## TABLE OF CONTENTS

### SCHOOL OF ENGINEERING

**Annual Report Summary** ................................................................. 3

### DEPARTMENTS

#### Chemical Engineering

**Annual Report Summary** ................................................................. 13
**Archival Technical Journal Publications** ........................................ 17
**Books, Book Chapters, Book Sections & Edited Volumes** ................. 23
**Conference Proceedings & Other Publications** ............................... 25
**Active Research Grants and Contracts** ........................................... 29
**Awards, Honors, Patents** ............................................................... 35
**Major Professional Activities** ....................................................... 37

#### Civil & Environmental Engineering

**Annual Report Summary** ................................................................. 53
**Archival Technical Journal Publications** ........................................ 57
**Books, Book Chapters, Book Sections & Edited Volumes** ................. 63
**Conference Proceedings & Other Publications** ............................... 65
**Active Research Grants and Contracts** ........................................... 71
**Awards, Honors, Patents** ............................................................... 79
**Major Professional Activities** ....................................................... 81

#### Computer Science & Engineering

**Annual Report Summary** ................................................................. 89
**Archival Technical Journal Publications** ........................................ 91
**Books, Book Chapters, Book Sections & Edited Volumes** ................. 95
**Conference Proceedings & Other Publications** ............................... 97
**Active Research Grants and Contracts** ........................................... 107
**Awards, Honors, Patents** ............................................................... 113
**Major Professional Activities** ....................................................... 115

#### Electrical & Computer Engineering

**Annual Report Summary** ................................................................. 125
**Archival Technical Journal Publications** ........................................ 127
**Books, Book Chapters, Book Sections & Edited Volumes** ................. 135
**Conference Proceedings & Other Publications** ............................... 137
**Active Research Grants and Contracts** ........................................... 153
**Awards, Honors, Patents** ............................................................... 163
**Major Professional Activities** ....................................................... 165
Mechanical Engineering
Annual Report Summary................................................................. 175
Archival Technical Journal Publications........................................... 177
Books, Book Chapters, Book Sections & Edited Volumes................. 183
Conference Proceedings & Other Publications................................. 185
Active Research Grants and Contracts............................................. 191
Awards, Honors, Patents................................................................. 199
Major Professional Activities.......................................................... 201

Metallurgy & Materials Engineering
Annual Report Summary................................................................. 207
Archival Technical Journal Publications........................................... 209
Books, Book Chapters, Book Sections & Edited Volumes................. 215
Conference Proceedings & Other Publications................................. 217
Active Research Grants and Contracts............................................. 221
Awards, Honors, Patents................................................................. 225
Major Professional Activities.......................................................... 227

CENTERS
Booth Engineering Center for Advanced Technology......................... 233
Connecticut Global Fuel Cell Center............................................... 237
Connecticut Transportation Institute................................................. 239

PROGRAMS
Biomedical Engineering................................................................. 243
Environmental Engineering Program................................................. 247
Management and Engineering for Manufacturing............................ 251
Undergraduate Education and Programs Office................................. 253

§
The 2003-2004 academic year was punctuated by numerous successes and challenges. As in previous years, the University suffered a reduction in funding from the State that resulted in a reduced budget for Engineering. Despite these cuts, the School made impressive progress in fulfilling its multi-faceted mission.

**STRATEGIC PRIORITIES**

*Research*

During the year, the School of Engineering was awarded a record-setting in-kind software grant valued at $146 million, and a number of faculty members were awarded large federal grants. Overall, our faculty were extremely successful in securing external funding from federal agencies. Recent statistics attest to this success: in the last year, our per faculty research expenditures in the School of Engineering exceeded those for any other School in the University. In fact, four engineering departments were in the top 10 throughout the University for research expenditures by department per faculty member. Please refer to Figures 2 and 3 appearing on page 10. Figure 4 provides a visual snapshot of yet another performance measure, growth in the number of archival journal publications from 1997-2003.

