line Interface Circuits for Fiber Optic Communication,” (with PI: F. Jain (25%) and co-PIs: J. Ayers, (25%) and F. Papadimitrakopoulos (25%)), Connecticut Innovations, July 1, 2000-June 30, 2003, \$290,750.

“RF Power Transmission to and Telemetry from an Antenna Array,” Electric Boat, February 11, 2002-December 31, 2003, \$36,534.

“Microwave Imaging for Breast Cancer,” University of Connecticut Research Foundation, January 1, 2003-December 31, 2003, \$12,990.

“Graduate Research Program in Applied Electromagnetics,” United Technologies Research Center, November 1, 1988-December 31, 2004, \$18,000.

“Reconfigurable Interconnects, 200-500 GHz SiGe and InGaAs-InP Nanochannel FETs, and 1.55 m Quantum Well Lasers Modulators on Silicon for Advanced Systems,” (with PI: F.C. Jain (28%) and co-PIs: F. Papadimitrakopoulos (18%), J. Ayers (18%) and W. Huang 18%)), Office of Naval Research N000140210883, September 1, 2002-August 31, 2005, \$125,000.

Yaakov Bar-Shalom

“Estimation with Multisensor/Multiscan Detection Fusion,” (with co-PIs: P.K. Willett (10%) and K.R. Pattipati (10%)), Air Force Office of Scientific Research F49620-00-1-0052, December 1, 1999-November 30, 2002, \$390,000.

“Tracking with Electronically Scanned Arrays,” (with co-PIs: P.K. Willett (10%) and K.R. Pattipati (10%)), Office of Naval Research, N00014-97-1-0502, March 1, 1997-December 31, 2002, \$620,000.

“Estimation with Multisensor Fusion,” Air Force Office of Scientific Research F49620-03-1-0118, January 1, 2003-December 31, 2003, \$135,000.

“Multitarget-Multisensor Tracking for Battlefield Surveillance,” Office of Naval Research N00014-01-1-0876, (with co-PI: P.K. Willett (20%)), May 21, 2001-April 30, 2004, \$350,000.

“Feature-Aided Tracking for Robust BMD,” (with co-PIs: P.K. Willett (10%) and K.R. Pattipati (10%)), Office of Naval Research N00014-00-1-0740, June 1, 2000-December 1, 2004, \$655,420.

Steven Boggs

“Implementation on On-Line Ultrasonic PD Location System,” Con Ed, June 1, 2001-December 1, 2002, \$155,000.

“System for Measuring Nonlinear Dielectric Properties,” 3M Corporation, October 15, 2000-December 31, 2002, \$62,000.

“Effect of High Frequency,” DTE, January 2, 2000-January 1, 2003, \$67,500.

“Comprehensive Research Partnership,” (with co-PI: M.T. Shaw (50%)), General Electric, March 9, 2000-June 30, 2003, \$199,029.

“EPR Cable Consortium,” DuPont, Dow, Exxon, Kerite, Okonite and Uniroyal, November 1, 1998-December 31, 2003, \$615,000.

“Supplement to Optimization of Capacitor Materials and Structures,” Department of Defense/ARMY, July 29, 2001-March 31, 2005, \$100,000.

“Optimization of Capacitor Materials and Structures,” USA TASCUM, August 29, 2001-March 31, 2005, \$79,989.

“Development of Improved Film Dielectrics,” USA TASCUM, October 1, 2002-March 31, 2005, \$100,000.

“Analytical Services,” Northeast Utilities Service Company, February 1, 2000-infinite, \$25,000.

Nan Guang Chen

“Ultrasound Assisted Optical Imaging,” U.S. DOD Army Medical Research and Material Command, May 1, 2001-April 30, 2004, \$150,000.

Eric Donkor

“A 10-bit 10GSPS Optical ADC for X-Band Radar Signal Processing,” DOD-Air Force, March 16, 2001-December 30, 2002, \$50,243.

“DMFC Bipolar Plate/Bipolar Plate Electrical Interface Design and Fabrication,” School of Engineering/DOD, June 1, 2002-May 30, 2003, \$72,293.

“Decoherence and Its Control in Eigenvalue Degenerate Quantum Systems,” University of Connecticut Research Foundation, June 1, 1994-May 31, 2003, \$25,658.

“Micro-fabrication of an Integrated Membrane-Electrode-Catalyst-Distributor Structure for Portable Direct Methanol Fuel Cell Development,” Department of Defense, January 22, 2003-January 21, 2004, \$40,000.

John D. Enderle

“UConn Biomedical Engineering Industrial Internship Program at Hartford Healthcare Corporation,” Hartford Healthcare Corp., August 24, 2001-August 23, 2002, \$4,000.

“Annual Review of Engineering Senior Design Projects to Aid Persons with Disabilities,” (with co-PI: M.B. Hallowell), National Science Foundation, August 15, 1998-July 31, 2003, \$291,413.

“Engineering Design Projects for the Disabled,” (with co-PI: M.B. Hallowell), National Science Foundation, September 15, 1998-August 31, 2003, \$210,603.

“Department of Education: RERC on Accessible Medical Instrumentation,” (with PIs: J. Winters and M.F. Story), U.S. Department of Education/Marquette University, November 1, 2002-October 31, 2003, \$64,021.

“Co-Editor-in-Chief of *EMB Magazine*,” IEEE-EMBS, August 1, 2001-December 31, 2003, \$83,230.

“Industrial Internship Program in Biomedical Engineering at the University of Connecticut,” Whitaker Foundation, May 1, 1999-December 31, 2004, \$161,466.

“Clinical Engineering Internship Program at Baystate Medical Center,” Baystate Medical Center, August 23, 1997-August 22, 2007, \$398,000.

“Clinical Engineering Internship Program at Hartford Hospital,” Hartford Hospital, August 23, 1997-August 22, 2007, \$290,000.

“Clinical Engineering Internship Program at John Dempsey Hospital,” John Dempsey Hospital, August 24, 1997-August 23, 2007, \$300,365.

“Clinical Engineering Internship Program at the VA Hospital in West Haven, CT,” Veterans Affairs Hospital in West Haven, CT, August 24, 2001-August 23, 2011, \$70,000.

Monty A. Escabi

“Supplement – Neural Mechanisms for Sound Source Separation in the Central Auditory System,” University of Connecticut Research Foundation, June 1, 2002-May 31, 2003, \$21,287.

“Neurophysiology 2: Acoustic Mapping and Connectivity,” (with PI: H. Read (66%)), National Institutes of Health, August 5, 2002-July 31, 2007, \$809,619.

Martin D. Fox

“Recursive Algorithm for Volumetric Analysis,” Multidimension Technology, Inc., September 1, 2001-August 31, 2002, \$22,000.

“Volumetric Imaging Ultrasound Scanning System,” Pfizer Central Research, October 1, 2001-January 31, 2003, \$15,000.

Faquir C. Jain

“Development of High Brightness Quantum Dot Based Nanophosphors for Electroluminescent Flat Panel Displays and Illuminators,” (with co-PIs: F. Papadimitrakopoulos (33%) and J. Ayers (33%)), Ballistic Missile Defense Organization N00178-98-C-3035/E-Lite Technologies, Inc., April 15, 1999-December 31, 2002, \$518,158.

“Advanced SiGe Field Effect Transistor Design and Processing Technology to Fabricate 10Gb/s+ Line Interface Circuits for Fiber Optic Communication,” (with co-PIs: F. Papadimitrakopoulos (25%), J. Ayers (25%) and R. Bansal (25%)), July 1, 2000-June 30, 2003, Connecticut Innovations, \$290,750.

“SiGe Field Effect Transistors for 10 Gb/s Line Interface Circuits for Fiber Optic Communication,” (with co-PIs: F. Papadimitrakopoulos (25%), J. Ayers (25%) and R. Bansal (25%)), Transwitch Corporation, July 1, 2000-June 30, 2003, \$100,000.

“Nanochannel FETs and Quantum Dot Based Nonvolatile Memory Cells Using Site-specific and Layer-by-layer Self-Assembly Techniques,” (with co-PIs: F. Papadimitrakopoulos (25%), J. Ayers (25%) and M. Aindow (25%)), National Science Foundation (Nanotechnology Exploratory Initiative), July 1, 2002-June 30, 2003, \$93,609.

“Towards Miniaturized Wireless-Integrated, and Implantable Glucose Sensors,” (with PI: Diane Burgess (34%) and co-PI: F. Papadimitrakopoulos (33%)), U.S. Army, October 1, 2002-September 30, 2003, \$250,000.

“DNA-Assisted Photonic Crystal Fabrication,” (with PI: F. Papadimitrakopoulos (55%) and co-PIs: C.V. Kumar (15%) and B. Zhang (15%)), Air Force Office of Scientific Research, September 18, 2001-December 14, 2003, \$375,000.

“Micro-Fuel Cells for Helmet Mounted Displays and Other Portable Applications,” (with co-PIs: F. Papadimitrakopoulos (33%) and H. Marcus (33%)), U.S. Army, January 22, 2003-January 21, 2004, \$225,000.

“Reconfigurable Interconnects, 200-500 GHz SiGe and InGaAs-InP Nanochannel FETs, and 1.55 μ Quantum Well Laser Modulators on Silicon for Advanced Systems,” (with co-PIs: F. Papadimitrakopoulos (18%), J. Ayers (18%), R. Bansal (18%) and W. Huang (18%)), Office of Naval Research N000140210883, September 1, 2002-September 30, 2005, \$125,000.

Bahram Javidi

“Real-time 3D Target Recognition Using Optical Imaging Systems,” U.S. Air Force/Optometrics, October 13, 2000-August 31, 2002, \$51,978.

“Optical Information Security,” Photonics Technology Access Program sponsored by National Science Foundation, DARPA and OIDA, December 1, 2001-December 1, 2002, \$35,000, Equipment Grant.

“Automated Detection and Analysis of Road Surface Degradations,” ConnDOT, June 1, 2002-May 31, 2003, \$30,000.

“Pattern Recognition Applied to Text Analysis and Security Systems,” Pitney Bowes Company, February 1, 2002-December 31, 2003, \$60,000

“Monitoring and Measurement of Micro-Structured Evolution of SOFC’s with Digital Holography,” Department of Defense, January 22, 2003-January 21, 2004, \$40,000.

“Improved Resolution and Viewing Angle Three Dimensional TV Using Integral Imaging,” Samsung Company and Korea Ministry of Industry, January 23, 2003-January 23, 2004, \$80,000.

“3D Image Recognition,” Lockheed Martin, September 1, 2002-March 1, 2004, \$27,528.

“A Laser-based 3D Data Acquisition System for the Analysis of Pavement Distress and Roughness,” Connecticut Department of Transportation, June 1, 2003-May 31, 2004, \$62,745.

“Three Dimensional Scanning Camera,” Connecticut Innovation, June 1, 2001-June 30, 2004, \$259,261.

Peter B. Luh

“Planning and Scheduling of Re-Manufacturing Supply Networks,” United Technologies Research Center, August 1, 2002-December 31, 2002, \$32,781.

“A New Generation of Neural Network Optimization Techniques with Applications to Manufacturing Scheduling,” (with co-PI: L.S. Thakur), National Science Foundation DMI-9813176, October 1, 1998-January 31, 2003, \$207,408.

“Supply Chain Performance Evaluation and Improvement,” Toshiba Corporation, April 1, 2002-March 31, 2003, \$25,000.

“Advanced Techniques for Power Quality Monitoring and Advanced Energy Management Techniques for GE Power Management Control System,” General Electric, March 9, 2000-December 31, 2003, \$203,241.

“Editor-in-Chief Support – *IEEE Transactions on Robotics and Automation*,” January 1, 2002-December 31, 2003, \$127,556.

“Simultaneous Optimal Auction and Unit Commitment for Deregulated Electricity Markets,” Southern California Edison, May 15, 2003-December 31, 2003, \$30,018.

“ESS: Scheduling, Inventory Optimization, and Coordination of Maintenance Networks,” National Science Foundation DMI-0223443, August 1, 2002-January 31, 2004, \$149,453.

“Toshiba’s Scholarship Award,” Toshiba Corporation, April 2, 2002-March, 2004, \$5,302.

“Forecasting Market Clearing Prices in the Deregulated Power Market,” Northeast Utilities, December 1, 1998-March 30, 2004, \$355,788.

Robert Magnusson

“Development of Nanostructured Photonic Devices with Nonlinear Organic Materials,” (with PI: T. A. Maldonado (50%)), Texas Advanced Research Program, January 1, 2002-December 31, 2003, \$200,000.

“Development of Optical Fiber Sensor Technology for Fuel Cell Diagnostics,” U.S. Army via Connecticut Global Fuel Cell Center, January 22, 2003-January 21, 2004, \$40,000.

“Photonic-Crystal Vertical-Cavity Lasers,” University of Connecticut Research Foundation, June 1, 2003-May 31, 2004, \$14,000.

Krishna R. Pattipati

“Analytic Model-Driven Design of Adaptive Organizations for Dynamic and Uncertain Mission Environments,” Office of Naval Research N00014-00-1-0101, November 1, 1999-October 9, 2002, \$872,266.

“Estimation with Multisensor-Multiscan Detection Fusion,” (with PI: Y. Bar-Shalom (80%) and co-PI: P.K. Willett (10%)), Air Force Office of Scientific Research F49620-00-1-0052, December 1, 1999-November 30, 2002, \$390,000.

“Tracking with Electronically Scanned Arrays,” (with PI: Y. Bar-Shalom (80%) and co-PI: P.K. Willett (10%)), Office of Naval Research N00014-97-1-0502, March 1, 1997-December 31, 2002, \$620,000.

“Advanced Techniques for Reliability Analysis of Industrial Power Systems,” General Electric Industrial Systems, March 9, 2000-December 31, 2003, \$96,696.

“Multi-functional Models for Monitoring, Information Fusion and Option Selection for Asymmetric Threats,” (with co-PI: P.K. Willett (50%)), Aptima, Inc., March 19, 2003-March 18, 2004, \$198,083.

“Intelligent Diagnostics,” (with co-PI: P.K. Willett (10%)), Toyota Technical Center, February 1, 2003-March 31, 2004, \$119,987.

“Multi-layer Model-based Reasoning and Optimization Techniques for Integrated Vehicle Health Management,” NASA-Ames Research Center, May 1, 2003-April 30, 2004, \$155,776.

“Feature-Aided Tracking for Robust BMD,” (with PI: Y. Bar-Shalom (80%) and co-PI: P.K. Willett (10%)), Office of Naval Research N00014-00-1-0740, June 1, 2000-December 1, 2004, \$655,420.

Geoffrey W. Taylor

“Monolithic Uncooled Ultraviolet Detector Array Capability,” Space Photonics, November 15, 2001-August 12, 2002, \$59,000.

“True Time Delay for Interference Cancellation,” MDA/OPEL, Inc./BMDO, August 15, 2002-February 15, 2003, \$41,500.

“High Frequency Optoelectronic Pulse Source for Digital Communications,” MDA/OPEL, Inc., September 10, 2002-March 10, 2003, \$41,500.

“Network Analyzer and Coupled DC Parameter Analyzer System with Software for OEIC Testing,” (with co-PI: M. Anwar (10%)), Office of Naval Research, April 30, 2000-April 30, 2003, \$199,204.

“Development of Shared Aperture EO/RF Sources,” Air Force Research Laboratory/OPEL, Inc., September 15, 2001-February 15, 2004, \$750,000.

“Development of Integrated Optical Photoreceivers,” BMDO/OPEL, September 15, 2001-September 15, 2004, \$750,000.

Bing C. Wang

“Bit-level Random Access Optical Memory Using Spectral Bistability in Semiconductor Optical Amplifier Ring Lasers,” University of Connecticut Research Foundation, January 1, 2003-December 31, 2003, \$18,535.

Peter K. Willett

“Active Sonar Waveform Fusion for Detection, Localization and Tracking,” NUWC, July 1, 2001-September 30, 2002, \$34,457.

“Estimation with Multisensor/Multiscan Detection Fusion,” (with PI: Y. Bar-Shalom (80%) and co-PI: K.R. Pattipati (10%)), Air Force Office of Scientific Research, December 1, 1999-November 30, 2002, \$390,000.

“Tracking with Electronically-Scanned Arrays,” (with PI: Y. Bar-Shalom (80%) and co-PI: K.R. Pattipati (10%)), Office of Naval Research N00014-97-1-0502, March 1, 1997-December 31, 2002, \$620,000.

“Tracking Approaches to Matched Field Processed Observations,” Department of Defense/Navy, July 8, 2002-January 7, 2003, \$33,100.

“Intelligent Quantization for Measurement Fusion Assuming Particle Filter Tracking,” Qinetiq, Ltd., January 1, 2002-May 31, 2003, \$89,900.

“Integrated Passive Detection and Classification,” Office of Naval Research/Naval Undersea Warfare Center, July 9, 2002-July 31, 2003, \$35,000.

“AOA Processing for Spawning Targets,” Georgia Tech Research Institute/SEAL, June 1, 2003-December 31, 2003, \$71,507.

“Real-time Onboard and Remote Vehicle Health Management Project – Phase II STTR,” Qualtech Systems, Inc., May 1, 2002-March 10, 2004, \$53,386.

“Feature Aided Tracking for Robust BMD,” (with PI: Y. Bar-Shalom (80%) and co-PI: K.R. Pattipati (10%)), Office of Naval Research N00014-1-0740, June 1, 2000-December 1, 2004, \$655,420.

“Intercept Waveforms,” Office of Naval Research/Naval Undersea Warfare Center, January 1, 2003-December 31, 2004, \$61,579.

Quing Zhu

“A Novel Breast Imaging Device Using Ultrasound and Near Infrared Diffusive Light,” Connecticut Innovations, August 1, 1999-July 31, 2002, \$214,053.

“A Novel Breast Imaging Device Using Ultrasound and Near Infrared Diffusive Light,” Multi-Dimensional Technology, August 1, 1999-July 31, 2002, \$15,000.

“Fall 2001 Equipment Competition: A Fast Optical Coherent Tomography Scanner,” University of Connecticut Research Foundation, January 1, 2002-December 31, 2002, \$5,000.

“Feature Based Adaptive Robot,” ABB Power Plant Lab, January 1, 2001-January 30, 2003, \$78,194.

“Diagnostic Optical Imaging of Periodontal Tissues,” National Institutes of Health (subcontract from University of Pennsylvania), September 15, 2000-July 31, 2003, \$195,792.

“Near Infrared Diffusive Light Imaging with Ultrasound Guidance,” National Institutes of Health R01, September 1, 2002-August 30, 2003, \$206,702.

“Breast Cancer Diagnosis Using Ultrasound and NIR Diffusive Light,” U.S. Department of Defense/ARMY Medical Research and Material Command, August 15, 2000-September 14, 2003, \$195,299.

“3-D Simultaneous Ultrasound and NIR Imaging for Breast Cancer Detection,” Donaghue Foundation, January 1, 2002-December 31, 2004, \$179,992.

“Monitoring Cancer Oxygenation Diffusion Induced by Ultrasound,” U.S. Department of Defense/ARMY Medical Research and Material Command, June 15, 2002-May 14, 2005, \$65,994.

**ELECTRICAL & COMPUTER ENGINEERING
AWARDS, HONORS, PATENTS
2002-2003**

Yaakov Bar-Shalom

2000 M. Barry Carlton Award for Best Paper in IEEE Transactions on AES (award made in 2002).

2002 J. Mignona Data Fusion Award from the Department of Defense JDL Data Fusion Group.

John D. Enderle

Second Place (Excellence) Award – Engineering in Medicine & Biology Magazine, for Technical Publications, Trade/News Article category, “Golden Accomplishments in Biomedical Engineering” (May 2002). Received from the Society for Technical Communication (NY Metro Chapter) in 2002, J.D. Enderle, Editor-in-Chief; F. Nebecker, Author, IEEE Senior Research Historian; B. Benbrook, Managing Editor; J. Dudar, Art Director.

Elected Member, Connecticut Academy of Science and Engineering, 2003.

Faquir C. Jain

“Coupled Well for Transport Channel in Field Effect Transistors,” (with E. Heller), U.S. Patent #6,498,360, December 24, 2002.

Bahram Javidi

IEEE Lasers and Electro-optics Society Distinguished Lecturer Award, 2003.

Best Journal Paper Award, IEEE Transactions on Vehicular Technology, March 24, 2003.

Krishna R. Pattipati

AAUP Research Excellence Award, April 2003.

2002 NASA Space Act Award for “A Comprehensive Toolset for Model-based Health Monitoring and Diagnostics,” Part of an 11 member team to receive a \$11,000 cash award.

Co-recipient of the Barry Carlton Award for the Best AES Transactions Paper of 2000, August 2002.

The Walter E. Peterson Award for Best New Technology Paper, IEEE Autotestcon, Huntsville, AL, October 2002.

Geoffrey W. Taylor

“Grating Coupled Devices,” U.S. Patent # 6,031,243 (reissue).

“Modulation Doped Thyristor and Complementary Transistor Combination for a Monolithic Optoelectronic Integrated Circuit,” U.S. Patent # 6,479,844.

Bing C. Wang

“TOAD Having Enhanced Extinction Ratio of the Switching Window,” (with P.R. Prucnal, I. Glesk, R. Runser and C. Coldwell), U.S. Patent # 6,535,662, March 2003.

Peter K. Willett

Fellow, IEEE.

ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT
MAJOR PROFESSIONAL ACTIVITIES
2002-2003

Mehdi Anwar

Editor, *IEEE Transactions on Electron Devices*.

Member, International Advisory Board, International Conference on Electrical and Computer Engineering (ICECE), Dhaka, Bangladesh, December 26-28, 2002.

Panel Reviewer, National Science Foundation.

Presentations

“Advanced III-V Devices: GaAs Metamorphic HEMTs and GaN FETs,” plenary, International Conference on Electrical and Computer Engineering, Dhaka, Bangladesh, December 2002.

“GaN HEMTs,” Raytheon Company, Andover, MA, October 2002.

John E. Ayers

Member, NSF SBIR/STTR Review Panel, April 2003.

Reviewer, National Science Foundation.

Rajeev Bansal

Associate Editor, *IEEE Antennas and Propagation Magazine*, 1987-present.

Associate Editor, *IEEE Microwave Magazine*, 2000-present.

Vice-Chairman, “Biological Effects and Medical Applications” Subcommittee of the Technical Program Committee for the 2003 IEEE International Microwave Symposium.

Vice-Chairman, Technical Coordinating Committee MTT-10 of the IEEE.

MTT-S Delegate to the IEEE-USA Medical Technology Policy Committee, 2002-present.

IEEE AP-S Liaison to COMAR, 2001-present.

Honorary Member, The Electromagnetics Academy, 1990-present.

Yaakov Bar-Shalom

President, International Society of Information Fusion (2002).

Member, Board of Directors, International Society of Information Fusion, through 2004.

Session Chair, IEEE Aerospace Conference, March 2003.

Member, DARPA Review Panel on Next Generation Ground Tracker.

Member, NRC/NAE Review Panel on Airspace Systems Program.

Presentations

NATO Research and Technology Agency Lecture Series for the Turkish Navy, September 2002.

IEEE Aerospace Electrical Systems Society Distinguished Lecture given to Istanbul Section, September 2002.

Steven Boggs

Contributing Associate Editor, *IEEE Electrical Insulation Magazine*.

Presentations

“Fundamentals of Partial Discharges Detection,” HV Testing, Monitoring and Diagnostics Workshop, VA, November 2, 2002.

“Nonlinear Material Analysis for Power Applications,” IEEE Asia Pacific Transmission and Distribution Conference, Yokohama, Japan, October 8, 2002.

“Cable Degradation Mechanisms and Diagnostic Techniques,” EPRI Cable Users Working Group Meeting, Albuquerque, NM, September 17, 2002.

“High Energy Density Capacitor Technology,” Combat Hybrid Power Systems Workshop, National Academy of Sciences, San Jose, CA, August 26, 2002.

“High Field Electrical Performance of Polymers,” Union Carbide Division/Dow Chemical Company, Canal Research Center, NJ, July 16, 2002.

“Diagnostics Techniques for Medium High Voltage Cable,” Detroit Edison, Detroit, MI, July 7, 2002.

“Partial Discharge in the Context of Distribution Cable Testing,” Detroit Edison, Detroit, MI, July 9, 2002.

John A. Chandy

Session Chair, International Conference on Computer Science and Technology, 2003.

Member, Program Committee, International Conference on Parallel and Distributed Processing Techniques and Applications, 2003.

Nan Guang Chen

Presentations

“Diffusive and Coherent Imaging Methods for Biomedical Applications,” Steele Laboratory, Massachusetts General Hospital, December 2002.

“Advances in Biomedical Optical Imaging Technology,” Center for Molecular Imaging Research, Massachusetts General Hospital, November 2002.

“Advances in Biomedical Optical Imaging Technology,” Robarts Research Institute and University of West Ontario, August 2002.

Eric Donkor

Editor, *Journal of Nanoscience and Nanotechnology*.

Associate Program Chair, SPIE Conference on Quantum Information and Computation, Conference #5105, Orlando, FL, April 2003.

Editor, *SPIE Proceedings*, Vol. 5105, April 2003.

Vice-Chair, IEEE LEOS Connecticut Chapter.

Session Chair, SPIE Conference on Quantum Information and Computation, Conference #5104 and Conference #5105, April 2003.

Member, NSF SBIR Phase I Review Panel, 2003.

Presentation

“Ultra-Fast Fiber-Based Optical Switching and Signal Processing,” MIT Optical Sensor Group, Department of Electrical and Computer Engineering, March 2003.

John D. Enderle

Editor-in-Chief, *IEEE EMB Magazine*.

Member, Editorial Board, Academic Press Biomedical Engineering Book Series.

ABET/EAC Engineering Accreditation Commission Program for Evaluator for Bioengineering Programs.

Chair-Elect, American Society for Engineering Education, Biomedical Engineering Division Program.

Member, Connecticut Academy of Science and Engineering, 2003.

Member, Board of Directors, Rocky Mountain Bioengineering Symposium.

Member, CURE (Connecticut United for Research Excellence).

Member, Peer Review Committee, National Science Foundation.

Monty A. Escabi

Presentations

“Spectro-Temporal Information Processing and the Transformation Between the Inferior Colliculus and the Primary Auditory Cortex,” (invited), Biomedical Engineering Colloquium, Boston University, April 2003.

“Spectro-Temporal Information Processing in the Central Auditory System and its Implications for Binaural Spatial Processing,” (invited), Mathematical Bioscience Institute Symposium, Ohio State University, May 5-9, 2003.

Abstracts

“Quantification of Spectrotemporal and Binaural Receptive Field Characteristics in the Central Nucleus of the Cat Inferior Colliculus,” (with A. Qiu), Society for Neuroscience Annual Meeting, Abstract 762.13, Orlando, FL, November 2002.

“Intensity Dependence of the Auditory STRF,” (with A. Ertel and H.L. Read), Association for Research in Otolaryngology Annual Meeting, Abstract 1584, Daytona Beach, FL, February 2003.

Martin D. Fox

Member, Steering Committee, New England Doppler Conference.

Convenor of Working Group 10, Ultrasound Doppler Devices, Berlin, Germany, August 2002.

Faquir C. Jain

Editor, Symposium Proceedings, Connecticut Microelectronics and Optoelectronics Consortium (CMOC), April 9, 2003.

Coordinator, Connecticut Microelectronics and Optoelectronics Consortium CMOC.

Member, NSF Review Panels: Photonics A: LEDs and Lasers, SBIR, March 3, 2003; Nanomaterials, SBIR, September 23-24, 2002; DARPA 2003 Intelligent Systems, January 29-29, 2003.

Member, IEEE Nanotechnology Advisory Board, representing SMC Society of IEEE.

Member, Advisory Board for IEEE 2003 Nanotechnology Conference.

Reviewer, National Science Foundation.

Visiting Research Fellow and Professor, Yale University, June 1, 2002-January 15, 2003.

Presentations

“Reconfigurable Logic at 500 GHz,” DARPA, January 29, 2003.

“Reconfigurable Interconnects,” Office of Naval Research, January 6, 2003.

Bahram Javidi

Associate Topical Editor, *Optical Signal and Image Processing*, Marcel Dekker.

Associate Editorial Board, *Optical and Fiber Communications Reports*, Springer-Verlag.

Co-Chair, “Workshop on Optics and Photonics in Homeland Security,” (sponsored by SPIE, National Institute of Justice and Center for Security Research), Alexandria, VA, December 11-12, 2002.

Chair, “Signal and Image Processing Program,” International Symposium on Optical Science and Engineering, Annual Meeting of the Optical Engineering Society (SPIE), Seattle, WA, July 2002.

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), Glasgow, Scotland, November 2002.

Co-Chair, Optics for Information Systems, Technical Working Group of Optical Engineering Society (SPIE).

Co-Editor, “Three Dimensional Video and Display: Systems and Devices,” ITCOM 2002, SPIE Boston, MA, July 2002.

Conference Co-Chair and Proceedings Co-Editor, “Algorithms and Systems for Optoelectronics Information Processing,” International Symposium on Optical Science and Engineering, Annual Meeting of the Optical Engineering Society (SPIE), Seattle, WA, July 2002.

Chair, Technical Committee, Electro-Optics Sensors and Systems, Institute of Electrical and Electronics Engineers (IEEE) Lasers and Electro-Optics Society (LEOS).

International Symposium on Optical Science and Engineering, Annual Meeting of the International Society for Optical Engineering (SPIE), July 2002.

International Symposium on Photonics for Aerospace Applications of Optics, International Society for Optical Engineering (SPIE), Orlando, Florida, April 2003.

Institute of Electrical and Electronics Engineers (IEEE) Annual Meeting of Lasers and Electro-Optics Society (LEOS), November 2002.

Session Chair, conferences sponsored by IEEE, OSA and SPIE.

Reviewer, Israel Science Foundation and National Science Foundation.

Presentations

“Improved Resolution 3D TV and Video using Moving Micro-optics Array Lens Technique (MALT),” *keynote address*, International Symposium on Industrial Photonics: Intelligent Systems and Advanced Manufacturing, Messe Stuttgart International, Stuttgart, Germany, November 2002.

Office of Deputy ASD (Spectrum, Space, Sensors, Command, Control, Communications Policy), The Pentagon, Virginia, September 2002.

“Improved Resolution and Viewing Angle 3D Optical Imaging,” *invited*, Workshop on High Resolution Optical Imagery, sponsored by CNRS (Centre National de la Recherche Scientifique), Paris, France, January 2003.

“Optical Methods in Security and Encryption,” *invited tutorial*, 2002 Optical Society of America’s Annual Meeting, Orlando, FL, September 29-October 3, 2002.

Peter B. Luh

Editor-in-Chief, *IEEE Transactions on Robotics and Automation*, May 1999-September 2003.

Founding Editor-in-Chief, *IEEE Transactions on Automation Science and Engineering*, 2003-2008.

Associate Editor, *IIE Transactions on Design and Manufacturing*, 1997-present.

Associate Editor, *Discrete Event Dynamic Systems*, 1999-present.

Member, Program Committee, Video Committee, Best Automation Paper Committee, 2003 IEEE International Conference on Robotics and Automation, Taipei, Taiwan, May 2003.

Member, International Program Committee, 2002 Fourth Asian Control Conference, 2002.

Member, Program Committee, The 6th Workshop on Discrete Event Systems, Zaragoza, Spain, October 2002.

Member, International Program Committee, International Symposium on Robotics and Automation, Toluca, Mexico, September 2002.

Council Member, Connecticut Academy of Science and Engineering, 2000-2005.

Member, Nominating Committee, Connecticut Academy of Science and Engineering, 2003-present.

Panelist, Service Enterprise Engineering Program, National Science Foundation, December 2002.

Chair, King-Sun Fu Memorial Best Transactions Paper Committee, *IEEE Transactions on Robotics and Automation*, 2003.

Member, Kayamori Best Automation Paper Review Committee, IEEE International Conference on Robotics and Automation, May 12-17, 2003.

Session Chair, 2003 IEEE International Conference on Robotics and Automation.

Member, Best Video Review Committee, IEEE International Conference on Robotics and Automation, 2003.

Plenary Speaker, 2003 International Conference on Control and Automation, Montreal, Canada, June 2003.

Invited Visiting Professor, Tsinghua University, Department of Automation, 2001-2004.

Robert Magnusson

Topical Editor, *Applied Optics-Optical Technology & Biomedical Optics*, August 1, 2001-present.

Editor, *Trends in Optics and Photonics Series*, Vol. 75, Diffractive Optics and Micro-Optics, Optical Society of America, Washington, DC, 2002.

Member, Technical Program Committee, Algorithms and Systems for Optical Information Processing, Annual Meeting of SPIE, Seattle, WA, July 7-11, 2002.

Symposium Organizer, Photonic Component Integration, Optical Society of America Annual Meeting, Orlando, FL, September 29-October 3, 2002.

Technical Group Chair, Integrated Optics and Micro-Optics Group of the Photonics Division, Optical Society of America, 2002-2003.

Representative, Science and Engineering Council, Optical Society of America, 2002-2003.

Member, Technical Program Sub-committee on Electro-optic Sensors and Systems, IEEE LEOS 2002 Annual Meeting, Glasgow, Scotland, November 11-14, 2002.

Session Chair, Micro/Nano Optics, IEEE LEOS 2002 Annual Meeting, Glasgow, Scotland, November 11-14, 2002.

OSA Technical Council Representative, 2004 Integrated Photonics Research Topical Meeting.

Invited Participant, OSA Leadership Conference, Washington, DC, February 5-8, 2003.

Presentations

“Diffractive Optical Devices: Practice and Prospects,” Symposium with final reports and review of “Tera Optical Information Systems” and “Diffractive and/or Ultra-fine Optical Elements for Those Systems and Fabrication Technologies,” supported by the Japan Science and Technology Agency, Osaka Science and Technology Center, Japan, October 28, 2002.

“Design and Fabrication of Resonant Diffractive Optical Elements,” Osaka Science and Technology Center, Japan, October 29, 2002.

Krishna R. Pattipati

Member, Program Committee, 2003 IEEE SMC Conference, Washington, DC.

Member, Program Committee, 2002 IEEE SMC Conference, Tunisia.

Member, Program Committee, 2002 SPIE Conference on Diagnostics and Prognostics, Orlando, FL.

Member, Air Force Office of Scientific Research (AFOSR) Review Panel of Subject Matter Experts on Decision Support Systems Research, June 16-17, 2003.

Presentations

Naval War College, Newport, RI, October 2002.

ONR A2C2 Program Review, Washington, DC, March 2003.

Workshop on Information Aggregation, (invited), Silver Spring, MD, May 2003.

Granted Access to Internet 2 and Naval War College Innovation Lab.

Bing C. Wang

Member, National Science Foundation SBIR/STTR Phase I Review Panel, C. Photonics, Opto/Magneto-electronic Devices and Systems, March 2003.

Peter K. Willett

Associate Editor, *IEEE Transactions on Aerospace and Electronic Systems*, September 1998-present.

Associate Editor, *IEEE Transactions on Aerospace and Electronic Systems Magazine*, June 2000-present.

Associate Editor, Special Tutorial Issue of *IEEE Transactions on Aerospace and Electronic Systems Magazine*.

Associate Editor, *IEEE Transactions on Systems, Man and Cybernetics, Part A: Systems and Human*, June 1998-present.

Associate Editor, *IEEE Transactions on Systems, Man and Cybernetics, Part B: Cybernetics*, June 1998-present.

Co-Chair, 2002 Aerospace Conference Track in Remote Sensing.

Conference Organizer, SPIE Aerosense 2002 in Diagnostics, Prognostics and System Health.

Member, IEEE Signal Processing Society's Sensor Array and Multichannel Technical Committee, May 2000-present.

Session Chair, Conference on Decision and Control, Las Vegas, NV, December 2003.

Session Organizer and Chair, International Conference on Information Fusion, Annapolis, MD, December 2003.

Chair, International Conference on Information Fusion, 2 Sessions on Probabilistic Multi-hypothesis Tracking, Annapolis, MD, December 2003.

Presentations

“A Scatter-Brain’s View of Particle Filters,” Electrical & Computer Engineering Department, Middle East Technical University, Ankara, Turkey, October, 2002 and Electrical & Computer Engineering Department, McMaster University, Hamilton, Canada, October 2002.

“Approaches to CDMA Demodulation,” Electrical & Computer Engineering Department, Middle East Technical University, Ankara, Turkey, October 2002.

“Monopulse Radar Detection and Localization of Multiple Targets via Joint Multiple-Bin Processing,” MDS Hercules Project Review, February 2003.

Quing Zhu

Associate Editor, *IEEE Transactions of Systems, Man and Cybernetics*.

Session Chair, SPIE International Symposium on BioMedical Optics.

Reviewer, National Science Foundation.

Invited presentation, 2002 Gordon Conference on Lasers in Medicine and Biology, Kimball Union Academy, NH, July 14-19, 2002.

**MECHANICAL ENGINEERING DEPARTMENT
ANNUAL REPORT SUMMARY
2002-2003**

During the 2002-2003 academic year, the Department of Mechanical Engineering had an undergraduate enrollment of 201 students, and a graduate enrollment of 60 students. Twenty-eight bachelor's degrees were conferred. In total, the department faculty served as advisors to 11 graduating master's and seven graduating Ph.D. students.

FACULTY AND STAFF

There were 20 full-time tenured or tenure-track faculty members in the department during the 2002-2003 academic year. The department also employs three non tenure-track faculty members and is home to three clerical staff as well as two professional staff members. Professors Lee Langston and Herbert Koenig retired effective June 1, 2003, after many years of contributing to the department and university. Dr. Jim Cowart resigned as Associate Department Head effective July 3, 2003.

UNDERGRADUATE TEACHING AND CURRICULUM

Forty-one undergraduate courses were taught by Mechanical Engineering faculty members during the academic year. Included in the 41 are five courses taught in the Management & Engineering for Manufacturing (MEM) Program by Mechanical Engineering faculty members. Ten industrially-sponsored senior design projects were included in the Major Design Experience.

GRADUATE PROGRAM

The Mechanical Engineering Department offered 22 graduate courses to our graduate students. The Department received 138 applications and admitted 92 students. Seventeen students joined the program. Six of the 22 courses were taught on-site at Pratt & Whitney under the auspices of the Master of Engineering Program.

SCHOLARLY ACTIVITY AND RESEARCH

Department faculty members were associated with 53 grants, of which 10 were externally-sponsored senior design projects. Annual expenditures (direct costs of external grants) were approximately \$2.6 million. This compares to expenditures of \$1.3 million in 2000-2001 and \$0.8 million in 1998-1999. The direct cost portion of new grants obtained by the department faculty in 2002-2003 is approximately \$4.5 million. The faculty published 49 full-length journal articles as well as 44 conference papers. In addition, one patent was secured.

STUDENT RECRUITING AND STUDENT ORGANIZATION ACTIVITIES

Freshman enrollment in Mechanical Engineering for the fall of 2003 is expected to be approximately 70. This represents significant increases over previous years (50 in 2001, and 20 in 1999). The expected enrollment value does not include any estimate for undecided students, most of whom choose a major within the School during their freshman year. The department participated in the Engineering 2000 program for high school sophomores and juniors, as well as the da Vinci program for high school math and science teachers.

ALUMNI

Ten Mechanical Engineering alumni were among the 23 School of Engineering graduates who were inducted as *Founding Fellows* of the University of Connecticut Academy of Distinguished Engineers and Hall of Fame. These include: Dr. James Barger, former Chief Scientist at Bolt, Beranek and Newman; Mr. Dennis Bushnell, Chief Scientist at NASA Langley Research Center; Dr. Franklin Chang-Díaz, NASA astronaut; Mr. Hugh Cox, former President of Raymond Engineering division of Kaman Corporation; Mr. Richard Grossi, former Chairman and CEO of United Illuminating; Dr. Michael Hartnett, President, CEO and Chairman of Roller Bearings Company of America; Mr. John Krenicki, President and CEO of GE Plastics; Mr. Walter Rose, founder of Windsor Manufacturing (now Barnes Aerospace); Mr. Michael Toner, Executive Vice President of General Dynamics Corporation and President of General Dynamics Electric Boat and; Mr. Raymond Williams, Director of Naval Architecture at General Dynamics Electric Boat.

Also inducted was Mr. Paul Greenberg, former Chief of Design at Pratt & Whitney and friend of the Mechanical Engineering department.

MECHANICAL ENGINEERING DEPARTMENT
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2002-2003

Theodore L. Bergman

“Scaling Analysis and Prediction of the Thermal Plasma Spraying Process Using a Discrete Particle Approach,” (with J. Lee), *Journal of Thermal Spray Technology*, Vol. 11, pp. 179-185, 2002.

Baki M. Cetegen

“Lagrangian Simulation of the Unsteady Near Field Dynamics of Planar Buoyant Plumes,” (with M. C. Soteriou and Y. Dong), *Physics of Fluids*, Vol. 14, No. 9, pp. 3118-3140, 2002.

“Deposition of Multi-Layered, Nano-Structured Alumina-Titania Coatings by Detonation Waves,” (with S.Y. Semenov and D. Goberman), *Scripta Materialia*, Vol. 48, No. 10, pp. 1483-1488, 2003.

“Structure and Magnetic Properties of NiFe/SiO₂ and Co/SiO₂ Nano-Composites Consolidated by Detonation Compaction,” (with Y.D. Zhang, X.Q. Ma, S. Hui, M. Wu, S.H. Ge, W.A. Hines, J.I. Budnick and S.Y. Semenov), *Journal of Applied Physics*, Vol. 93, No. 10, pp. 6969 – 6971, 2003.

“Mechanisms of Ceramic Coating Deposition in Solution-Precursor Plasma Spray,” (with T. Bhatia, A. Ozturk, L. Xie, E. Jordan, M. Gell, X. Ma and N. Padture), *Journal of Materials Research*, Vol. 17, No. 9, pp. 2363 – 2372, 2002.

Wilson K.S. Chiu

“Residual Stress Measurement in Thin Carbon Films by Raman Spectroscopy and Nanoindentation,” (with C.A. Taylor and M.F. Wayne), *Thin Solid Films*, Vol. 429, pp. 190-200, 2003.

“Characterization of Carbon CVD Films for Hermetic Optical Fiber Coatings,” (with C.A. Taylor), *Surface and Coatings Technology*, Vol. 168, pp. 1-11, 2003.

“Open-Air Carbon Coatings on Fused Quartz by Laser-Induced Chemical Vapor Deposition,” (with K.H. Kwok), *Carbon*, Vol. 41, pp. 673-680, 2003.