In November 2003, the School received the largest grant in University of Connecticut history – an in-kind software grant that will better prepare engineering graduates for the manufacturing and technology environment. Under terms of the grant, commercially valued at $146 million, software giant UGS Corp. of Plano, TX agreed to provide the School with leading industry software tools. The grant covers a suite of product lifecycle management (PLM) tools for computer aided design (CAD), computer aided manufacturing (CAM) and computer aided engineering, finite element analysis and optimization programs, and advanced solid modeling. Equipped with these new programs, we are now beginning to integrate e-engineering into our curriculum at the undergraduate and graduate levels, where students will design product models, simulate their operation, and quantitatively evaluate their performance. The grant also permits the School to establish a new Institute for Engineering Education, Design and Computing.

In the fall, the Connecticut Global Fuel Cell Center learned that it was successful in securing $1.4 million in additional funding from the U.S. Army to continue development of portable micro-miniature fuel cells. The Center has now received more than $18 million in funding from government and industrial sources and friends.

Several faculty members and faculty teams won large grants during the year. Professor Thomas Wood of Chemical Engineering was co-PI on a three-year grant from the National Science Foundation (NSF), totaling $764,061, to conduct studies involving enhanced removal of heavy metals and organic pollutants from contaminated soil. Another large three-year NSF grant was awarded to associate professor Lisa Aultman-Hall and assistant professor Britt Holmén of Civil & Environmental Engineering to study airborne particulates emitted by automobiles and other vehicles. Assistant professor of Mechanical Engineering Michael Renfro received a coveted five-year NSF Early Career Development (CAREER) award in the amount of $418,000 for his proposed research entitled “Characterization of Propagating and Receding Flame Edges in Composition and Velocity Gradients.” Lei Zhu, assistant professor of Chemical Engineering, also received a five-year NSF CAREER Award
of $430,000 to research in the area of nanotechnology. Mark Aindow, associate professor of Metallurgy & Materials Engineering, was awarded nearly $360,000 from DARPA, under subcontract with Pratt & Whitney, for research into “Propulsion Systems Prognosis.”

Peter Luh, SNET Professor of Communications & Information Technologies in the Electrical & Computer Engineering Department, was awarded $350,000 to conduct research entitled “Robustness, Efficiency, and Security of Electric Power Grids in a Market Environment.” Another interdisciplinary team, comprising professor and emeritus professor-in-residence of Metallurgy & Materials Engineering Nitin Padture and Maury Gell, and professor of Mechanical Engineering Eric Jordan, won a three-year contract in the amount of $540,000 from the Department of Energy for research into “Superior Thermal Barrier Coatings for Industrial Gas Turbine Engines.”

The School established a new Center for Optics, Sensing and Tracking in Homeland Security (COSTHS) during the year. The Center, which includes a multi-disciplinary, multi-university research core of 33 faculty, will focus on original development, application and refinement of fundamental technologies involved in homeland security, such as the material composition of sensors; the mechanical and electrical principles and systems underpinning sensor, optical and tracking technologies; and fusion, compression and analysis of data accumulated from diverse sensor and detection systems.

A multidisciplinary team was awarded a $500,000 grant from the Defense Advanced Projects Agency (DARPA) in support of the School’s activities in developing technologies for homeland security. Ian Greenshields, Associate Dean for Academic Affairs, served as PI.

**Outreach**

The School maintained and, in fact, expanded, its outreach activities during the year, with the objectives of positioning our School of Engineering as a pioneering research center and enhancing awareness of engineering’s importance to society. After many months of meticulous planning, networking and hard work, the School welcomed nearly 450 attendees to its successful International Conference on Advanced Technologies for Homeland Security (ICATHS) September 25-26, 2003. With speakers from the top echelons of government, academia and private industry, ICATHS demonstrated the high level of interest in technologies and policies surrounding homeland security and national defense. Keynote speakers were NASA Administrator Sean O’Keefe and U.S. Congressman Rob Simmons of Connecticut, and dozens of leaders from across the national spectrum spoke on facets of the homeland security issue.