“Temperature Distribution of an Optical Fiber Traversing Through a Chemical Vapor Deposition Reactor,” (with P.O. Iwanik), *Numerical Heat Transfer, Pt. A: Applications*, Vol. 43, pp. 221-237, 2003.

Jim S. Cowart

“The Formation of a Combustible Mixture During the First Cycle of Cranking and Startup in a Port Fuel Injected Spark Ignition Engine,” *ASME Journal of Engineering for Gas Turbines and Power*, Vol. 125, No. 2, pp. 402-411, 2003.

Amir Faghri

“Analysis of Liquid Vapor Pulsating Flow in a U-Shaped Miniature Tube,” (with Y.W. Zhang and M.B. Shafii), *International Journal of Heat and Mass Transfer*, Vol. 45, No. 12, pp. 2501-2508, 2002.

“Analysis of Heat Transfer in Unlooped and Looped Pulsating Heat Pipes,” (with M.B. Shafii and Y. Zhang), *International Journal of Numerical Methods for Heat and Fluid Flow*, Vol. 12, No. 5, pp. 585-609, 2002.

Eric H. Jordan

“Plasma Spray Forming of Nanostructured Composite Coatings,” (with X.L. Jiang, L. Shaw and M. Gell), *Journal of Materials & Technology*, Vol. 18, No 3, pp. 287-288, 2002.

“Mechanisms of Ceramic Coating Deposition in Solution-Precursor Plasma Spray,” (with T. Bhatia, A. Ozturk, L. Xie, B. Cetegen, M. Gell, X. Ma and N. Padture), *Journal of Materials Research*, Vol. 17, No 9, pp. 2363-2372, 2002.

“NDE Assessment of TBC’s: An Interim Report of a Photo-Stimulated Luminescence ‘Round Robin’ Test,” (with J.A. Nychka, D.R. Clarke, S. Sridharan, M. Gell, M.J. Lance, C.J. Chunnillall, I.M. Smith, S.R.J. Saunders, R. Pillan, B. Sergo, A. Selcuk, A. Atkinson and K.S. Murphy), *Surface and Coatings Technology*, Vol. 163-164, pp. 87-94, 2003.

“Failure Modes in Plasma-Sprayed Thermal Barrier Coatings,” (with K.W. Schlichting, N.P. Padture and M. Gell), *Materials Science and Engineering A*, Vol. 342, pp. 120-130, 2003.

“Implementation of a Viscoplastic Model for a Plasma Sprayed Ceramic Thermal Barrier Coating,” (with W. Xie, K.P. Walker and M. Gell), *Journal of Engineering Materials and Technology*, Vol. 125, pp. 200-207, 2003.

Kazem Kazerounian

“Efficient Evaluation of Spur Gear Tooth Load Using Pseudo-Interference Stiffness Estimation,” (with M. Pimsarn), *Mechanisms and Machine Theory*, Vol. 37, Issue 8, pp. 769-786, 2002.

Kevin D. Murphy

“Characterization of Interfacial Adhesion Energy and Energy Dissipation in Micro-Cantilevers via Instrumented Mechanical Actuation,” (with E.E. Jones and M.R. Begley), *Journal of the Mechanics and Physics of Solids*, Vol. 51, No. 8, pp. 1601-1622, 2003.

Nejat Olgac

“Tunable Multiple Frequency Absorber Using Delayed Position Feedback,” (with C. Huang), *Journal of Vibration and Control*, Vol. 8, pp. 451-465, 2002.

“A Single Step Automatic Tuning Algorithm for the Delayed Resonator Vibration Absorber,” (with M. Hosek), *IEEE/ASME Transactions on Mechatronics*, Vol. 7, No. 2, pp. 245-255, 2002.

“Degenerate Cases in Using the Direct Method,” (with R. Sipahi), *Special Issue on Time Delayed Systems of ASME Journal of Dynamic Systems, Measurement and Control*, Vol. 125, No. 2, pp. 194-201, 2002.

Ranga Pitchumani

“Control of Flow in Resin Transfer Molding with Real-Time Preform Permeability Estimation,” (with D. Nielsen), *Polymer Composites*, Vol. 23, No. 6, pp. 1087–1110, 2002.

“Nonisothermal Healing and Interlaminar Bond Strength Evolution During Thermoplastic Matrix Composites Processing,” (with F. Yang), *Polymer Composites*, Vol. 24, No. 2, pp. 262–278, 2003.

“Viscous Fingering in a Hele-Shaw Cell with Finite Viscosity Ratio,” (with X. Guan), *ASME Journal of Fluids Engineering*, Vol. 125, No. 2, pp. 354–364, 2003.

“Optimal Temperature and Current Cycles for Accelerated Curing of Composites Using Internal Resistive Heating,” (with A. Mawardi), *ASME Journal of Heat Transfer*, Vol. 125, No. 1, pp. 126–136, 2003.

Kenneth L. Reifsnider

“Characterization of Nonlinear Behavior in Woven Composite Laminates,” (with S. Ogihara), *Applied Composite Materials*, Vol. 9, pp. 249-263, 2002.

“Crack Growth of Natural Rubber Using a Modified Double Cantilever Beam,” (with J.T. South and S.W. Case), *Mechanics of Materials*, Vol. 34, pp. 451-458, 2002.

“Property Modeling Across Transition Temperatures in Polymers: Application to Thermoplastic Systems,” (with C. Mahieux), *Journal of Materials Science*, Vol. 37, pp. 911-920, 2002.

Michael W. Renfro

“Scalar Time-Series Simulations for Turbulent Nonpremixed Flames,” (with J.P. Gore and N.M. Laurendeau), *Combustion and Flame*, Vol. 129, pp. 120-135, 2002.

“Fluorescence Lifetime Measurements in Atmospheric-Pressure Flames Using Nanosecond-Pulsed Lasers,” *Applied Physics B*, Vol. 74, pp. 167-174, 2002.

Nigel Sammes

“Sintering and Thermal Expansion Characterization of Al-Doped and Co-Doped Lanthanum Strontium Chromites Synthesized by the Pechini Method,” (with M. Mori), *Solid State Ionics*, Vol. 146, pp. 301-312, 2002.

“Extruded Tubular Strontium and Magnesium-Doped Lanthanum Gallate, Gadolinium-Doped Ceria, and Yttria Stabilized Zirconia Electrolytes,” (with Y. Du, G.A. Tompsett, D. Zhang, J. Swan and M. Bowden), *Journal of the Electrochemical Society*, Vol. 150, No. 1, pp. 74-78, 2003.

“Compatibility of $Gd_xTi_2O_7$ Pyrochlores ($1.72 \leq x \leq 2.0$) as Electrolytes in High-Temperature Solid Oxide Fuel Cells,” (with M. Mori, G.A. Tompsett, E. Suda and Y. Takeda), *Solid State Ionics*, Vol. 158, pp. 79 – 90, 2003.

“Fabrication and Performance of LaGaO₃-Based Tubular SOFC’s,” (with Y. Du), *Ionics*, Vol. 9, pp. 7-14, 2003.

“Evaluation of Ni and Ti-Doped Y₂O₃ Stabilized ZrO₂ Cermet as an Anode in High-Temperature Solid Oxide Fuel Cells,” (with M. Mori, Y. Hiei, H. Itoh and G.A. Tompsett), *Solid State Ionics*, Vol. 160, pp. 1-14, 2003.

Jiong Tang

“Vibration De-Localization of Nearly Periodic Structures Using Coupled Piezoelectric Networks,” (with K.W. Wang), *ASME Journal of Vibration and Acoustics*, Vol.125, pp. 95-108, 2003.

Bi Zhang

“Surface Integrity in Machining Hard-Brittle Materials,” *Journal of Japan Society for Abrasive Technology*, Vol. 47, No. 3, pp. 131-134, 2003.

“Fundamental Aspects in Vibration-Assisted Tapping,” (with F.L. Yang and J.X. Wang), *Journal of Materials Processing Technology*, Vol. 132, pp. 345-352, 2003.

“Grinding Induced Damage in Ceramics,” (with X.L. Zheng, H. Tokura and M. Yoshikawa), *Journal of Materials Processing Technology*, Vol. 132, pp. 353-364, 2003.

“Grinding of Nanostructured Metallic and Ceramic Coatings: Part I. Surface Observation and Material Removal Mechanism,” (with X.B. Liu), *International Journal of Machine Tools and Manufacture*, Vol. 42, pp. 1665-1676, 2002.

“Grinding of Nanostructured Ceramic Coatings: Damage Evaluation,” (with X.B. Liu), *International Journal of Machine Tools and Manufacture*, Vol. 43, pp. 161-167, 2003.

“Simulation of Single-Grit Grinding and Evaluation of Surface/Subsurface Integrity for Ceramics Based on a CDM Model,” (with X.B. Liu), *ASME Journal of Manufacturing Science and Engineering*, Vol. 124, pp. 553-561, 2002.

“Effects of Grinding Process on Residual Stresses in Nanostructured Ceramic Coatings,” (with X.B. Liu), *Journal of Materials Science*, Vol. 37, pp. 3229-3239, 2002.

“Microgrinding of Nanostructured Material Coatings,” (with X.B. Liu, C.A. Brown and T.S. Bergstrom), *Annals of the CIRP*, Vol. 51, pp. 251-254, 2002.

Peng Zhang

“On the Continuum Modeling of Carbon Nanotubes,” (with Y. Huang, P.H. Geubelle and K.C. Hwang), *Acta Mechanica Sinica*, Vol. 18, pp. 528-536, 2002.

“The Elastic Modulus of Single-Wall Carbon Nanotubes: A Continuum Analysis Incorporating Interatomic Potentials,” (with Y. Huang, P.H. Geubelle, P. Klein and K.C. Hwang), *International Journal of Solids and Structures*, Vol. 39, pp. 3893-3906, 2002.

“Fracture Nucleation In Single-Wall Carbon Nanotubes Under Tension: A Continuum Analysis Incorporating Interatomic Potentials,” (with Y. Huang, H. Gao and K.C. Hwang), *Journal of Applied Mechanics*, Vol. 69, pp. 454-458, 2002.

“Numerical Simulation of Cohesive Fracture with the Virtual-Internal-Bond Model,” (with P.A. Klein, Y. Huang, H. Gao and P.D. Wu), *Computer Modeling in Engineering and Sciences*, Vol. 3, pp. 263-277, 2002.

MECHANICAL ENGINEERING DEPARTMENT
BOOKS, BOOK CHAPTER, BOOK SECTIONS & EDITED VOLUMES
2002 - 2003

Nejat Olgac

Guest Editor, "Measurement and Control," *ASME Journal of Dynamic Systems, Special Issue on Time Delayed Systems*, June 2003.

Ranga Pitchumani

Guest Editor, "Polymer Composites," *Special Issue on Polymer and Composite Materials Processing*, (S.G. Advani), Vol. 24, No. 2, SPE, Brookfield, CT, 2003.

Kenneth L. Reifsnider

Damage Tolerance and Durability of Composite Material Systems, (with S. Case), John Wiley and Sons, 432 pages, April 2002.

"Fatigue of Composites," *Special Issue of the International Journal of Fatigue*, (ed.), Elsevier Science, Vol. 24, No. 2-4, 2002.

Durability Analysis of Composite Systems 2001, (Y. Miyano, A H. Cardon, H. Fukuda and S. Ogihara, eds.), Balkema Publishers, 2002.

Nigel Sammes

"Electrolyte, Fluorite-type Oxide Ion Conductors," *Solid Oxide Fuel Cells: Fundamentals and Applications*, (O. Yamamoto), First Edition Elsevier Press, pp. 55-90, 2002.

Roman Solecki

Advanced Mechanics of Materials, (with R.J. Conant), Oxford University Press, 784 pgs., ISBN 0195143728, March 2003.

MECHANICAL ENGINEERING DEPARTMENT
CONFERENCE PROCEEDINGS & OTHER PUBLICATIONS
2002-2003

Theodore L. Bergman

“Optimization of Plasma Spray Processing Parameters for Deposition of Nanostructured Coatings,” (with I. Ahmed), *Proceedings of the 2002 ASME International Mechanical Engineering Congress and Exposition*, CD ROM 2002.

“Predicted Response of Multi-Ceramic Particles to Rapid Heating and Cooling,” (with S. Roychoudhary) *Proceedings of the 12th International Heat Transfer Conference*, CD-ROM 2002.

Zbigniew M. Bzymek

“Some Problems of Design for Nano-Manufacturing: Present and Future Aspects,” (with E. Jordan), *ASME 2002 Design Engineering Technical Conferences and Computer and Information in Engineering Conference (DETC'02), DFM: 7th Design for Manufacturing Conference*, No. DETC2002/DFM-34175, CDROM, Montreal, Canada, September 29 - October 2, 2002.

“Solving Engineering Problems Using BTIPS,” (in Polish), *XLVII Conference of the Engineering Committee of the Polish Academy of Science and Science Committee of the Polish Association of Engineers and Technicians, KRYNICA 2002*, Opole - Krynica, Poland, Vol. 4, pp. 257-263, September 15-20, 2002.

“Some Problems of Bridge Contact Analysis Using MARC,” (with J. Dierberger), *Proceedings of Contact Mechanics 2003, Computational Methods in Contact Mechanics V*, (C.A. Brebbia, ed.), Wessex Institute of Technology, UK, WIT Press, pp.62 -72, 2003.

Baki M. Cetegen

“Interaction of a Planar Diffusion Flame with a Line Vortex,” (with S. Candel), *Proceedings of The Third Joint Technical Meeting of the U.S. Sections of the Combustion Institute*, No. PD05 in CD-ROM, Chicago, IL, March 17-19, 2003.

“Nucleation of Zirconia in a Droplet Stream of Liquid Precursor Processed by Flat Premixed Flame,” (with A. Ozturk), *Proceedings of The Third Joint Technical Meeting of the U.S. Sections of the Combustion Institute*, No. F21 in CD-ROM, Chicago, IL, March 17-19, 2003

“Detonation Consolidation of NiFe/SiO₂ and Co/SiO₂ Nanocomposites,” (with X. Ma, Y.D. Zhang, S. Hui, M. Wu, S. Ge, W.A. Hines, J.I Budnick and S.Y. Semenov), *Proceedings of Material Research Society*, Vol. 759, pp. MM1.7.1- MM1.7.5, 2003

Wilson K. S. Chiu

“Laser-Induced Carbon CVD Using an Open-Air Reactor,” (with K.H. Kwok), *Proceedings of the CVDXVI/ EURO-CVD 14 Symposium, 203rd ECS Meeting*, Vol. 1, pp. 581-587, 2003.

“Characterization of Carbon CVD Coatings Deposited at Near Atmospheric Pressure,” (with C.A. Taylor), *Proceedings of the SPIE Photonics Fabrication Europe*, Vol. 4940, pp. 101-107, 2002.

“Optical Fiber Coatings by Laser-Assisted Chemical Vapor Deposition,” (with K.H. Kwok), *Proceedings of the 12th International Heat Transfer Conference*, Vol. 4, pp. 825-830, 2002.

“Numerical Modeling of CO₂ Laser-Heated Moving Glass Rods,” (with W. Tian), *Proceedings of the ASME International Mechanical Engineering Congress and Exposition*, CD-ROM Vol. 1, No. IMECE2002-33082, 2002.

“Heat Transfer Correlations for a CVD Optical Fiber Coating Process,” (with P.O. Iwanik), *Proceedings of the ASME International Mechanical Engineering Congress and Exposition*, CD-ROM Vol. 1, No. IMECE2002-33919, 2002.

Jim S. Cowart

“A Comparison of Transient Air-Fuel Measurement Techniques,” *Proceedings of the Society of Automotive Engineers Powertrain and Fluid Systems Conference*, SAE #2002-01-2753, October 2002.

Amir Faghri

“Experimental Investigation of Heat Transfer and Pressure Drop during Complete Condensation of Water in Miniature Tubes,” (with E. Begg and B. Holley), *12th International Heat Transfer Conference*, Grenoble, France, August 18-23, 2002.

Kazem Kazerounian

“Generalized Mobility Analysis of Spatial Four Bar Linkages,” *Proceedings of the Special Celebratory Symposium in the honor of Professor Bernie Roth*, Stanford University, CD-ROM, June 2003.

“Teaching Engineering, Teaching Science: A two-Sided Coin,” (with R. Vieth), *2003 American Society for Engineering Education Annual Conference*, Nashville, TN, ASEE 2003-1133, June 2003.

“Engineering Ambassadors in the High School Classroom,” (with R. Vieth), *Proceedings of the 2003 American Society for Engineering Education Annual Conference*, Nashville, TN, ASEE 2003-1125, June 2003.

“From Mechanisms and Robotics to Protein Confirmation and Drug Design,” *Proceedings of the 2002 ASME Mechanisms and Robotics Conference*, Montréal, Canada, DETC2002/MECH, September 2002.

“Evaluation of Ring Gear Tooth Stress,” (with L. Duong and M. McCunne), *Proceedings of the 2002 ASME Mechanisms and Robotics Conference*, Montréal, Canada, DETC2002/ISD-34434, September 2002.

“Process Modeling of Flexible Robotic Grinding,” (with Y. Zhang, Y. Sun and Z. Gan), *Proceedings of the 2002 ASME Mechanisms and Robotics Conference*, Montréal, Canada, DETC2002/MECH-34365, September 2002.

“Force Sensor Based Calibration of Robot Grinding,” (with Y. Zhang and Y. Sun), *Proceedings of the 2002 ASME Mechanisms and Robotics Conference*, Montréal, Canada, DETC2002/MECH-34364, September 2002.

Lee Langston

“Leading Edge Modification Effects on Turbine Cascade Endwall Loss,” (with S. Becz and M.S. Majewski), *ASME Turbo Expo 2003*, Atlanta, GA, CD-ROM, June 2003.

“Bubble Buster,” *ASME Mechanical Engineering Magazine*, pp. 6-9, June 2003.

Nejat Olgac

“A Numerical Study for Time Delayed System Stability Using Direct Method,” (with R. Sipahi), *ESDA 2002 6th Biennial Conference on Engineering Systems Design and Analysis*, Istanbul, Turkey, July 2002.

“A New Perspective for Time Delayed Control Systems with Application to Vibration Suppression,” (with R. Sipahi) *IMECE 2002*, New Orleans, LA, November 2002.

“Interesting Scenarios Using Time Delay as a Stabilizing Tool in Target Tracking,” (with R. Sipahi), *CNRS-NSF Workshop on Advances in Time-Delayed Systems*, Paris, January 2003.

“Direct Method Implementation for the Stability Analysis of Multiple Time-Delayed Systems,” (with R. Sipahi), *IEEE-CCA 2003*, Istanbul, Turkey, June 2003.

“An Exact Method for the Stability Analysis of Time Delayed LTI Systems,” (with R. Sipahi), *Automatic Control Conference*, Denver, CO, June 2003.

Ranga Pitchumani

“Studies on Fiber/Matrix Interphase Development in Thermosetting-Matrix Composites,” (with F. Yang), *Heat Transfer 2002, The 12th International Heat Transfer Conference*, Vol. 3, pp. 153-158, 2002.

“Induction Heating Assisted Permeation Enhancement for the VARTM Process,” (with R.J. Johnson), *The International SAMPE Technical Conference*, Vol. 34, pp. 250-261, 2002.

Kenneth L. Reifsnider

“Solid Oxide Fuel Cell Research and Development Program,” (with N. Sammes), *Solid Oxide Fuel Cells, SOFC VIII, The Electrochemical Society*, Connecticut Global Fuel Cell Center, PV 2003-07, (S.C. Singhal and M. Kokiya, eds.) pp. 953-962, 2003.

“Multiscale Mechanistic Modeling for Functional Material Systems,” (with X. Huang and V. Vinjamoori), *Proceedings of the International Conference on New Challenges in Mesomechanics*, Aalborg University, pp. 439-446, August 26-30, 2002.

“Nonlinear Stress-Strain Behavior in Woven GFRP Composites,” (with S. Ogihara and A. Kobayashi), *Durability Analysis of Composite Systems 2001*, (Y. Miyano, A.H. Cardon, K.L. Reifsnider, H. Fukuda and S. Ogihara, eds.), Balkema Publishers, pp. 351-356, 2002.

Michael W. Renfro

“Comparison of OH Time-Series Measurements and Large-Eddy Simulations in Hydrogen Jet Flames,” (with A. Chaturvedy, G.B. King, N.M. Laurendeau, A. Kempf, A. Dreizler, A. Sadiki and J. Janicka), *The Third Joint U.S. Section Meeting of The Combustion Institute*, CD-ROM, March 2003.

“Hydroxyl Time-Series Measurements in Turbulent Counter-Flow Nonpremixed H₂/CH₄/air Flames,” (with K.K. Venkatesan, G.B. King and N.M. Laurendeau), *The Third Joint U.S. Section Meeting of The Combustion Institute*, CD-ROM, March 2003.

“Cross-Sections for Quenching of CH A 2D, n'=0 by N₂ and H₂O from 1740 to 2160 K,” (with K.K. Venkatesan and N.M. Laurendeau), *Proceedings of the Combustion Institute*, Vol. 29, pp. 2695-2702, 2003.

Nigel Sammes

“Be Able to Benefit From Solid Oxide Fuel Cells SOFC in a Deregulated Economy,” *The 2nd Annual Early Markets for Stationary Fuel Cells*, Boston, Vol. 2, pp. 1-10, 2002.

“Stress Prediction in Solid Oxide Fuel Cell Electrolytes,” (with R. Foster), *The 11TH Symposium on Solid Oxide Fuel Cells in Japan*, Vol. 11, pp. 59-63, 2002.

“The Stability of Solid Oxide Fuel Cell Materials in Real Operating Environments,” *HEET-UTSR Materials Workshop*, pp. 1-14, 2002.

“Physical and Electrochemical Properties of Ce_{0.8}Gd_{0.2-y}Pr_yO_{2-d} (y=0-0.05),” (with R. Torrens and G.A. Tompsett), *202nd Electrochemical Society Meeting*, Vol. 202, pp. 92, 2002.

“Fabrication and Performance of a LaGaO₃-Based Tubular SOFC,” (with Y. Du), *The 9th Euroconference on Ionics*, Vol. 9, pp. 14, 2002.

“Electrical Performance of LaGaO₃-Based Tubular SOFC’s,” (with Y. Du), *11th Chinese Conference on Solid State Ionics, and the International Workshop on Solid Electrochemical Devices for Energy Conversion*, Vol. 11, pp. 9, 2002.

“Novel SOFC Tubular Design Configurations,” (with Y. Du and R. England), *The 8th International Symposium on Solid Oxide Fuel Cells*, Vol. PV2003-07, pp. 1077-1081, 2003.

“Precious Metal Thin-Films for SOFC Applications,” (with R. England), *The 8th International Symposium on Solid Oxide Fuel Cells*, Vol. PV2003-07, pp. 611-614, 2003.

“Solid Oxide Fuel Cell Research and Development Program at the Connecticut Global Fuel Cell Center,” (K. Reifsnider), *The 8th International Symposium on Solid Oxide Fuel Cells*, Vol. PV2003-07, pp. 953-962, 2003.

“Fabrication and Performance of a Small SOFC Stack Using Doped Lanthanum Gallate Electrolyte,” (with Y. Du), *The 8th International Symposium on Solid Oxide Fuel Cells*, Vol. PV2003-07, pp. 1119-1125, 2003.

“Direct Methane Oxidation in Micro-Tubular SOFC’s Using Doped LaGaO₃ Electrolyte,” (with V. Mandakolathur), *The 8th International Symposium on Solid Oxide Fuel Cells*, Vol. PV2003-07, pp. 1170-1175, 2003.

“Application of La_{0.6}AE_{0.4}MnO₃ (AE = Ca, Sr),” (with M. Mori, E. Suda and E.Y. Takeda), *The 43rd battery Symposium, Fukuoka*, Vol. 43, pp. 370-371, 2003.

Jiong Tang

“A Simultaneous Active-Passive Approach for Structural Vibration Confinement Using Piezoelectric Actuators,” (with K.W. Wang), *The 44th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Materials Conference*, AIAA-2003-1721, 2003.

Bi Zhang

“Grindability Comparison Between Conventional and Nanostructured Material Coatings,” (with X.B. Liu, Z.H. Deng and J. Meng), *The 5th International Conference on Frontiers of Design and Manufacturing*, Dalian, China, pp. 1-5, July 10-12, 2002.

**MECHANICAL ENGINEERING DEPARTMENT
ACTIVE RESEARCH GRANTS & CONTRACTS
2002-2003**

Thomas Barber

“Near Nozzle Flow Field Characterization of a Combustor,” (with B. Cetegen (50%)), Pratt & Whitney, 09/01/02 - 03/01/03, \$36,442.

“Automated Design and Analysis in Pro/E,” (with J. Cowart (50%)), Timken, 08/23/02 - 05/31/03, \$5,000.

John Bennett

“PATHS Toward the Future: A Community of Learners,” U.S. Department of Education, 09/01/99–08/31/04, \$470,059.

“PATHS Toward the Future: A Community of Learners,” Nellie Mae Foundation, 09/01/99–08/31/04, \$200,000.

“Connecticut TALENT Program Administration Project,” State of Connecticut TALENT Program, 09/01/00–08/31/03, \$123,840.

“Create Adjustable Mobile Shielding Facility,” Electric Boat, 08/23/02 - 05/31/03, \$5,000.

Theodore Bergman

“Technology Development for Chair Professors in the Connecticut Global Fuel Cell Center,” (with P. Bergman (50%)), Clean Energy Fund/Connecticut Innovations, 04/11/03, \$2,000,000.

“Development of a Large Scale Fuel Cell Testing Facility,” (with P. Bergman (33%) and N. Sammes (33%)), Clean Energy Fund/Connecticut Innovations, 05/01/03 – 04/30/04, \$1,000,000.

“Novel Thermal Control and Improved Power and Energy Density of Portable PEM Fuel Cells,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 06/01/02 - 05/02/03, \$72,515.

“Improved Power Density of Portable DMFC Fuel Cells and DMFC Miniaturization – Phase I,” Department of Defense, 01/02/03 – 01/01/04, \$75,000.

“Frozen PEM Electrolysis and Fuel Cell Systems,” (with M. Renfro (50%)), Proton Energy Systems, 08/23/02 - 05/31/03, \$5,000.

Zbigniew Bzymek

“Dual Coil Variable Torque Frictionless Clutch: Phase Two,” (with K. Kazerounian (50%)), The Carlyle Johnson Machine Company, L.L.C., 08/23/02 - 05/31/03, \$5,000.

Baki Cetegen

“Superior Thermal Barrier Coatings Using a Novel Solution Spray Process,” (with M. Gell (25%), N. Padture (25%), E. Jordan (25%), and Inframat Corp. (25%)), Office of Naval Research, \$900,000, 01/01/02 - 12/31/05.

“Transport Phenomena in Thin Rotating Liquid Films Including Nucleate Boiling,” (with A. Faghri (50%)), NASA Microgravity Fluid Physics Program, 03/01/00 - 12/01/03, \$340,000.

“Near Nozzle Flow Field Characterization of a Combustor,” (with T. Barber (50%)), Pratt & Whitney, 09/01/02 - 03/01/03, \$36,442.

“Rapid Formation of Detonations in Two-Phase Fuel/Air Mixtures for Application in Pulsed Detonation Engines,” University of Connecticut Research Foundation, 06/01/01 - 12/31/02, \$19,805.

“Evaluation of Emission Performance of Municipal Buses with Hybrid Diesel-Electric Propulsion,” U.S. Department of Transportation and Connecticut Transit, 01/03 to 01/05, \$122,725.

“*In-situ* Optical Diagnostics for Measurements of Water Vapor Concentration and Temperature in PEM Fuel Cell Membrane-Electrode Assemblies – Phase II,” (with M. Renfro (50%)), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 01/02/03 - 01/01/04, \$150,000.

“Design of a Helicopter Inlet Particle Separator,” (with L. Langston (50%)), Pratt & Whitney, 08/23/02 - 05/31/03, \$5,000.

Wilson K.S. Chiu

“Transport Phenomena in the Chemical Vapor Deposition of Hermetic Optical Fiber Coatings: An Integrated Research and Education Program,” National Science Foundation, 01/01/01–12/01/05, \$385,000.

“Electrochemical Modeling of Advanced Naval Fuel Cell Systems,” Office of Naval Research, 06/01/02 - 05/31/04, \$180,000.

“Performance and Reliability of Optical Fibers for Use in Underwater Acoustic Arrays,” Office of Naval Research, 06/01/01 - 05/01/04, \$330,025.

Jim Cowart

“Characterization and Improvement of Portable Fuel Cell Systems,” U.S. Army, 06/01/02 - 05/02/03, \$117,982.

“DMFC System Modeling and Stack Airflow Optimization,” U.S. Army, 01/03 - 01/04, \$73,601.

“Automated Design and Analysis in Pro/E,” (with T. Barber (50%)), Timken, 08/23/02 - 05/31/03, \$5,000.

Amir Faghri

“Advanced Technology for Portable Miniature and Micro Fuel Cells,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 2/23/03 - 4/22/04, \$3,095,300.

“Portable Fuel Cell Power Systems,” (with P. Bergman (50%)), U.S. Army, 6/4/02 - 8/31/03, \$1,990,263.

“Transport Phenomena in Thin Rotating Liquid Films Including Nucleate Boiling,” (with B. Cetegen (50%)), NASA Microgravity Fluid Physics Program, 03/01/00 - 12/01/03, \$340,000.

Robert Jeffers

“Automated Jumper Wire Insertion Machine,” Wiremold Company, 08/23/02 - 05/31/03, \$5,000.

Eric Jordan

“Measurement of Three Critical Parameters as a Basis for a Simple Life Prediction Method,” (with M. Gell (50%)), Department of Energy, 05/01/02 - 04/31/05, \$478,495.

“Superior Thermal Barrier Coatings Using a Novel Solution Spray Process,” (with M. Gell (25%), N. Padture (25%), B. Cetegen (25%), and Inframat Corp. (25%)), Office of Naval Research, 01/01/02 - 12/31/05, \$900,000.

“Thermal Barrier Coatings and Metallic Coatings with Improved Durability,” (with M. Gell (25%), U. Pittsburgh (25%) and U. Central Florida (25%)), Department of Energy, 02/01 - 01/03, \$320,000.

“Advanced Thermal Barrier Coatings for Combustors,” (with M. Gell (33%) and N. Padture (33%)), Solar Turbines Incorporated, 06/01/00 - 05/31/03, \$75,000.

“Expanding Solar Harvester Functional Platform,” (with P. Zhang (50%)), Connecticut Energy, 08/23/02 - 05/31/03, \$7,000.

Kazem Kazerounian

“NSF Graduate Ambassadors in K-12 Classrooms,” (with R. Vieth (33%) and T. Reagan (33%)), National Science Foundation, 06/01/02 – 05/30/05, \$1,410,000.

“Design and Development of an Automated Robotic System for Remote Operation of Electrical Circuit Breaker Panels,” General Electric Industrial Systems, (with N. Olgac (50%)), 02/01/02 - 05/30/03, \$141,986.

“Control Strategies for Robotic Grinding,” ABB-Robotics Division, 09/01/00 - 06/30/03, \$116,705.

“Design and Development of a Novel Control Strategy and System for Sensor-based Coordination of Computer Controlled Manipulators,” ABB-Robotics Division, 07/01/02 – 06/30/04, \$91,705.

“Dual Coil Variable Torque Frictionless Clutch: Phase Two,” (with Z. Bzymek (50%)), The Carlyle Johnson Machine Company, L.L.C., 08/23/02 - 05/31/03, \$5,000.

Herbert Koenig

“Low Cost, Compact Friction Tester,” (with M. Wood (50%)), Pitney Bowes, 08/23/02 - 05/31/03, \$5,000.

Lee Langston

“Design of a Helicopter Inlet Particle Separator,” (with B. Cetegen (50%)), Pratt & Whitney, 08/23/02 - 05/31/03, \$5,000.

“Endwall Loss Reduction Program,” Pratt & Whitney, 01/01/02-12/31/02, \$150,000.

“Endwall Loss Reduction Program Extension,” Pratt & Whitney, 02/01/03 -06/30/03, \$50,000.

Kevin D. Murphy

“Development of a Test Facility and Modeling Capability for MEMS Research and Education,” National Science Foundation, 01/01/01-12/31/03, \$212,963.

“Predictions of Fatigue Life and Delamination in Lightweight Aerospace Components,” NASA Langley Air Force Base, 07/01/01-06/30/03, \$17,000.

“An Examination of the Vibration Characteristics of Solar Sails,” NASA Langley Air Force Base, 09/01/01-08/30/02, \$22,000.

Nejat Olgac

“Semi-Active Re-Tuning Against Vibration and Shock Transmissibility on Portable Fuel Cells,” U.S. Army, 06/01/02 - 05/02/03, \$75,497.

“Design and Development of an Automated Robotic System for Remote Operation of Electrical Circuit Breaker Panels,” (with K. Kazerounian), General Electric Industrial Systems, 02/01/02 - 05/30/03, \$141,986.

“A New Vibration Cancellation Mechanism Using Smart Materials,” Sikorsky, 06/01/00 - 12/01/02, \$156,000.

“Modeling and Dynamic Analysis of Micromanipulators Used in Transgenics and Biomedical Applications,” University of Connecticut Research Foundation, 01/01/01 - 12/01/02, \$12,000.

“Vibration and Shock Transmissibility on Portable Fuel Cells - Phase II,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 01/02/03 – 01/01/04, \$40,000.

Ranga Pitchumani

“Curing of Composites: An Integrated Multiscale Process Description Toward Tailored Structures and Properties,” Air Force Office of Scientific Research, 09/01/01- 08/31/04, \$399,093.

“ITR/AP: Simulation and Optimization of Materials Processing Under Uncertainty: Application to Optical Fiber Drawing,” (with E. Santos (33%) and L. Achenie (33%)), National Science Foundation, 09/01/01 - 08/31/04, \$409,140.

“Investigations on Transport Phenomena Governing Interface Development in Thermoplastic Composites Processing,” National Science Foundation, 09/01/00 - 08/31/03, \$219,903.

“Pilot Investigations on a Novel Technique for Synthesis of Biomimetic Multiscale Reinforced Fibrous Composites,” University of Connecticut Research Foundation, 06/01/00 - 05/31/03, \$13,674.

“Characterizing Sampling for Optimization Under Uncertainty: A Fractal Geometry Approach,” National Science Foundation (Subcontract to Carnegie Mellon University), 09/01/01-08/31/02, \$27,712.

“Neural Network Onboard Engine Life Models,” United Technologies Corporation, Pratt & Whitney, 01/20/03 –11/28/03, \$75,000.

“Simulation and Optimization of PEM Fuel Cells – Phase II,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 01/02/03 – 01/01/04, \$75,000.

Kenneth Reifsnider

“Development of Micro-Miniature Tubular Solid Oxide Fuel Cells,” (with N. Sammes (25%), N. Padture (25%) and M. Wei (25%)), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 04/19/03 – 10/18/04, \$300,000.

Michael Renfro

“Characterization of Scalar Correlations in Turbulent Counterflow Nonpremixed Flames,” (with N. Laurendeau (70%)), National Science Foundation, 09/15/01- 09/14/04, \$272,001.

“CAREER: Characterization of Propagating and Receding Flame Edges in Composition and Velocity Gradients,” National Science Foundation, 02/01/03 - 01/31/08, \$417,999.

“Study on the Structure of Nonpremixed Flames with High Stoichiometric Mixture Fractions,” University of Connecticut Research Foundation, 01/01/03 - 12/31/03, \$16,334.

“*In-Situ* Optical Diagnostics for Measurements of Water Vapor Concentration and Temperature in PEM Fuel Cell Membrane-Electrode Assemblies – Phase II,” (with B. Cetegen (50%)), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 01/02/03 - 01/01/04, \$150,000.

“Statistical Interpretation of Scalar Time-Series Measurements in Turbulent Partially Premixed Flames,” (with N.M. Laurendeau (40%) and G.B. King (40%)), Air Force Office of Scientific Research, 12/15/02-12/14/05, \$472,568.

“Frozen PEM Electrolysis and Fuel Cell Systems,” (with T. Bergman (50%)), Proton Energy Systems, 08/23/02 - 05/31/03, \$5,000.

Nigel Sammes

“Development of Micro-Miniature Tubular Solid Oxide Fuel Cells – Phase II,” (with K. Reifsnider (25%), N. Padture (25%) and M. Wei (25%)), through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 01/02/03 – 01/01/04, \$300,000.

“Modeling of a 42kW MCFC System,” GenCell Corp., 01/01/03 – 05/01/03, \$17,628.

“Fabrication and Study of MEA’s for PEM Fuel Cells,” Aerogel Composite, 05/01/03 – 07/01/03, \$23,884.

“Fabrication of Ceramic Tubes for Electrolyzer Studies,” Lawrence Livermore National Labs, 03/01/03 – 09/01/03, \$68,671.

“Fabrication of Micro-Miniature Tubular SOFC’s,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 04/01/03 – 03/31/04, \$72,912.

“Development of a Large Scale Fuel Cell Testing Facility,” (with T. Bergman (33%) and P. Bergman (33%)) Clean Energy Fund/Connecticut Innovations, 05/01/03 – 04/30/04, \$1,000,000.

Jiong Tang

“System Level Dynamic Modeling and Control Development for PEM Fuel Cells – Phase II, Through Connecticut Global Fuel Cell Center,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 01/02/03 - 01/01/04, \$40,000.

“Dynamic Shape Control Using Piezoelectric Network and Circuitry Dynamics,” NASA EPSCoR Core Funding Program, 03/17/03 - 02/29/04, \$10,000.

“Piezoelectric Valve System for Fuel Cell Applications,” University of Connecticut Research Foundation, 01/01/03 - 12/31/03, \$17,084.

“Development of a Helicopter Rotor Blade Balancing System,” Sikorsky Aircraft Corporation, 08/23/02 - 05/31/03, \$5,000.

Marcelle E. Wood

“Low Cost, Compact Friction Tester,” (with H. Koenig, (50%)), Pitney Bowes, 08/23/02 - 05/31/03, \$5,000.

Bi Zhang

“Innovative Manufacturing of Bipolar Plates for Portable PEM Fuel Cells,” U.S. Army, 06/01/02 - 05/02/03, \$63,963.

“Study of Grindability of Thermal-Spray Coated Nanostructured Materials,” Office of Naval Research, 11/01/00 - 12/31/02, \$194,311.

“Automatic Tool Changer,” (with J. Ayers (50%)), Gerber Technology, 08/23/02 - 05/31/03, \$7,500.

“A Unique Design of Endplates and Clamping Mechanisms for Miniature/Micro/Portable DMFC Stacks – Phase II,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 01/02/03 – 01/01/04, \$75,000.

“DNA-Assisted Photonics Crystal Fabrication” (with F. Papadimitrakopoulos (90%)), Air Force Office of Scientific Research, 09/01 – 08/04, \$375,365.

Peng Zhang

“Fracture Simulation in Solid Oxide Fuel Cell Electrolyte – Phase II,” through Connecticut Global Fuel Cell Center, U.S. Department of Defense, 01/23/03 – 01/01/04, \$ 40,000.

“Expanding Solar Harvester Design Platform,” (with E. Jordan (50%)), Connecticut Energy, 08/23/02 – 05/31/03, \$7,000.

**MECHANICAL ENGINEERING DEPARTMENT
AWARDS, HONORS, PATENTS
2002-2003**

Wilson K. S. Chiu

U.S. Navy/ASEE Summer Faculty Research Fellowship, 2003.

Michael W. Renfro

Early CAREER Award, National Science Foundation, January 2003.

Nigel Sammes

“Integrated Solid Oxide Fuel Cell and Reformer,” U.S. Patent, Number #6,492,050, December 10, 2002.

MECHANICAL ENGINEERING DEPARTMENT
MAJOR PROFESSIONAL ACTIVITIES
2002-2003

John Bennett

Member, Connecticut Department of Higher Education Advisory Committee of Accreditation.

Distinguished Technologist, Chair of Program Committee, and Member of Board of Directors, Connecticut Academy for Education in Mathematics, Science, and Technology.

Theodore L. Bergman

Member, ASME Heat Transfer Division, *ad hoc* Committee, 2003 Summer Heat Transfer Conference.

Baki M. Cetegen

Treasurer, Combustion Institute Eastern States Section.

Member, Executive Board, Combustion Institute Eastern States Section.

Wilson K. S. Chiu

Established an Educational Partnership Agreement, Naval Undersea Warfare Center, March 2003.

Amir Faghri

Honorary Editorial Advisory Board, *International Journal of Heat and Mass Transfer*, 1997 – Present.

Editorial Board, *Journal of Process Mechanical Engineering*, 1998 – Present.

Editorial Advisory Board, *International Journal of Numerical Methods for Heat and Fluid Flow*, 1998 – Present.

Honorary Member, Editorial Advisory Board, *Communication in Heat and Mass Transfer*, 1997 – Present.

Editorial Board, *Journal of Heat Transfer Research*, 1997 – Present.

Editorial Board, *Journal of Applied Thermal Engineering*, 1996 – Present.

Executive Editor, *Heat Transfer Engineering Journal, (Thermal Storage & Heat Pipes)*, 1993 – Present.

North American Editor, *Journal of Enhanced Heat Transfer*, 1993 – Present.

Robert Jeffers

Governor, American Society of Mechanical Engineers, International.

Presentation

“Designing a Winning ABET Visit,” *invited*, ASME International Design Engineering Conference, Montreal Canada, September 29, 2002.

Eric H. Jordan

Organized and conducted “DOE Materials Workshop,” (with M. Gell), on behalf of South Carolina Energy Research Institute and U.S. Department of Energy, Storrs, CT, October 7-9, 2002.

Kazem Kazerounian

Associate Editor, *The official Journal of the International Federation for the Theory of Mechanisms and Machines- IFToMM, (Mechanisms and Machine Theory)*, April 2002.

General Conference Chairman, 2002 ASME-Design Engineering Technical Conferences and Computers in Engineering Conference, Montreal, Canada, September 2002.

Chairman, ASME Mechanisms and Robotics Committee, 2002-2004.

Chairman, Mechanisms and Robotics Symposiums of the 2003 ASME-Design Engineering Technical, Chicago, IL.

Nejat Olgac

Member, Executive Committee, ASME Dynamic Systems and Control Division, 2002-07.

Associate Editor, *ASME, Journal of Dynamic Systems, Measurement and Control*, 1997-2004.

Guest Editor, *ASME Journal of Dynamic Systems, Measurement and Control, Special Issue, “Time Delayed Systems,”* June 2003.

Chairman, Noise and Vibration Control Panel, ASME Dynamic Systems and Control Division, 2001-2003.

Symposium Organizer, and Chairman, Active Control of Noise and Vibration, within the ASME-IMECE 2002, New Orleans, November 2002.

Ranga Pitchumani

Member, Editorial Board, *Journal of Thermoplastic Composite Materials*, Sage Publications, 1998-.

Kenneth L. Reifsnider

Editor-in-Chief, *International Journal of Fatigue*, Elsevier Publishers, Ltd.

Chair, Program Committee, Fifth International Congress on Thermal Stresses and Related Topics, Blacksburg, VA June 8-11, 2003.

Nigel Sammes

Editorial Board, *Journal of Power Sources*.

Editorial Board, *International Journal of Hydrogen Energy*.

Editorial Board, *Journal of the Australasian Ceramics Society*.

Editorial Board, *Fuel Cells Virtual Journal*.

Member, Connecticut Governor's Steering Committee for the Connecticut Climate Change Stakeholders.

Presentations

"Fuel Cells in Connecticut," *invited*, 2nd Annual Early Markets for Stationary Fuel Cells, Strategic Research Institute, Boston, October 2002.

"Stress Prediction in Solid Oxide Fuel Cell Electrolytes," *invited*, 11th Symposium on Solid Oxide Fuel Cells, Tokyo, Japan, December 12-13, 2002.

"Microstructural/Property Relationships of Lanthanum Gallate-Based Systems," *keynote*, and "Fuel Cell Research and Development at the Connecticut Global Fuel Cell Center," Advanced NATO Research Workshop on Mixed Ionic Electronic Conducting (MIEC) Perovskites for Advanced Energy Systems, Kiev, Ukraine, June 1-5, 2003.

"Fuel Cells Forum: Latest Technologies, Applications and Costs," *invited speaker/panelist*, Globalcon, Boston, MA, 2003.

Bi Zhang

Editorial Board Member, *Chinese Journal of Mechanical Engineering*, English Edition.

Overseas Editor, *Journal of Nanotechnology and Precision Engineering*, appointed March 2003.

METALLURGY & MATERIALS ENGINEERING DEPARTMENT

ANNUAL REPORT SUMMARY

2002-2003

The major highlight of this year was the successful completion of the five-year assessment of this Department, as mandated by the Chancellor's Office. This process involved self-assessment by the Department faculty members and staff, and an evaluation by an independent panel of external reviewers comprising:

- Professor T. Pollock, Department of Materials Science and Engineering, University of Michigan
- Professor T. Tsakalagos, Department of Ceramics and Materials Engineering, Rutgers University
- Professor A. Philpotts, Department of Geology and Geophysics, University of Connecticut

The research-output metrics (graduate students supported, publications, citations) of the Department faculty members over the last five years were found to be at par with those of materials departments in the top quartile in the U.S. and Canada: in this Department, per full time equivalent (FTE) per year, 4.5 graduate students were supported, 11.8 articles published, and 43 citations received. However, the small size of the faculty and the lack of block-funding grants were identified as major shortcomings, which need to be addressed over the next five years. The budding undergraduate program is off to a good start, with the very first B.S. in Metallurgy & Materials Engineering class set to graduate in 2004. However, increasing the undergraduate enrollment remains a major challenge, and the task of obtaining accreditation (ABET) is over the horizon.

CHANGES IN PERSONNEL

Two tenured faculty members, one research faculty member and two staff members retired in 2003, and one research faculty member resigned. Professor John Morral, who served as the Department Head from 1998 until his retirement (June 1, 2003), retired after 32 years at the University of Connecticut. Professor Morral is internationally known for his seminal work in the areas of multi-component diffusion, oxidation, and phase equilibria. Under his leadership this Department launched the undergraduate program and recruited three new faculty members. Professor Norbert Greene retired after serving this Department for 34 years. An expert in the area of metal corrosion, Professor Greene is best known as the co-author of one of the most popular textbooks, *Corrosion Engineering*. Professor Maurice Gell, Professor-in-Residence, also retired after 10 years of service to the Department. Professor Gell, who has been instrumental in initiating and sustaining research in the areas of coatings and nanostructured materials, and facilitating Departmental planning, plans to continue serving the Department on a half-time basis. Mrs. Teresa Provost retired after 11 year of service to this Department (13 years at UConn) in the capacity of Administrative Assistant. Mr. James Koch, staff member in this Department, retired after serving the Department for 16 years (23 years at UConn). He was primarily responsible for the operation and upgrading of the Surface Modification and the Surface Analysis laboratories. Dr. T.T. Cheng resigned after a one-year stint as Associate-Professor-in-Residence in the Department, to join Pratt & Whitney as a technical staff member. We wish them all good luck!

Three searches are currently underway: (i) Assistant/Associate Professor in the area of fuel cell science and technology, (ii) Assistant/Associate Professor in the general area of materials, and (iii) and Administrative Coordinator.

Professor Nitin Padture was promoted to the rank of full Professor, effective August 23, 2003. He was also named Interim Department Head, effective June 1, 2003.

UNDERGRADUATE PROGRAM

The current enrollment stands at six juniors, 10 sophomores, three freshmen, and six incoming freshmen. Seven scholarships were awarded to five of our undergraduates (C.D. Gatto, E.H. Jordan, S. Iddir, R. Prasad, A. Ruminski) at the Engineering Awards Banquet. In order to increase the undergraduate enrollment, Professor Leon Shaw led the outreach effort, designed to interest middle school and high school students in the New England area via the following events: University Open Houses, Engineering 2000, Departmental Visitation Days, the Connecticut Invention Convention, the da Vinci Project, Connecticut Science Fair, CPTV Family Science Expo, and Materials Week. A few local middle schools and high schools were also visited as part of the Materials Roadshow, which included lectures, hands-on demonstrations, and videos. A one-credit course, MMAT 100 Materials Engineering in Society, was also designed to expose incoming, undecided freshman to the field of materials.

GRADUATE PROGRAM AND RESEARCH

The current graduate enrollment stands at 56, which includes 36 full-time students and 20 part-time students. In the past year, five M.S. degrees (S. Adibhatla, M. Allen, P. Bansal, D. Kang, J. Scott) and three Ph.D. degrees (D. Goberman, W. Gordon, M. Robson) were awarded; our congratulations to the new grads! For fall 2003, a total of 13 students have been admitted to the graduate program with full assistantships. The average GPA of the incoming graduate students is 3.3/4.0, and their average GRE scores are: Verbal 580/800, Quantitative 790/800, and Analytical 700/800. These students were selected from a pool of 70 highly-qualified applicants from around the world.

The Department faculty members remain highly productive in terms of obtaining external research funding. During the year, our faculty garnered total external research funding of \$2,641,000, which on a per capita basis equals an average of \$220,000 annual research expenditure per faculty member (12 faculty members). The total value of the current multi-year, multi-investigator external grants where our faculty members are Principal or Co-Principal Investigators stands at \$8,817,000. Our faculty remain highly active in scholarly pursuits: an average of 3.6 peer-reviewed publications per faculty member (12 faculty members) were published in high-impact journals, and a total of 39 invited talks were presented in the US and abroad. Our faculty members are also highly active in the area of professional service: reviewing papers and proposals, serving as journal editors, performing as committee members and contributing scholarly talks.

HONORS, AWARDS, AND PATENTS

Professor Mark Aindow was elected a Fellow of the Institute of Materials, London, and he was also named the University of Connecticut School of Engineering Outstanding Junior Faculty Awardee. Professor Martin Blackburn won the prestigious William Hunt Eisenman Award from ASM International for "unusual achievements in industry in the practical application of materials science and engineering through production and engineering use." This award was presented to him at the Awards Banquet in Columbus, OH, October 2002. Professor Harris Marcus was awarded U.S. Patent No. 6,540,784 (2003) for "Artificial Bone Implants." Professor John Morral was elected to the Connecticut Academy of Science and Technology (CASE). Professor Nitin Padture was awarded European Patent No. 0968153 (2002) for "Functionally-Graded Materials." Finally, the Department honored Dr. Young-Won Kim (Ph.D. '76) with the 2003 Outstanding Alumnus Award, in recognition of his "pioneering contributions to intermetallic alloys."

METALLURGY & MATERIALS ENGINEERING DEPARTMENT
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2002-2003

Mark Aindow

“A Transmission Electron Microscope Study of Microstructural Development in Magnetron Sputtered MoSi₂ Thin Films,” (with X.Y. Wang and I.T.H. Chang), *Intermetallics*, Vol. 10, pp. 829, 2002.

“Magnesium Manganese Oxide Nanoribbons: Synthesis, Characterization and Catalytic Applications,” (with J. Liu, J. Cai, Y.C. Son, Q. Gao and S.L. Suib), *Journal of Physical Chemistry B*, Vol. 106, pp. 9761, 2002.

“Nucleation of the C40 to C11_b Transformation in Magnetron-Sputtered MoSi₂ Thin Films,” (with X.Y. Wang and I.T.H. Chang), *Philosophical Magazine Letters*, Vol. 82, pp. 687, 2002.

“Measurement of Epitaxial Misorientations and Related Effects in Thin Films of YBa₂Cu₃O_{7-δ} Grown on Nominally (001)MgO Substrates by Pulsed Laser Deposition,” (with D.J. Norris), *Thin Solid Films*, Vol. 423, pp. 33, 2003.

“Effects of Zn Coating on the Microstructure and Magnetic Properties of Nd–Fe–B Magnets,” (with Y. Hu, I.P. Jones and I.R. Harris), *Journal of Alloys and Compounds*, Vol. 351, pp. 299, 2003.

“Zn Diffusion Induced Precipitation along Grain Boundaries in Zn-coated NdFeB Magnets,” (with Y. Hu, I.P. Jones and I.R. Harris), *Journal of Magnetism and Magnetic Materials*, Vol. 261, pp. 13, 2003.

“Effect of Self-Accommodation on α/α Boundary Populations in Pure Titanium,” (with S. Wang and M. Starink), *Acta Materialia*, Vol. 51, pp. 2485, 2003.

“Formation of a Cu/ \square -Al₂O₃ Self-Assembled Nanocomposite,” (with T. Bhatia and N.P. Padture), *Philosophical Magazine Letters*, Vol. 83, pp. 135, 2003.

S. Pamir Alpay

“Stress Induced Polarization-Graded Ferroelectrics,” (with J.V. Mantese, N.W. Schubring, A.L. Micheli, M.P. Thompson, R. Naik, G.W. Auner and I.B. Misirlioglu), *Applied Physics Letters*, Vol. 81, pp. 1068, 2002.

“Dependence of the Pyroelectric Response on Internal Stresses in Ferroelectric Thin Films,” (with Z.G. Ban), *Applied Physics Letters*, Vol. 82, pp. 3499, 2003.

“Fundamentals of Graded Ferroic Materials and Devices,” (with Z.G. Ban and J.V. Mantese) *Physical Review B*, Vol. 67, pp. 184104, 2003.

“Thermodynamic Analysis of Temperature-Graded Ferroelectrics,” (with Z.G. Ban and J.V. Mantese), *Applied Physics Letters*, Vol. 82, pp. 1269, 2003.

“Optimization of the Tunability of Barium Strontium Titanate Films via Epitaxial Stresses,” (with Z.G. Ban), *Journal of Applied Physics*, Vol. 93, pp. 504, 2003.

Maurice Gell

“Microstructure Development of Al₂O₃-13wt.%TiO₂ Plasma Sprayed Coatings Derived from Nanocrystalline Powders,” (with D. Goberman, Y. Sohn, L.L. Shaw and E.H. Jordan), *Acta Materialia*, Vol. 50, pp. 1141, 2002.

“Mechanisms of Ceramic Coating Deposition In Solution Precursor Plasma Spray,” (with T. Bhatia, A. Ozturk, L. Xie, E.H. Jordan, B. Cetegen, X. Ma and N.P. Padture), *Journal of Materials Research*, Vol. 17, pp. 2363, 2002.

“Low Thermal Conductivity Rare-Earth Zirconates for Potential Thermal-Barrier-Coatings Applications,” (with J. Wu, X. Wei, N.P. Padture, P.G. Klemens, M. Gell, E. Garcia, P. Miranzo and M.I. Osendi), *Journal of the American Ceramic Society*, Vol. 85, pp. 3031, 2002.

“Thermal Conductivity of Ceramics in the ZrO₂-GdO_{1.5} System,” (with J. Wu, N.P. Padture, P.G. Klemens, E. Garcia, P. Miranzo and M.I. Osendi), *Journal of Materials Research*, Vol. 17, pp. 3193, 2002.

“Plasma Spray Forming of Nanostructured Composite Coatings,” (with E.H. Jordan X.L. Jiang and L.L. Shaw), *Journal of Materials & Technology*, Vol. 18, pp. 287-288, 2002.

“NDE Assessment of TBCs: An Interim Report Of A Photo-Stimulated Luminescence 'Round Robin' Test,” (with J.A. Nychka, D.R. Clarke, S. Sridharan, E.H. Jordan, M.J. Lance, C.J. Chunnillall, I.M. Smith, S.R.J. Saunders, R. Pillan, B. Sergo, A. Selcuk, A. Atkinson and K.S. Murphy), *Surface and Coatings Technology*, Vol. 163-164, pp. 87, 2003.

“Failure Modes in Plasma-Sprayed Thermal Barrier Coatings,” (with K.W. Schlichting, N.P. Padture, and E.H. Jordan), *Materials Science and Engineering A*, Vol. 342, pp. 120, 2003.

“Implementation of a Viscoplastic Model for a Plasma Sprayed Ceramic Thermal Barrier Coating,” (with W. Xie, K.P. Walker and E.H. Jordan), *Journal of Engineering Materials and Technology*, Vol. 125, pp. 200, 2003.

“Indentation Fracture Behavior of Plasma Sprayed Nanostructured Alumina–13wt.% Titania Coatings,” (with H. Luo, D. Goberman and L.L. Shaw), *Materials Science and Engineering A*, Vol. 346, pp. 237, 2003.

John E. Morral

“A Local Equilibrium Model for Internal Oxidation,” (with Y. Li), *Acta Materialia*, Vol. 50, pp. 2683, 2002.

Nitin P. Padture

“Mechanisms of Ceramic Coating Deposition in Solution-Precursor Plasma Spray,” (with T. Bhatia, A. Ozturk, L. Xie, E.H. Jordan, B.M. Cetegen, M. Gell and X. Ma) *Journal of Materials Research*, Vol. 17, pp. 2363, 2002.

“Low Thermal Conductivity Rare-Earth Zirconates for Possible Thermal-Barrier Coatings Application,” (with J. Wu, X. Wei, P.G. Klemens, M. Gell, E. Garcia, P. Miranzo and M.I. Osendi), *Journal of the American Ceramic Society*, Vol. 85, pp. 3031, 2002.

“Thermal Conductivity of Ceramics in the ZrO_2 - $GdO_{1.5}$ System,” (with J. Wu, P.G. Klemens, M. Gell, E. Garcia, P. Miranzo and M.I. Osendi), *Journal of Materials Research*, Vol. 17, pp. 3193, 2002.

“Failure Modes in Plasma-Sprayed Thermal Barrier Coatings,” (with K.W. Schlichting, E.H. Jordan and M. Gell), *Materials Science and Engineering A*, Vol. 342, pp. 120, 2003.

“Formation of a ‘Self-Assembled’ $Cu/\gamma-Al_2O_3$ Nanocomposite,” (with T. Bhatia and M. Aindow), *Philosophical Magazine Letters*, Vol. 83, pp. 135, 2003.

“Improved Interfacial Mechanical Properties of Al_2O_3 -13wt% TiO_2 Plasma-Sprayed Coatings Derived from Nanocrystalline Powders,” (with P. Bansal and A.L. Vasiliev), *Acta Materialia*, Vol. 51, pp. 2959, 2003.

“Graded Ceramics for Improved Contact-Damage Resistance,” *Materials Science Forum*, Vol. 423-425, pp. 125, 2003.

Leon L. Shaw

“Microstructure Development of Al_2O_3 -13wt.% TiO_2 Plasma Sprayed Coatings Derived from Nanocrystalline Powders,” (with D. Goberman, M. Gell, Y. Sohn and E.H. Jordan), *Acta Materialia*, Vol. 50, pp. 1141, 2002.

“Plasma Spray Forming of Nanostructured Composite Coatings,” (with E.H. Jordan, X.L. Jiang and L.L. Shaw), *Journal of Materials & Technology*, Vol. 18, pp. 287-288, 2002.

“Distortion Minimization of Laser Processed Components Through Control of Laser Scanning Patterns,” (with K. Dai), *Rapid Prototyping Journal*, Vol. 8, pp. 270, 2002.

“Synthesis and Processing of Nanostructured WC-Co Materials,” (with Z.G. Ban), *Journal of Materials Science*, Vol. 37, pp. 3397, 2002.

“Synthesis of Nanostructured Silicon Carbide Through Integrated Mechanical and Thermal Activation Process,” (with R.M. Ren and Z.G. Yang), *Journal of the American Ceramic Society*, Vol. 85, pp. 819, 2002.

“Thermal Stability of Nanostructured $Al_3Fe_3Cr_2Ti_2$ Alloys Prepared via Mechanical Alloying,” (with J. Villegas, H. Luo and D. Miracle), *Acta Materialia*, Vol. 51, pp. 2647, 2003.

“Effects of Process Control Agents on Mechanical Alloying of Nanostructured Aluminum Alloys,” (with M. Zawrah, J. Villegas, H. Luo and D. Miracle), *Metallurgical and Materials Transactions*, Vol. 34A, pp. 159, 2003.

“Indentation Fracture Behavior of Plasma Sprayed Nanostructured Alumina–13wt.% Titania Coatings,” (with H. Luo, D. Goberman and M. Gell), *Materials Science and Engineering A*, Vol. 346, pp. 237, 2003.

“Characterization of Thermally Sprayed Nanostructured WC-Co Coatings Derived from Nanocrystalline WC-18wt% Co Powders,” (with Z.G. Ban), *Journal of Thermal Spray Technology*, Vol. 12, pp. 112, 2003.

Mei Wei

“Synthesis and Characterisation of Hydroxyapatite, Fluoride-Substituted Hydroxyapatite and Fluorapatite,” (with T. Bostrom, L. Grøndahl and J.H. Evans), *Journal of Materials Science: Materials in Medicine*, Vol. 14, pp. 311, 2003.

Metallurgy & Materials Engineering Department
Books, Book Chapters, Book Sections & Edited Volumes
2002-2003

Martin J. Blackburn

“High-Temperature Structural Applications,” (with H.A. Lipsitt and D.M. Dimiduk), Chapter 23 in *Intermetallic Compounds: Principles and Practice*, Vol. 3, (J.H. Westbrook and R.L. Fleischer, eds.), John Wiley, New York, 2002.

Leon L. Shaw

“Nano-Structured Materials Through Mechanical-Activation-Based Processes,” in *Recent Research Development in Materials Science*, Vol. 3, (S.G. Pandalai, ed.), Research Signpost, Kerala, India, 2002.

METALLURGY & MATERIALS ENGINEERING DEPARTMENT
CONFERENCE PROCEEDINGS AND OTHER PUBLICATIONS
2002-2003

Mark Aindow

“Phase Formation in Ti (Ta)-Ni and Co-Ti Films Deposited on (001)Si in N₂ Atmospheres,” (with A.L. Vasiliev, A.G. Vasiliev, I.A. Horin A.A. Orlikovsky), *Materials Research Society Symposia Proceedings*, Vol. 745, pp. N4.10-1, 2003.

“Crystallization of Aluminum in Powder-Processed Al-Rare Earth- Transition Metal Alloys,” (with A.L. Vasiliev, M.J. Blackburn and T.J. Watson), *Institute of Physics Conference Service*, Vol. 754, pp. CC-11-1, 2003.

“Synthesis of Metal-Doped Cryptomelane Nanomaterials Using Cross-Linking Reagents,” (with J. Liu, J. Cai, X. Shen and S.L. Suib), *Materials Research Society Symposia Proceedings*, Vol. 755, pp. DD-6.24-1, 2003.

S. Pamir Alpay

“Thermodynamic Analysis of the Hysteresis Offset in Polarization Graded Ferroelectric Materials,” (with Z.G. Ban and J.V. Mantese), *Materials Research Society Symposia Proceedings*, Vol. 748, pp. U3.10-1, 2003.

“Tuning the Tunability in Epitaxial Barium Strontium Titanate Film via Internal Stresses,” (with Z.G. Ban), *Materials Research Society Symposia Proceedings*, Vol. 748, pp. U16.3-1, 2003.

“Hysteresis Offset in Stress Induced Polarization-Graded Ferroelectrics,” (with J.V. Mantese, N.W. Schubring, A.L. Micheli, M.P. Thompson, R. Naik, G.W. Auner, I.B. Misirlioglu and Z.G. Ban), *Materials Research Society Symposia Proceedings*, Vol. 748, pp. U12.20-1.

Martin J. Blackburn

“Crystallization of Aluminum in Powder-Processed Al-Rare Earth-Transition Metal Alloys,” (with A.L. Vasiliev, M. Aindow and T.J. Watson), *Institute of Physics Conference Service*, Vol. 754, pp. CC-11-1, 2003.

Harold D. Brody

“Simulation of Phase Appearance, Phase Dissolution, and Solute Redistribution in Multicomponent Aluminum Casting Alloys,” (with M. Qian, J.E. Morral and D. Zhang), *Advances in Aluminum Casting Technology II*, pp. 31, 2002.

“An Integrated Heat Treatment Model for Aluminum Castings,” (with R.D. Sisson, Y.K. Rong and J.E. Morral), *MPMD Fourth Global Innovations Symposium*, pp. 1, 2003.

Harris L. Marcus

“Studies on Slurry Extrusion for Dental Restoration,” (with J.W. Wang, X.X. Li, L.L. Shaw, T.B. Cameron and C. Kennedy), *Proceedings of the 13th Annual SFF Symposium*, pp. 83, 2002.

“Gas Phase Solid Freeform Fabrication,” (with J. Crocker, E. Geiss, H. Wei and L.L. Shaw), *Rapid Prototyping of Materials*, pp. 19, 2002.

“Dental Restoration through Laser Densification of Dental Porcelain Powder,” (with X.X. Li, J.W. Wang, L.L. Shaw, T. B. Cameron and C. Kennedy), *Rapid Prototyping of Materials*, pp. 107, 2002.

John E. Morral

“Simulation of Phase Appearance, Phase Dissolution, and Solute Redistribution in Multicomponent Aluminum Casting Alloys,” (with M. Qian, H.D. Brody and D. Zhang), *Advances in Aluminum Casting Technology II*, pp. 31, 2002.

“An Integrated Heat Treatment Model for Aluminum Castings,” (with R.D. Sisson, Y.K. Rong and H.D. Brody), *MPMD Fourth Global Innovations Symposium*, pp. 1, 2003.

Leon L. Shaw

“Finite Element Modeling for Laser-Assisted Dental Restoration Process,” (with K. Dai), *Proceedings of the 2003 NSF Design, Service and Manufacturing Grantees and Research Conference*, pp. 2292, 2003.

“Preheating Effects on Multiple Materials Laser Densification,” (with K. Dai), *Proceedings of the 13th Annual SFF Symposium*, pp. 392, 2002.

“Studies on Slurry Extrusion for Dental Restoration,” (with J.W. Wang, X.X. Li, H.L. Marcus, T.B. Cameron and C. Kennedy), *Proceedings of the 13th Annual SFF Symposium*, pp. 83, 2002.

“Dental Restoration through Laser Densification of Dental Porcelain Powder,” (with X.X. Li, J.W. Wang, H.L. Marcus, T.B. Cameron and C. Kennedy), *Rapid Prototyping of Materials*, pp. 107, 2002.

Finite Element Analysis of Distortion Minimization in Layer-by-Layer Laser-Processed Components,” (with K. Dai), *Rapid Prototyping of Materials*, pp. 29, 2002.

“Gas Phase Solid Freeform Fabrication,” (with J. Crocker, E. Geiss, H. Wei and H.L. Marcus), *Rapid Prototyping of Materials*, pp. 19, 2002.

Mei Wei

“Bonelike Apatite Formation on Calcium-Containing Silica and Titania Gels in Simulated Body Fluid,” (with T. Kokubo), *Bioceramics*, Vol. 15, pp. 37, 2002.

“Low Melting Temperature Machinable Glass Ceramics,” (with Y. Zhang, X. Sun, L. Zhou and K. Wang), *Bioceramics*, Vol. 15, pp. 241, 2002.

“Cell Attachment and Proliferation on Hydroxyapatite and Ion Substituted Hydroxyapatite,” (with D. Vellinga, D. Leavesley, J. Evans and Z. Upton), *Bioceramics*, Vol. 15, pp. 671, 2002.

Metallurgy & Materials Engineering Department
Active Research Grants & Contracts
2002-2003

Mark Aindow

“Interfacial Structure and Processes in Lamellar TiAl-Based Alloys,” National Science Foundation, 07/01/00-06/30/04, \$431,815.

“Acquisition of an Automated Digital Transmission Electron Microscope,” (with R. Joesten, N.P. Padture, D.M. Pease and S. Suib), National Science Foundation, 08/01/00-06/30/03, \$620,000 (equipment grant).

“Accelerated Insertion of Materials: Rotor Components,” (with M. Blackburn), DARPA, (sub-contract from Pratt & Whitney), 03/01/01-12/03/02, \$341,000.

“Structural Amorphous Metals,” (with M. Blackburn), DARPA, (sub-contract from Boeing), 06/01/01-05/31/04, \$557,198.

“NER: Nanochannel FETs and Quantum Dot Based Nonvolatile Memory Cells using Site-Specific and Layer-by-Layer Self-Assembly Techniques,” (with F.C. Jain, J. Ayers and F. Papadimitrakopoulos), National Science Foundation, 06/01/02-05/31/03, \$100,000.

“Applications of Biomechanically Compatible Pseudoelastic Beta Titanium Alloys in Orthopedic Devices,” (with M. Blackburn and S.P. Alpay), Connecticut Innovations/Memry, 06/01/02-05/31/03, \$200,000.

S. Pamir Alpay

“Applications of Biomechanically Compatible Pseudoelastic Beta Titanium Alloys in Orthopedic Devices,” (with M. Blackburn and M. Aindow), Connecticut Innovations/Memry, 06/01/02-05/31/03, \$200,000.

“Ferroelectric Multilayers, Superlattices, and Compositionally Graded Films,” National Science Foundation Early CAREER Award, 12/15/01-11/30/06, \$517,164.

Martin J. Blackburn

“Accelerated Insertion of Materials: Rotor Components,” (with M. Aindow), DARPA, (sub-contract from Pratt & Whitney), 03/01/01-12/03/02, \$341,000.

“Structural Amorphous Metals,” (with M. Aindow), DARPA, (sub-contract from Boeing), 06/01/01-05/31/04, \$557,198.

“Applications of Biomechanically Compatible Pseudoelastic Beta Titanium Alloys in Orthopedic Devices,” (with M. Aindow and S.P. Alpay), Connecticut Innovations/Memry, 06/01/02-05/31/03, \$200,000.

Harold D. Brody

“Solution Heat Treatment of Aluminum Alloys: Effect on Microstructure and Service Properties,” (with J.E. Morral), Center for Heat Treating Excellence, 01/01/00-06/30/03, \$325,107.

“An Energy Saving Model for the Heat Treatment of Castings,” (with J.E. Morral, Y. Rong and R. Sisson at WPI), U.S. Department of Energy, 09/01/02-08/31/06, \$742,647.

“Microradiography Observation and Analysis of Dendritic Solidification in Alloys,” MIT, 01/01/03-12/31/03; \$10,000.

Maurice Gell

“Advanced Thermal Barrier Coatings For Industrial Gas Turbine Engines,” (with N.P. Padture), U.S. Department of Energy, 02/01/00-01/31/03, \$335,000.

“Advanced Thermal Barrier Coatings For Combustors,” (with E.H. Jordan and N.P. Padture) Solar Turbines, 09/01/00-08/31/03, \$216,000.

“Thermal Barrier Coatings And Metallic Coatings With Improved Durability,” (with E.H. Jordan), U.S. Department of Energy, 02/01/01-01/31/03, \$300,000.

“Measurement of Three Critical Parameter as a Basis for a Simple Life Prediction Model,” (with E.H. Jordan), U.S. Department of Energy/South Carolina Institute for Energy Studies, 02/01/02-01/31/05, \$480,000.

“Superior Thermal Barrier Coatings Using a Novel Solution Spray Process,” (with E.H. Jordan, N.P. Padture and B.M. Cetegen), 01/01/02-12/31/04, Office of Naval Research, \$900,000.

Harris L. Marcus

“Solid Freeform Fabrication of Photonic Crystals,” (with F. Papadimitakopoulos), Office of Naval Research, 03/01/00-08/31/03, \$525,000.

“Research Center for Advanced Deployable Nano-Sensors,” (with F. Papadimitakopoulos, J. Rusling and K. Noll), ARO, 10/01/02-09/30/03, \$865,000.

John E. Morral

“Computational Modeling of Interdiffusion Microstructures,” (with Y. Wang, OSU), National Science Foundation, 05/01/02-04/30/05, \$279,000.

“A Multicomponent Subsurface Diffusion Routine,” U.S. Army Research Lab, 05/15/03-04/30/05, \$90,000.

“An Energy Saving Model for the Heat Treatment of Castings,” (with H.D. Brody, and Y. Rong and R. Sisson at WPI), Department of Energy, 09/1/02-08/31/06, \$742,647.

“Solution Heat Treatment of Aluminum Alloys: Effect on Microstructure and Service Properties,” (with H.D. Brody), Center for Heat Treating Excellence, 01/01/00-06/30/03, \$325,107.

Nitin P. Padture

“Fundamental Studies of Novel Contact-Damage Resistant Ceramics,” (with S. Suresh at MIT), Air Force Office of Scientific Research, 12/15/99-05/31/03, \$600,000.

“Advanced Thermal Barrier Coatings For Industrial Gas Turbine Engines,” (with M. Gell), Department of Energy, 02/01/00-01/31/03, \$335,000.

“Advanced Thermal Barrier Coatings For Combustors,” (with M. Gell and E.H. Jordan), Solar Turbines, 09/01/00-08/31/03, \$216,000.

“Superior Thermal Barrier Coatings Using a Novel Solution Spray Process,” (with M. Gell, E.H. Jordan and B.M. Cetegen), Office of Naval Research, 01/01/02-12/31/04, \$900,000.

“Acquisition of an Automated Digital Transmission Electron Microscope,” (with M. Aindow, R. Joesten, D.M. Pease and S. Suib), National Science Foundation, 08/01/00-06/30/03, \$620,000 (equipment grant).

“Processing and Mechanical Properties of Nanostructured Ceramics,” MIT (prime grant from Office of Naval Research), 11/01/02-10/31/03, \$40,000.

Leon L. Shaw

“A Novel Surface Nanocrystallization and Hardening (SNH) Process for Improved Fatigue and Wear Resistance,” National Science Foundation, \$388,000, 09/01/02–08/31/05.

“Multi-Material Laser Densification for Dental Restorations,” National Science Foundation, \$360,000, 09/01/02–8/31/03.

“A New Generation of High-Temperature Aluminum-Based Nanocomposites with Enabling Structural Efficiency,” (with D. Miracle), Air Force Research Laboratory Director Fund, \$75,000, 09/01/01–08/31/02, Sabbatical Support.

Mei Wei

“Novel Partially Fluoride Substituted Hydroxyapatite Composite for Orthopedic Applications,” University of Connecticut Research Foundation, \$19,953, 01/01/03-12/31/03.

**Metallurgy & Materials Engineering Department
Awards, Honors, Patents
2002-2003**

Mark Aindow

Outstanding Junior Faculty Award, School of Engineering, University of Connecticut, 2003.

Harris L. Marcus

“Artificial Bone Implants,” (with J. Barlow, G. Lee, R.H. Crawford, J.J. Beaman and R.J. Lagow),
U.S. Patent Number 6,540,784, April 1, 2003.

John E. Morral

Elected Member of the Connecticut Academy of Science and Technology.

Nitin P. Padture

“Functionally-Graded Materials,” (with S. Suresh, A.E. Giannakopoulos and J. Jitcharoen),
European Patent Number 0968153, 2002.

Metallurgy & Materials Engineering Department
Major Professional Activities
2002-2003

Mark Aindow

“Structure of Interfaces in Zeron 100 Duplex Stainless Steel,” *invited talk*, Structure and Composition of Interfaces, Irsee, Germany, August 2002.

S. Pamir Alpay

Panel Member, NSF Early CAREER Awards, National Science Foundation, October 2002, Arlington, VA.

Presentations

“Microstructure and Properties of Epitaxial Ferroelectric Films,” *invited seminar*, Department of Physics, University of Connecticut, Storrs, CT, November 2002.

“Twinning in Ferroelectric Materials,” *invited seminar*, Department of Materials Science and Engineering, University of Pittsburgh, Pittsburgh, PA, October 2002.

Harold D. Brody

Member: TMS Solidification Committee, TMS Process Model Committee.

Presentations

“Real Time Observation of Dendritic Solidification in Sn-Bi Alloys,” *invited*, Gordon Research Conference, Physical Metallurgy, Plymouth, NH, July 2002.

“Simulation of Phase Appearance, Phase Dissolution and Solute Redistribution in Multi-component Aluminum Casting Alloys,” *invited*, 2nd International Conference on Aluminum, Metallurgy, Columbus, OH, October 2002.

“Solution Treatment of Aluminum Alloys,” *invited*, CHTE Membership Meeting, Worcester, MA, November 2002.

“Solution Treatment of Aluminum Alloys,” *invited*, CHTE Membership Meeting, Worcester, MA, May 2003.

Maurice Gell

Organizer, Materials Workshop, High Efficiency Engines and Turbines, Storrs, CT, October 2002.

Presentations

“Highly Durable Thermal Barrier Coatings Made by the Solution Precursor Plasma Spray Process,” *invited*, International Conference on Metallurgical Coatings and Thin Films, San Diego, April 2003.

“Nanostructured Functional Materials,” *plenary lecture*, Connecticut Nanotechnology Initiative Meeting, Cromwell, May 2003.

Harris L. Marcus

Co-Organizer, 2002 Solid Freeform Fabrication Symposium, University of Texas, Austin, TX, August 2002.

Meetings Organizer, *Ad Hoc* Committee for State Nanotechnology Initiative, April 2003.

John E. Morral

Deputy Editor, *Journal of Phase Equilibria*.

Session Organizer and Chair, CALPHAD XXXII Meeting, Montreal Canada, May 2003.

Member, ASM International Thermodynamics and Phase Equilibria Committee, Atomic Transport Committee, Alloy Phase Diagram Committee, Heat Treating Society R&D Committee.

Member: National University Materials Council.

Presentations

“Diffusion Paths Near boundaries, Free Surfaces and Interfaces,” *invited*, Gordon Research Conference, Physical Metallurgy, Holderness School, Plymouth, New Hampshire, July 2002.

“Solution Heat Treatment of Aluminum Alloys,” *invited*, CHTE Membership Meeting, Worcester, MA, November 2002.

“Multi Component Diffusion,” *invited*, Army Research Laboratory, Aberdeen, MD, January 2003.

“Diffusion Path Principles Applied to Electronic Materials,” *invited*, Technical University of Eindhoven, Eindhoven, The Netherlands, February 2003.

“Predicting Interdiffusion in Electronic Materials,” *invited*, TMS Annual Meeting & Exhibition, San Diego, CA, March 2003.

“Modeling Diffusion in Electronic Materials,” (with Hongwei Yang), *invited seminar*, Department of Materials Science and Engineering, Ohio State University, Columbus, OH, March 2003.

“PROFILER and Inverse Methods of Diffusivity Measurements and the Butterfly Effect,” *invited*, National Institute of Standards and Technology, Gaithersburg, MD, March 2003.

“A New Model for Internal Oxidation,” *invited seminar*, Department of Materials Science and Engineering, Lehigh University, Bethlehem, PA, April 2003.

Nitin P. Padture

Principal Editor, *Journal of Materials Research*.

Associate Editor, *Journal of the American Ceramic Society*.

Session Chair, FGM 2002, Beijing, China, October 2002.

Member: Executive Committee, Basic Science Division, the American Ceramic Society.

Presentations

“Towards Durable Thermal Barrier Coatings with Novel Microstructures Deposited Using Solution-Precursor Plasma Spray,” *invited*, Office of Naval Research Review Meeting, Woods Hole, MA, May 2002.

“Novel Concepts in Contact-Damage- and Wear-Resistant Ceramics,” *invited*, Air Force Office of Scientific Research Annual Review Meeting, Bar Harbor, ME, August 2002.

“Graded Ceramics,” *invited*, FGM 2002, Beijing, China, October 2002.

“Next Generation Ceramic Thermal Barrier Coatings,” *invited seminar*, Kyoto Institute of Technology, Kyoto, Japan, October 2002.

“Novel Concepts in Ceramic Thermal Barrier Coatings,” *invited seminar*, National Institute of Advanced Industrial Science and Technology, Synergy Ceramics, Nagoya, Japan, October 2002.

“Novel Concepts in Contact-Damage Resistant Ceramics,” *invited seminar*, National Institute for Materials Science, Tsukuba, Japan, October 2002.

“Next Generation Ceramic Thermal Barrier Coatings,” *invited seminar*, Instituto de Ceramica y Vidrio, Madrid, Spain, March 2003.

“Next Generation Ceramic Thermal Barrier Coatings,” *invited seminar*, Universidad de Sevilla, Seville, Spain, March 2003.

“Next Generation Ceramic Thermal Barrier Coatings,” *invited seminar*, Universidad de Extremadura, Badajoz, Spain, March 2003.

Leon L. Shaw

Organizer, Symposium on “Processing and Properties of Structural Nanomaterials,” TMS Fall Meeting, Chicago, IL, November 2003.

Member: Committee of Basic Science Division of the American Ceramic Society, TMS/ASM International Composite Materials Committee, TMS Powder Metallurgy Committee, NSF SBIR Proposal Review Panel (October 2002), NSF Proposal Review Panel, Engineering Directorate, January 2003.

Presentations

“Gas Phase Solid Freeform Fabrication,” *keynote lecture*, Symposium on Rapid Prototyping of Materials, TMS Fall Meeting, Columbus, OH, October 2002.

“Slurry Extrusion and Laser Densification in Rapid Prototyping for Dental Restoration,” *invited talk*, Symposium on Powder Materials: Current Research and Industrial Practices, TMS Fall Meeting, Chicago, IL, November 2003.

“Surface Roughness Evolution in the Surface Nanocrystallization and Hardening (SNH) Process,” *invited talk*, Twelfth International Symposium on Processing and Fabrication of Advanced Materials: XII, ASM Materials Solutions Conference, Pittsburgh, PA, October 2003.

“Investigation of a Nanostructured Al-Fe-Cr-Ti Alloy for High Temperature Structural Applications,” *invited talk*, Eastern New York ASM and Hudson-Mohawk TMS Spring Symposium: Frontiers in Materials Development: Computation, Nanomaterials, and Alternative Energy, Schenectady, NY, May 2003.

“Processing and Properties of Nanostructured $Al_{93}Fe_3Cr_2Ti_2$ for High Temperature Structural Applications,” *invited seminar*, Worcester Polytechnic Institute, February 2003.

Mei Wei

Member, Organizing Committee, Annual International Bioceramics Conference: Bioceramics 15, Sydney, Australia, December 2002.

Session Chair, Annual International Bioceramics Conference: Bioceramics 15, Sydney, Australia, December 2002.

TAYLOR L. BOOTH ENGINEERING CENTER FOR ADVANCED TECHNOLOGY
ANNUAL REPORT SUMMARY
2002-2003

In June 2002, the Advanced Technology Institute (ATI, and formerly the Precision Manufacturing Institute) was merged with the Taylor L. Booth Center for Computer Applications and Research (BRC) to form the Booth Engineering Center for Advanced Technology, or BECAT. The mission of BECAT is to provide the University with a physical and intellectual environment to foster advanced, interdisciplinary, and visionary research, applications, and outreach. In particular, recognizing the rapid technology change within engineering, the increasing interdisciplinary nature of engineering, and the complex technological infrastructure required to support engineering research, it is the mission of BECAT:

- To facilitate research in engineering and relevant associated disciplines, and to foster excellence in these research activities;
- To be a catalyst for interdisciplinary research across engineering departments and associated disciplines;
- To develop and foster a collaborative research atmosphere and a culture of excellence in which research scientists from the sectors of industry, academia, and national laboratories interact to provide visionary and cross-fertilization of ideas and approaches;
- To acquire and maintain equipment and infrastructure necessary to pursue excellence in research;
- To provide an administrative environment for grant preparation, submission, and management for faculty engaged in Center activities; and
- To adopt and foster a proactive outreach and technology transfer policy.

The Director and Associate Director of BECAT report to the Dean of Engineering. The support staff, responsible for providing the services necessary to carry out the mission of BECAT, includes software and hardware specialists and administrative support personnel. The research staff, on the other hand, is composed of faculty, visiting researchers, graduate assistants and undergraduate students. In August 2002, Dr. Peter Luh, BRC Director and professor of Electrical & Computer Engineering, completed his one-year sabbatical leave and assumed his position as BECAT Director. At the same time, Interim BRC Director, Dr. Eugene Santos, Jr. of Computer Science & Engineering assumed his Associate Director position. Many thanks are extended to Dr. Santos and also to Dr. Ian Greenshields for their leadership and direction during Dr. Luh's leave.

BECAT has been actively supporting research, applications, and outreach through cost-sharing, technical support, and investments in new research areas (startup packages, laboratory enhancements, etc.). Highlights of BECAT activities for the 2002-2003 academic year include: aggressive pursuit and support of group and center-wide proposals; success in gaining strong funding for research activities, with 88 externally funded grants and contracts totaling about \$9.9 million; continued development of our GRID/Cluster-based computing facility for advanced scientific computing; enhancement of the operations of our Depot campus facilities; increased faculty involvement as leaders in professional organizations; and — as we complete the merger between BRC and ATI — a commitment to enhancing facilities and services to our affiliated researchers.

FACILITIES AND SERVICES

BECAT Research Laboratories

BECAT consists of 25 laboratories located either within various departments or at the main BECAT complex of about 17,000 sq. ft. renovated area of Level A of the Homer Babbidge Library. These laboratories are organized in the following major thrusts: Software Engineering and Artificial Intelligence; Distributed Computation and Information Systems; Manufacturing Systems; System Optimization in Centralized or Distributed Environments; Signal, Data, and Image Processing; Optical Computing; Biomedical Computing; Civil Engineering Computing; Psychology Computing; Thermo-Mechanical Processing and Manufacturing; Heat Transfer; Precision Design, Manufacturing, and Grinding; and Optoelectronics. The completion of the new Information Technology Engineering Building (ITEB), which houses the departments of Electrical & Computer Engineering and Computer Science & Engineering, offered the opportunity for some labs to relocate. While some labs moved from the Homer Babbidge Library (HBL) facility to ITEB, other labs moved to HBL. The tunnel that will connect BECAT to ITEB is in its final phase and is expected to open shortly. This access will enhance the interaction between BECAT and the faculty and graduate students from both CSE and ECE.

Depot Campus Locations

As a result of the merger of BRC and ATI, BECAT now oversees two off-campus facilities. The Longley Building consists of lab areas and graduate, faculty, and administrative offices. It houses research on precision design, manufacturing, and grinding. In addition, there are two companies that lease Longley space: Inframat/U.S. Nanocorp, which develops nano-structured ceramic coatings; and OSCI, Inc., which designs Optoelectronic Systems. Also located in Longley is a JEOL 840A Scanning Electron Microscope, currently being moved and calibrated in a newly renovated space. The second Depot Campus facility is located in the Merritt Building and houses a state-of-the-art clean room for optoelectronics research and offices for graduate students and staff.

Grid Computing Research

This year, we continued to develop our grid computing facility for large-scale scientific computation. Grid computing is an abstraction by which clusters of loosely coupled computers in a distributed system can be treated as a single virtual machine. This computing infrastructure provides a platform for ubiquitous execution of computation intensive applications. Grids allow researchers, across a wide range of academic fields, to acquire on-demand supercomputing power that can be used to explore a variety of compute intensive problems, and is expected to eliminate both distance and time barriers by providing a framework for supercomputing over the Internet. Currently, the BECAT Cluster/GRID is up and running and consists of 32 nodes (mostly Pentium-III 550 Mhz CPUs, 384 MB RAM) running RedHat Linux with a total storage (of more than) 256 T Byte, and these nodes are interconnected through 100MB fast-Ethernet switches and other networking/infrastructure devices (e.g. KVM switches). The BECAT Cluster supports: Grid middleware (Globus from Argonne National Laboratory), Cluster Scheduling and Resource Management systems (Condor from the University of Wisconsin, OpenPBS from NASA, OpenMosix from the Hebrew University of Jerusalem), and Parallel programming libraries (MPI, PVM). In addition, the BECAT technical staff provides technical assistance, training, and workshops on parallel and distributed computing to the School of Engineering. Our goal is to offer a new perspective on how faculty and students can succeed in using the Grid/Cluster environment to solve their challenging research problems. Moreover, we are investigating the possibility of interfacing the BECAT Grid/cluster with the National Super Computing Grid through the National Center for Supercomputing Applications (NCSA) to provide BECAT researchers with a terminals access to supercomputer-grade power.

Service and Support

The BECAT technical staff not only provides general computer support to the BECAT community but also specializes in a selected set of operating systems and hardware platforms. We work closely with the Engineering Computing Services and offer the following technical service and support to BECAT members inside and outside the School of Engineering:

- General PC support, including computer installation, upgrades, and troubleshooting;
- Assistance in setting up and maintaining UNIX/Linux systems, covering selected operating systems including Solaris, HPUX and Linux with different flavors (RedHat, Debian, SuSE, Mandrake, etc.) and different hardware platforms including Intel, Sparc, and RISC;
- Setting up a local lightweight network intrusion detection system, regularly scanning the BECAT network, and offering recommendations on securing Windows/UNIX/Linux systems;
- Installation and maintenance of major research applications on Unix/Windows servers, including Cadence, Ansoft Maxwell, Silvaco, Matlab, Flexsim, and ArcInfo;
- Installation and maintenance of the ftp submission systems for IEEE Transactions on Robotics and Automation and the newly created IEEE Transactions on Automation Science and Engineering;
- Providing advice to BECAT members on computer hardware/software selection, including equipment for new clusters;
- Managing IP addresses for servers, workstations, PCs, and network printers moving into and out of the BECAT HBL area; and
- Installation and maintenance of a new BECAT web server with advanced functionalities.

STAFFING UPDATE

In addition to Director Peter Luh, the BECAT organizational structure consists of an Associate Director, Dr. Eugene Santos, Jr.; Administrative Coordinator, Ms. Sandi Lizee; Administrative Services Specialist, Ms. B. J. McLaughlin; Secretary, Ms. Elizabeth Moore; Technical Support Peng Li, Mohamed Kerasha, and Shikui Yan; and undergraduate student support. Fifty-eight faculty members are affiliated with BECAT and several had Research Specialists working with them this year, including Edward Zeigler working with Michael Accorsi of Civil & Environmental Engineering; Jae-Guan Nam, Ravi Nori, Vicky Hsin-Wei Wang and Jeffrey Maddox working with Dong-Guk Shin of CSE; Nan Guang Chen working with Quing Zhu of ECE; Weidong Feng working with Peter Luh of ECE; Shahid Farooqi working with Robin Cote of Physics; Mark Majewski working with Lee Langston of Mechanical Engineering; and Alexander Gusev working with Harvey Swadlow of Psychology.

CONNECTICUT GLOBAL FUEL CELL CENTER
ANNUAL REPORT SUMMARY
2002-2003

The Connecticut Global Fuel Cell Center (CGFCC) is a newly established, dynamic partnership between the state of Connecticut, Connecticut industry and the University of Connecticut. The goal of the CGFCC is to be the *leading world-class institution* in fuel cell research, design, education and training, and product development. The CGFCC will provide a source of technical strength that is capable of addressing the multitude of issues across the total product platform and will not focus on just one fuel cell technology or market.

PERSONNEL

As mentioned, the CGFCC was formed by a unique collaboration between the University, Connecticut Innovations and Connecticut industry. This collaboration led to the establishment of six *new* endowed chair professorial positions within the School of Engineering – a unique feature that will ensure that the Center promotes broadly diverse technical strengths that will facilitate unique advancements of fuel cell technology. The chair faculty members, to be recruited from outside the University of Connecticut, will augment an existing technical base at the University.

The following individuals are the first two endowed professors:

Professor Nigel Sammes, *United Technologies Chair Professor in Fuel Cell Technology* and *Director of Operations* for the Connecticut Global Fuel Cell Center. Dr. Sammes has an outstanding record of scholarly accomplishment including authorship of several hundred book chapters, books, peer reviewed papers, journal articles, published conference papers, patents and abstracts. He earned his Ph.D. in 1987 from Imperial College, London in a fuel cell related area.

Dr. Sammes was previously Director of Fuel Cell Development at Acumentrics Corporation, Westwood, MA. Prior to that, he was Professor of Materials and Process Engineering at the University of Waikato, New Zealand. During his tenure at Waikato, he was named the Fletcher Challenge Chair Professor of Fuel Cell Development. He collaborated on joint ventures with industrial partners to develop novel fuel cell technology, forming a renowned center for excellence in fuel cell technology.

Professor Ken Reifsnider, *Pratt & Whitney Chair Professor in Design & Reliability*. Prior to his appointment at the University of Connecticut in August 2002, Dr. Reifsnider was the Alexander Giacco Professor of Engineering Science & Mechanics at Virginia Tech University. He is co-founder of the Virginia Tech Center for Composite Materials and Structures, past Director of the Virginia Institute for Material Systems, creator of the VPI Navy Integrated Information Technology Initiative, and Deputy Director of the NSF Center for High Performance Polymeric Adhesives and Composites. In conjunction with these activities, he and others have supported more than 200 M.S. and Ph.D. students with total research funding in excess of \$35 million. He has published more than 170 articles in refereed journals, authored several book chapters and edited eight books. Dr. Reifsnider recently completed his signature work, *Damage, Tolerance and Durability of Composite Materials Systems* published by Wiley in 2002. Dr. Reifsnider is the current Editor-in-Chief of the *International Journal of Fatigue*, and Associate Editor of the *Journal of Applied Composites*. He is also the founding Editor-in-Chief of the *Journal of Composites Technology and Research*. Dr. Reifsnider received his Ph.D. in 1968 from The Johns Hopkins University in metallurgy and solid mechanics.

In addition to the endowed professors, the Center has core staff members consisting of:

Ms. Tricia Bergman, Associate Director, B.S. Mechanical Engineering, M.S. IA, Purdue University
Dr. Ray England, Technical Program Manager and Assistant Research Professor, Ph.D., University of Rhode Island
Mr. Yanhai Du, M.Sc., Post Doctoral Fellow, Ph.D., University of Waikato, New Zealand
Dr. Xinyu Huang, Assistant Research Professor, Ph.D., Virginia Tech
Mr. Peter Menard, Technician
Ms. Nancy Crouch, Program Assistant, BA Communications, University of Wisconsin, Madison

The Center staff members handle the operational activities, including, but not limited to: facility and technical support, financial management, marketing and ongoing proposal support needs.

FACILITIES

The Connecticut Global Fuel Cell Center is supported by a dedicated, state-of-the art, 16,000 square foot facility that serves as the focal point for multidisciplinary fuel cell research. The building is located on the Mansfield Depot Campus. The research portion of the building consists of eight labs. Of these, four labs are approximately 1,000 sq. ft. high bay areas, and four labs are 900 sq. ft. each wet chemistry labs. The labs are allocated for specific activities or areas of research and are currently being outfitted with equipment.

CURRENT FUEL CELL PROGRAMS

An initial \$2 million federal earmark from the Department of Defense for development of a portable fuel cell system was received in mid 2002. This one-year, multidisciplinary program involves 14 leading faculty members from the School of Engineering and Physical Sciences along with over 25 top students. The students include undergraduates as well as graduate students.

A subsequent second congressional earmark totaling over \$3 million from the Department of Defense was awarded in the fall of 2002 for the advancement of miniature and micro fuel cell technologies and systems. This program involves 38 faculty members from the School of Engineering, three from the Department of Chemistry and one from Biology and Life Sciences. In addition, the program employs over 75 students ranging from undergraduates to graduate students.

A \$1 million award was received in the spring of 2003 for the development of a testing laboratory. This testing laboratory will provide a service, both internally and externally, to test component and system level performance of early stage fuel cell products. This performance testing will provide objective feedback that results from defined testing procedures.

The preceding programs are in addition to a number of smaller ongoing research programs and senior design projects. In addition, there are a number of large (multi-million dollar) federal grant applications that have been submitted and are in the review stage.

EDUCATION

In addition to the research activities the fuel cell center is actively involved in developing fuel cell courses to be offered in the undergraduate and graduate curriculum. During the fall of 2002, a fuel cell course was offered through the Mechanical Engineering department with over 50 students enrolled. Two subsequent fuel cell courses were offered in the spring semester through the departments of Mechanical and Chemical Engineering.

**CONNECTICUT TRANSPORTATION INSTITUTE
ANNUAL REPORT SUMMARY
2002-2003**

The Connecticut Transportation Institute is the focal point for the University of Connecticut activities in the transportation sector. The Institute, administered through the Office of the Dean of Engineering, is responsible for the following major program areas:

- The Connecticut Cooperative Highway Research Program
- The New England Transportation Consortium
- The Connecticut Advanced Pavement Laboratory
- The Transportation Technology Transfer Center, and
- The Transportation Research Program

During fiscal year 2003, the Institute administered the following grant-funded programs totaling \$1,723,976.

THE CONNECTICUT COOPERATIVE HIGHWAY RESEARCH PROGRAM (\$301,184):

The Connecticut Transportation Institute coordinates and administers the Connecticut Cooperative Highway Research Program (CCHRP). This continuing research program, a cooperative effort of the Connecticut Department of Transportation and the University of Connecticut, focuses on the development of solutions to high priority issues related to the safe and efficient operation of Connecticut's roads and public transit systems.

During fiscal year 2003, the CCHRP funded the following research projects: *GRP for Fast Pavement Assessment; Field Monitoring and Evaluation of Sign Support Structures Subject to Dynamic Loads; A Best Practices Guide for the Design of Context Sensitive Roadway Cross-sections; An Automated Detection for Highway Geometry Using Image Recognition Models; Incorporating Truck Flows in the State-wide Planning Traffic Model; Developing a Methodology to Evaluate the Safety of Shared-use Paths; and Pilot for Automated Detection and Classification of Road Surfaces Degradation Features.*

Graduate Assistantships for 10 students were funded through CCHRP in fiscal year 2003.

THE NEW ENGLAND TRANSPORTATION CONSORTIUM (\$124,258):

The New England Transportation Consortium (NETC), a joint undertaking of the six New England states, pools the financial and professional resources of the region's Departments of Transportation with the academic resources of the region's state universities to research and develop improved methods of dealing with high priority issues in the planning, design, construction, maintenance and operation of the region's transportation system. The Connecticut Transportation Institute provides the management for the Consortium. During fiscal year 2003, the Consortium had \$1,822,656 in research under contract, \$541,016 of which was at the University of Connecticut. The Consortium allocated \$560,000 in fiscal year 2003 for the following new research projects: *Ability of Wood Fiber Materials to Attenuate Heavy Metals Associated With Highway Runoff; Field Studies of Concrete Containing Salts of an Alkenyl-Substituted Succinic Acid; Feasibility Study of an Erosion Control Laboratory in New England; Measuring Pollutant Removal Efficiencies of Storm Water Treatment Units; Evaluation of a Field Permeameter as a Longitudinal Joint Quality Control Indicator; and The Feasibility of the Use of Basalt Fiber Reinforced Polymer Composites for Transportation Infrastructure Applications.*

THE CONNECTICUT ADVANCED PAVEMENT LABORATORY (\$375,000):

The Connecticut Advanced Pavement Lab (CAP Lab) at the University of Connecticut serves the needs of Connecticut and all New England States by acting as a resource for both State agencies and the Hot Mix Asphalt Industry. The CAP Lab provides advice on mix acceptance issues, field construction, and Superpave test procedures. The CAP Lab performs research on pavement-related topics and serves as a regional training center for transportation construction engineers and inspectors. Activities during the past year were focused around both research and training.

The CAP Lab continued working with Penn State University in support of a Northeastern States Project on pavement issues. In addition, work continued on two research projects: one for the Connecticut Department of Transportation used thermal imaging to locate cool areas behind the HMA paver; the second project is a national study examining protocols of the new Dynamic Modulus Test to be included in the *2002 AASHTO Design Guide*. Also, a project was undertaken to develop Quality Assurance Specifications for asphalt pavements for the Connecticut Department of Transportation.

In fiscal year 2003, the CAP Lab conducted 10 training courses for inspectors, technicians, engineers and industry personnel. These training sessions covered the following topics: Superpave for Municipal Personnel; All About Asphalt; various preparatory courses for individuals seeking certification from the New England Transportation Technician Certification Program (NETTCP), NETTCP Binder Technician Certification, NETTCP Soils and Aggregate Inspector, as well as NETTCP Soils and Aggregate Laboratory Technician.

One graduate assistantship was funded through the Institute to support the above research projects. Two undergraduate students were also employed to support the research.

THE TRANSPORTATION TECHNOLOGY TRANSFER CENTER (\$313,558):

The Institute's Technology Transfer Center provided education, training, technical assistance and information 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 fiscal year 2003:

- Provided instruction and training to 4,000 state and local government employees
- Offered 40 workshop sessions on transportation and related topics
- Continued the Professional Development Seminar Series
- Partnered with the Connecticut Department of Transportation, the Federal Highway Administration, and the Connecticut Construction Industries Association to sponsor the first Connecticut Construction Career Day
- Partnered with the Connecticut Highway Street Supervisors Association to sponsor the Second Annual Technology Transfer Expo
- Partnered with the Connecticut Department of Transportation to offer the 2002 Research Showcase
- Provided 3,700 transportation-related publications, software, and videotapes in response to requests for information
- Provided one half-time Transportation Technology Transfer internship to the University of Connecticut Civil & Environmental Engineering graduate student

THE TRANSPORTATION RESEARCH PROGRAM (\$609,976):

This program includes research funded outside of the CCHRP. In Fiscal Year 2003, the Region 1 University Transportation Center (UTC) Program provided \$57,250 funding for *Analysis of Travel Route Data from a System Efficiency Perspective*, and \$76,250 funding for *Effect of Segment Characteristics of the Severity of Head-on Crashes on Two-lane Highways*. The Connecticut Transportation Institute administers and coordinates the University of Connecticut's participation in the UTC program. The Connecticut Department of Transportation provided \$149,136 in funding for the *Bridge Monitoring Networking Project*, \$57,100 in funding for *New Technologies for Photolog Image and Data Acquisition*, and \$105,240 in funding for the *Program Development for the Connecticut Transportation Institute*. The New England Transportation Consortium sponsored the following research projects: *Effective Visualization Techniques for the Public Presentation of Transportation Projects* (\$15,000), *Establishment Subgrade Support Values for Typical Soils in New England* (\$80,000), *Determination of Moisture Content of Deicing Salt at Point of Delivery* (\$40,000), and *Validating Traffic Simulation Models to Inclement Weather Conditions with Applications to Arterial Coordinated Signal Systems* (\$30,000).

Six graduate assistantships were funded through the Institute to support the above research projects. Three UTC graduate fellowships totaling \$20,000 were awarded to three students concentrating in transportation and urban engineering.

BIOMEDICAL ENGINEERING PROGRAM ANNUAL REPORT SUMMARY 2002-2003

Biomedical engineering activities at UConn have a rich 35-year history of success and accomplishment. The Biomedical Engineering program (BME) is located at the main campus in Storrs and the UCHC in Farmington. The School of Engineering offers B.S., M.S. and Ph.D. degree programs in biomedical engineering (BME), and participates in the sequential BME B.S.-to-MD/DMD degree program.

The BME program officially started the BME B.S. degree program in 2001 and graduated two B.S. students at the end of our first year and four students at the end of our second year. Currently, there are approximately 90 BME undergraduate students. In addition, the BME program is part of the sequential B.S.-to-M.D. or D.M.D. program. Admissions for 2003-2004 are up from the previous year, with 50 incoming freshmen. Drs. Charles Wolgemuth (Bioinformatics), Liisa Kuhn (Biomaterials and Cell & Tissue Engineering), and David Waitzman (Physiological Modeling and Neural Systems Engineering) joined the BME faculty in 2002-03. The BME program is currently recruiting for the Marianne E. Klewin Endowed Professorship in Biomedical Engineering. During 2002-2003, Dr. Quing Zhu received a \$835,000 grant from the National Institutes of Health National Cancer Institute for detection methods in diagnosing breast cancer.

Dr. John Enderle continues to serve as the BME program Director.

The objectives of UConn's undergraduate curriculum in Biomedical Engineering (BME) are: (1) To provide a sound foundation in the areas of mathematics, physical and life sciences, engineering science and design, communications, humanities and social sciences; and to foster a world view of the biomedical engineer's role in society. (2) To impart professional attitudes and encourage an awareness of social and ethical responsibilities. (3) To provide an up-to-date technical education in biomedical engineering with emphasis on synthesis, analysis, and design, so that the graduate may proceed to an entry-level position in the biomedical profession or continue to graduate studies in engineering, medical school, dental school, or related fields.

The undergraduate curriculum offers tracks in the following areas: biochemical engineering, biofluid biomechanics, bioinformatics, bioinstrumentation, biomaterials, and biosolid biomechanics. By combining studies of engineering science and engineering design with core courses offered in other programs, the BME B.S. degree program ensures graduates are prepared for the unpredictable, team-centered workplace or for graduate studies in engineering or a medical professional program. In addition to core science and math coursework, students are immersed in biomedical engineering, biomechanics, biomaterials, and a variety of biomedical design and measurement courses. The BME program is part of the sequential B.S. + M.D. program, one of several that provide selected students guaranteed admission to the UConn Health Center, providing that:

- All academic standards and contingencies (including maintaining a 3.2 GPA throughout the undergraduate years) are fulfilled to the satisfaction of either medical or dental schools at the UCHC; and
- The Student successfully completes the B.S. degree program in Biomedical Engineering.

Students must apply for this special program when applying for admission to UConn and the School of Engineering.

The goal of the biomedical engineering graduate program is to provide students the interdisciplinary training in biological and medical sciences, physical sciences, and engineering necessary to solve complex biomedical problems. Faculty members from engineering, biomedical sciences, materials sciences, chemistry, physics, medicine, and dental medicine form an interdisciplinary graduate degree program that spans the University of Connecticut campuses at Storrs and at the Health Center in Farmington. Biomedical engineering embraces the following research areas: biochemical engineering, bioinstrumentation, bioinformatics, biomaterials, biomechanics, biomedical imaging/biosignal processing, biosensors, biotechnology, cellular and tissue engineering, clinical engineering, ergonomics, physiological systems modeling, neurobiology, rehabilitation engineering. Approximately 10 graduate courses are offered each semester in biomedical engineering.

Besides the traditional M.S. program, a two-year 30-credit hour Clinical Engineering Internship M.S. program exists which permits graduate students to gain an in depth exposure to medical technology in the following medical institutions: Hartford Hospital, The University of Connecticut Health Center, Yale-New Haven Hospital and the Baystate Medical Center in Springfield, MA. In addition, a BME Industrial Engineering Internship exists which permits graduate students to gain in-depth exposure to the conception, design and manufacturing of health care products.

The student chapters of the Biomedical Engineering Society and the IEEE-EMBS Student Club are quite active and promote a seminar series, plant trips and fund raisers.

BME FACULTY

The following faculty (with areas of specialization) are members of the BME Program: Douglas Adams (Biomechanics, Rehabilitation), John Bennett Jr. (Biomechanics, Biofluid Dynamics), Leslie Bernstein (Auditory System, Physiological Modeling), James D. Bryers (Tissue Engineering, Biomaterials), William Chapple (Neuroscience, Physiological Modeling), Thomas Chen (Biotechnology), Martin Cherniack (Ergonomics, Epidemiology), Vincent Clark (Physiological and Biomedical Modeling), Christian Davis (Biomechanics, Biomaterials), Dipak K. Das (Physiological Modeling, Cardiovascular Systems), John Enderle (Biocontrols, Physiological Modeling, Oculomotor System, Signal Processing), Mary Ann Epstein (Biochemistry, Pharmacology, Physiological Modeling), Can Erkey (Biochemical Engineering), Monty Escabi (Biocontrols, Physiological Modeling, Signal Processing, Auditory System), Pouran Faghri (Rehabilitation Engineering), Martin Fox (Devices, Imaging, Medical Informatics, Ultrasound), A. Jon Goldberg (Biomaterials), Ian Greenshields (Bioinformatics, Imaging), Kazem Kazerounian (Biomechanics), Duck Kim (Auditory System, Physiological Modeling), Herbert Koenig (Biomechanics), Donald Kreutzer (Cellular and Tissue Engineering), Liisa Kuhn (Biomaterials and Cell & Tissue Engineering), Song Lai (Imaging), James Ligas (Respiratory Mechanics), Les Loew (Imaging), Andrew Moiseff (Neuroscience, Physiological Modeling), Francis Moussy (Biomaterials, Biosensors), Mary Lynn Newport (Biomaterials), Robert Northrop (Emeritus, Instrumentation, Biocontrols, Physiological Modeling), Nejat Olgac (Biomechanics), Douglas Oliver (Anatomy), Donald Peterson (Biomechanics, Ergonomics, Rehabilitation), Carol Pilbeam (Pharmacology, Physiological Modeling), Mansoor Sarfarazi (Bioinformatics, Cellular and Tissue Engineering), Dong-Guk Shin (Bioinformatics), Richard Simon (Bioinformatics, Signal Processing), David Waitzman (Physiological Modeling and Neural Systems Engineering), Nicholas Warren (Ergonomics), Mei Wei (Biomaterials), Robert Weiss (Biomaterials), Charles Wolgemuth (Bioinformatics), Thomas K. Wood (Biochemical Engineering, Biotechnology), and Quing Zhu (Bioinstrumentation, Biosensors, Imaging, Ultrasound). Research interests of the faculty include the following areas: Artificial Organs, Biochemistry, Bioelectric Phenomenon, Bioinstrumentation, Biomaterials, Biomechanics, Biomimetics, Biosensors, Biosignal Processing, Biotechnology, Cellular Engineering, Clinical Engineering, Drug Delivery Systems, Gait Analysis, Medical Imaging, Medical Informatics, Pharmacokinetics, Physiological

Modeling, Rehabilitation Engineering, Tissue Engineering and Molecular Engineering. Faculty work in the following UConn Research Centers: Biomaterials Research Center, Center for Biomedical Imaging Technology, Biotechnology Center, the Booth Center for Advanced Technologies, and Center for Neurological Sciences.

The BME faculty are leaders in their field, have published extensively in scholarly journals and proceedings, are significantly involved in their professional societies, and receive significant financial support from industry, foundations and government funding agencies like the NIH, NSF and the Whitaker Foundation. Details on publications, service and external research support are listed in the faculty home departments.

**ENVIRONMENTAL ENGINEERING PROGRAM
ANNUAL REPORT SUMMARY
2002-2003**

STUDENTS AND GRADUATES

The Environmental Engineering Program presently has 7 M.S. and 20 Ph.D. graduate students, and 17 undergraduate environmental engineering majors. The majority of graduate students is full-time and financially supported. During the year, the program graduated 4 M.S. students and two environmental engineering undergraduates (December 2002 and May 2003). During the past year, the program received 65 full-time graduate applications; of these, 22 were offered admission into the program and 16 have accepted admission, bringing our projected total of graduate students to 38 for fall 2003. In addition, 10 new undergraduate students were admitted as environmental engineering majors for fall 2003.

FACULTY

Detailed activities of the Environmental faculty may be found in their annual reports. An indicator of their high level of collective scholarly activity is reflected in their publication of more than 50 refereed journal papers and book chapters. In addition, during the year Professor Dani Or assumed responsibility as Graduate Program Director and Professor Nelly Abboud continued as Director of the Undergraduate Program with primary objectives of program outreach, student recruitment, retention, and undergraduate administration. Three new Civil & Environmental Engineering (CEE) faculty members joined the program:

- Dr. Guiling Wang, Assistant Professor (Ph.D, MIT) – focusing on land-plant-atmosphere interactions
- Dr. Dani Or, NU Foundation Endowed Chair Professor (Ph.D., Utah State University) – an expert in vadose zone hydrology and environmental physics
- Dr. Amvrossios Bagtzoglou, Associate Professor, (Ph.D., University of California, Irvine) – with expertise in groundwater and pollutant transport modeling and teaching responsibilities at the Stamford campus

During the year, Professor Emmanouil Anagnostou (CEE) was granted tenure, received the School of Engineering Outstanding Junior Faculty Award, and was nominated for the prestigious NSF Waterman Award. He is presently an active candidate for the award for FY 2004. Professor Joseph Helble (CHEG) was promoted to Professor and reappointed to a second term as CHEG Department Head.

Across the program, external research funding continues at an all-time high, with extramural grants totaling more than \$10 million, including prestigious national research awards such as NSF CAREER awards held by Professors Helble (CHEG), Barth Smets (CEE), Britt Holmén (CEE) and Anagnostou (CEE). In addition to holding significant offices within the University – Department Head of CHEG (Helble), Chair of the Microbiology Graduate Field of Study (Noll, MCB) – our faculty hold appointments in various national professional and learned societies. Professor Or is the Chair of the Soil Physics Division and a member of the Rapid Response Team of the Soil Science Society of America; Professor Baki Cetegen is a member of the Combustion Institute's executive board; Professor Smets has been appointed to the National Research Council's Committee on Bioavailability of Contaminants in Soils & Sediments; Professor Michael Cutlip is on the Executive Committee of the Chemical Engineering Division of the American Society of Engineering Education and an Academic

Trustee of CACHE Corporation; Professor Helble has several appointments in the American Association for Aerosol Research; Professor James Fenton (CHEG) serves on numerous committees of the Electrochemical Society; Professor Anagnostou serves on NASA's Tropical Rainfall Measuring Mission peer review and the International Precipitation Conference Steering Committee; Professor Abboud (CEE) is a Board member of the American Arab Engineers and Scientists Society and serves on the National Education Committee for the American Filtration and Separation Society; Professor James Bryers (Center for Biomaterials, UConn Health Center) serves on the National Research Council Committee on Biotechnology Education and the U.S. Department of State Committee on Environmental Biotechnology; and Professor Can Erkey (CHEG) serves on the Green Chemistry Division Committee of the American Chemical Society. Professor Thomas Torgersen (Marine Sciences) is editor-in-chief of *Reviews of Geophysics* and associate editor of *The Geochemical Journal*, and he is on the AGU Board of Journal Editors. Professors C.P. Schulthess (Plant Science), Bryers, Anagnostou, Bagtzoglou, and Or serve as associate editors of *Soil Science Society of America Journal*, *Biotechnology & Bioengineering*, *Journal of Applied Meteorology*, *Water Resources Research*, and *Vadose Zone Journal*, respectively. Additionally, Professors Abboud, George Hoag (CEE), and Smets serve on editorial boards of *Fluid/Particle Separation*, *Soil Contamination*, and *Biodegradation*, respectively.

Internationally, Professor Anagnostou serves as an advisor to the National Observatory of Athens, Athens, Greece; and was awarded an NSF grant to develop a unique continental-scale lightening network to improve rainfall estimation across Africa. Professor Fred Ogden continues his collaboration with the Technical University of Panama and the Canal Authority through funding by the U.S. Army Research Office. The project involves active student participation, including presentations by two students in a symposium on Tropical Hydrology that was held in Panama. Strong involvement in international conferences was evidenced earlier this year in the joint EGS-AGU spring meeting (Nice, France) with presentations by more than nine Environmental Engineering Program faculty and students, including two special sessions organized by Professors Anagnostou and Or. Professor Smets developed several new research proposals with colleagues in Denmark and Belgium, and Professor Or is PI on a research proposal funded by the Bi-national U.S.-Israel program.

OUTREACH PROGRAM

More than 1,500 packages containing Environmental Engineering and Civil Engineering brochures and related undergraduate information were sent to high schools in Connecticut, Massachusetts, Rhode Island, New Hampshire, Vermont, New York and New Jersey. As a result of this mailing, Professor Abboud has received numerous requests from Connecticut and New York high schools to introduce the program in their schools and during career and college fairs. Additionally, the Environmental Engineering Program organized and supported many outreach events during 2002-2003, including participation in the Connecticut Invention Convention, CPTV Expo, Guidance Counselor Luncheon Workshop, Engineering 2000, YESS Workshop, the Da Vinci Program, the ENGR 100 Environmental Workshop, and career day events in two Connecticut high schools. The program also organized and hosted the "Project Lead the Way" Workshop presented by Mr. Gregory Kane from the Connecticut State Education Department. The program initiated the "UConn CEE Partners in Education Program" in which our Environmental Engineering Program faculty collaborated with Connecticut companies involved in environmental engineering and identified partners who are willing to offer internships and host field trips to Connecticut high school students. Furthermore, the EEP was well represented at the fall and spring open houses at the Storrs, Waterbury and Stamford campuses, and its undergraduate director served as panel speaker at the Society of Women Engineers and awarded merit certificate awards to 61 students from 31 high schools. We initiated a comprehensive revision of the graduate program structure, guided by the expertise of core Environmental Engineering faculty and by our mission to provide a rigorous and highly relevant program in environmental biogeochemistry; air, water

and land pollution; atmospheric-land interactions; water resources; hydraulics; and fluid mechanics. We formed three areas of concentration (tracks) focusing on:

- Atmospheric processes and air-pollution;
- Bio-geochemistry; and
- Hydro-geo sciences and engineering.

These changes require revisions of our web page, brochures and procedures that are well underway.

The expansion of the Environmental Engineering Program necessitated establishment of administrative structures to assist with program guidance and management in a manner that reflects our collective views and objectives. We formed new governance structures, including establishment of a curriculum committee (Smets, chair) and an admissions committee (Holmén, chair), and established regular monthly ENVE forum meetings to discuss academic and research initiatives.

ENVE faculty have been involved in several multi-investigator activities to support research and education in Environmental Engineering. The fellowship award from the U.S. Department of Education, GAANN Program for “A Graduate Fellowship Program in Environmental Biotechnology at the University of Connecticut” entered its third year (Program Participants: Bryers, Noll (co-director), Smets (director), Vinopal and Wood). A group of 16 faculty members were involved in an NSF-IGERT proposal: Human-Land-Atmosphere Interactions – Observability and Predictability of Processes across Scales (the proposal was declined and will be resubmitted). A five-year joint Johns Hopkins-UConn-UMaryland “Center for Hazardous Substances in Urban Environments,” with a total EPA budget of \$6 million entered its second year with participation of Professors Helble, Hoag, Allison MacKay (CEE) and Smets.

Joint collaborations of program participants are supported by the National Science Foundation Division of Undergraduate Education for Courses Curriculum and Laboratory Improvement, “System dynamics of detention/retention ponds” (Torgersen and Ogden) and the Willimantic Water Commission, “Studies of nutrient loading to the Mansfield Hollow Reservoir, Connecticut” (Ogden (CEE), Hoag (CEE), Warner (NRME)). There is growing collaboration with other parts of the Civil & Environmental Engineering faculty, including joint NSF and NASA proposals with faculty specializing in structures and mechanics (Professors Accorsi and Ramesh Malla).

MANAGEMENT & ENGINEERING FOR MANUFACTURING
ANNUAL REPORT SUMMARY
2002-2003

The Management & Engineering for Manufacturing (MEM) program graduated five students this past year. Two completed their work in the spring, two finished in December, and one student completed the course of study in August. Eight students are candidates for graduation in December 2003.

During the year, plant visits were made to Wiremold Corporation and Pratt & Whitney Aircraft. In addition, we developed a general plant visit schedule for students in MEM and in the School of Business.

During the spring semester, 10 students participated in a final design project, sponsored by Pratt & Whitney Aircraft, as part of the capstone course of the program, MEM 215W. Dr. Zbigniew Bzymek coordinated the projects with Dr. Manuel Nunez and the mentors at Pratt & Whitney. The students made a number of on-campus presentations before audiences that included representatives from the company. MEM students also visited Pratt & Whitney.

During the year, 46 students were associated with the program – a significant increase over last year's figures, at 28 students. We expect to admit freshman students into the MEM program again and have already spoken with a few of them.

Our students formed the MEM Society as a student organization and held a number of meetings during the year. Members plan to interact with other on-campus student organizations next year.

In 2002, the program developed and produced a color brochure, with support from the Schools of Business and Engineering. This new promotional piece was debuted during Open House and also was distributed among students taking ENGR 100 and among visitors who express interest in the program. We anticipate this brochure will be a valuable tool in recruiting students.

UNDERGRADUATE EDUCATION AND PROGRAMS OFFICE
ANNUAL REPORT SUMMARY
2002–2003

During the 2002-2003 academic year, the School of Engineering Undergraduate Program continued to grow at a rate much greater than the national growth rate. The fall 2002 entering class of 358 students represented an increase of 98% compared with the fall 1997 entering class. The undergraduate student body has increased by 41% during this same period. Enrollments in our Biomedical Engineering, Computer Science and Mechanical Engineering programs continue to show the largest growth. The quality of the entering engineering student continues to improve: the average SAT score of entering freshman students is 1265, which is approximately 135 points higher than the average SAT score of freshman students entering UConn's other programs.

The University of Connecticut has an excellent Honors Program that enriches the undergraduate experience for qualifying students throughout the four-year curriculum. Among the 17 schools and colleges of the University, the average percentage of honors students in each unit is 7.7%; in contrast, the percentage of undergraduate engineering students enrolled in the Honors Program is 14%. This is just one indication of our strong academic advising program. The graduation rate from the School of Engineering is approximately 60% compared with the University's graduation rate of 68%. In spring 2003, the School of Engineering was able to offer more than \$680,000 in scholarships to entering freshmen and over \$510,000 in scholarships to continuing students. The number of enrolled transfer students continues to grow at a 10% rate due to outreach efforts at the State's 12 community and technical colleges.

OUTREACH/RECRUITMENT

The School of Engineering maintains various outreach/recruiting initiatives. In addition to the highly successful fall Open House and spring Visitation Day involving faculty, students and staff, the School of Engineering continued to conduct outreach to students and teachers in middle school through high school. The School's largest outreach event for the 2002-03 academic year involved hosting of the state-wide Connecticut Invention Convention (CIC) for the fourth consecutive year. In April, the CIC attracted more than 650 K-12th grade students to Gampel Pavilion, where their inventions were judged by more than 150 professionals and viewed by more than 2,800 spectators. Our second largest event centered on a series of workshops offered to more than 500 Girl Scouts as part of one-day program hosted and conducted by the student chapter of Phi Sigma Rho. This workshop consisted of many student-led engineering and science projects that resulted in the girls earning Girl Scout badges.

The da Vinci Project, a one-week residential program for middle and high school mathematics and sciences teachers, continues to be very popular. In August 2002, the event attracted 40 teachers, up from just 23 the previous year. In 2002, 80 high school juniors and seniors attended our one-week Engineering 2000 residential program, during which they carried out various hands-on experiments and projects that exposed them to diverse engineering disciplines and core principles. Participants are nominated by high school math and science teachers, and in 2002 the School of Engineering had a waiting list of 30 students. Twenty-three percent of high school participants are female; this early introduction to engineering is helping the School increase its number of undergraduate women, to 15%. The Assistant Dean's involvement as a member of the College of Technology advisory board has resulted in a significant increase of transfer students from the 12-campus state system.

Diversity and gender recruitment are the responsibility of all faculty, staff and students. However, we continue to maintain a strong Engineering Diversity program headed by Diversity Director, Kevin McLaughlin, the primary contact and coordinator. Our Pre-Engineering Program (PEP), geared toward underrepresented students in grades 7th-9th from inner-city school districts, has grown from 47 students to 60 students this year. A one-day Multiply Your Options (MYO) workshop for 8th grade girls attracted more than 245 students and 40 teachers who attended 34 different workshops. Each workshop presenter was a female professional in an area of science or engineering. Another of the outreach activities intended to increase the diversity of our student body is the five-week summer residential BRIDGE program for admitted underrepresented minorities and women. BRIDGE introduces participants to the basic tenets of chemistry, computer programming, mathematics, and physics with the objective of providing a solid foundation for qualifying admitted freshman students. Thirty students completed the college prep program and the summer 2002 BRIDGE enrollment was 44 students, an increase of 46%.

The student chapters of national professional engineering societies remained very involved in recruiting and retention efforts throughout the year. Student chapters of the National Society of Black Engineers (NSBE), Society of Women Engineers (SWE) and Society of Hispanic Professional Engineers (SHPE) attended recruiting activities in Bridgeport and Waterbury. Members of the SWE student chapter visited elementary schools and conducted age appropriate engineering projects. In addition, members of SHPE hosted a one-day *Eastern Technical & Career Conference – Pre-College Event* at UConn that was attended by students from 10 Connecticut high schools. The primary objective of the conference was to promote engineering and to develop a communication network among students and teachers from these 10 high schools. NSBE sponsored weekly study sessions, conducted biweekly either technical seminars or current event discussions for all students, raised scholarship funds and hosted an NSBE awards banquet.

SCHOLARSHIPS AND SCHOLARS

The University of Connecticut continues to offer full or partial scholarships to qualified entering students. Due to the highly successful fundraising initiatives of Engineering Dean Amir Faghri, in recent years the School of Engineering has established not only 17 new named and endowed chair professorships, but also sufficient funding to offer more than \$680,000 to recruit over 230 highly qualified students this fall. For the academic year 2002-2003, we have admitted an unprecedented number (41) of valedictorians and salutatorians to the School of Engineering. At our annual awards banquet in May 2002, 211 continuing students were awarded more than \$510,000 in scholarships. Additionally, sixteen engineering students received the Connecticut Infotech Scholarship and 33 students received the Connecticut Innovations Technology Scholarships this academic year. One hundred twenty-eight undergraduate students were members of one of the many student honor societies; over 238 students were on the Dean's list; 44 seniors received the *National Collegiate Engineering Award* for having a minimum of 3.6 CGPA; 44 seniors were inducted into *Who's Who Among American Colleges and Universities* for holding a minimum of 3.6 CGPA; and 47 juniors were inducted as *All American Scholars* for maintaining a minimum of 3.4 CGPA.

TUTORING AND ADVISING

Aggressive tutoring and advising services help the School of Engineering enhance its retention of undergraduate students. In 2002-2003, the School received a \$500,000 gift from an anonymous donor that permit us to expand our services to include mentoring, counseling and advising at the program level. This new gift enables us to hire three graduate students and two undergraduates to staff the Mentoring, Advising and Tutoring (MAT) Center. They will be responsible for mentoring, counseling, advising and conducting one-on-one tutoring. This Center does not replace faculty advising but rather complements it and provides more time to develop a relationship between students and their faculty.

Additionally, the faculty-student meetings can then address trends in the profession, research opportunities and more in-depth understanding of both individuals.

In addition, the School continued its tutoring program for lower division courses in mathematics, chemistry, computer programming and physics. Thanks to a grant from the National Science Foundation, we have been able to expand our tutoring to include four courses in the junior year of many majors. A new tutoring location is currently undergoing renovation so that each subject may be tutored in its own private area, in lieu of the current layout, which requires that two subjects be tutored simultaneously in a common area. Additionally, offices of four student honor societies will be located in the same area so that they can provide tutoring for upper division courses. Several professional student chapters conduct tutoring in their related topics.

OTHER MILESTONES

This year, the Computer Science & Engineering and Electrical & Computer Engineering programs moved to our new Information Technology Engineering Building. This 110,000 sq. ft. building, constructed with UConn 2000 funds, increases the number of School of Engineering teaching and research facilities to eight. Additionally, the School was able to retain all vacated spaces so that Mechanical and Chemical Engineering faculty could expand to the previously occupied areas. The University also provided \$2 million toward renovation of the Bronwell Building, which will house our rapidly growing Biomedical Engineering and outreach programs.



Atrium, Information Technologies Engineering Building

Dr. Amir Faghri, Dean
School of Engineering
University of Connecticut
261 Glenbrook Road, Unit 2237
Storrs, Connecticut 06269-2237
Ph. (860) 486-2429 Fax (860) 486-0318
e-mail: amir.faghri@uconn.edu