In March, the School hosted the first International Conference on Fuel Cell Development and Deployment, which attracted an audience of 300. The conference featured keynote and seminar speakers, posters and exhibits, trips to fuel-cell powered installations and workshop courses. Major General John Doesburg, commanding general of the U.S. Army Research, Development and Engineering Command (RDECOM) located at Aberdeen Proving Ground, MD, delivered the opening keynote address. In early spring, the School of Engineering hosted a groundbreaking event: the first “Women in Engineering Leadership Summit.” Co-sponsored by the Women in Engineering Leadership Institute (WELI) and the Civil & Environmental Engineering Department, the summit assembled 75 female leaders from professional organizations, government, academic institutions and industry with the goal of developing cooperative strategies for building effective joint programs that promote women in engineering leadership at all levels.

As in previous years, the School of Engineering planned and conducted the intensive week-long residential da Vinci Project for math and science teachers during August. Sixteen teachers participated in the da Vinci Project. And for the sixth consecutive year, we were privileged to sponsor and host the
Connecticut Invention Convention in May, which attracted more than 540 Connecticut students in K-8 to Gampel Pavilion in Storrs for the day’s annual invention competition. An estimated 2,500 family members, judges and industry sponsors as well as the youthful inventors attended.

The School published another issue of its twice-yearly news magazine, *Frontiers* (circ. 20,000) and executed regular updates to its master website at www.engr.uconn.edu. In addition, during the year our marketing staff assisted in development of a new website for the Computer Science & Engineering department and a new website for the Center for Optics, Sensing & Tracking in Homeland Security, and offered advice relative to a new alumni publication produced by the Electrical & Computer Engineering department.

**Undergraduate Enrollment**

In September, the School welcomed 341 freshman students in addition to 1,100 continuing undergraduate students. Freshman enrollments have risen steadily since 1997: the fall 2003 figure represents a 138% increase in freshman enrollments over ’97 figures. In the spring, the School of Engineering awarded $500,000 in scholarships to approximately 200 continuing undergraduate students and more than $775,000 in scholarships to 276 entering students admitted to the School for the fall 2004 term. Table 1 below reflects freshman and undergraduate enrollment since 1997 and includes the fall enrollment figures. Figure 1 on page 8 presents this data in a graphical format. More detailed tables (Tables 2 and 3) appearing on page 9 provide information relating to average teaching load, courses offered, contact credit hours and enrollment statistics per engineering program in 1997 and 2003.

<table>
<thead>
<tr>
<th>Year</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>% Change from ’97-04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman Enrollment in Engineering</td>
<td>158</td>
<td>214</td>
<td>281</td>
<td>279</td>
<td>348</td>
<td>356</td>
<td>376</td>
<td>379</td>
<td>140% increase</td>
</tr>
<tr>
<td>Undergraduate Enrollment in Engineering</td>
<td>908</td>
<td>918</td>
<td>1023</td>
<td>1099</td>
<td>1200</td>
<td>1279</td>
<td>1401</td>
<td>1500</td>
<td>65% increase</td>
</tr>
</tbody>
</table>

**Table 1.** Growth in enrollment in engineering from 1997-2004.

**Faculty/Staff Recognition & Awards**

In addition to the School of Engineering awards developed to encourage excellence in research and teaching, our faculty were distinguished with exceptional honors at the national and University level during the year.

Kenneth Reifsnider, Pratt & Whitney Chair Professor of Design & Reliability in the Mechanical Engineering Department, was elected to the venerated National Academy of Engineering (NAE). Election to the NAE is among the most coveted and exclusive of professional honors bestowed upon any U.S. engineer. This marks the first time in the history of the University of Connecticut that a full-time, tenure-track faculty member was elected to the National Academy of Engineering during his career at UConn. This momentous tribute honors a researcher of impressive international credentials and brings distinction to the entire University.” Dr. Reifsnider, who joined the UConn engineering faculty in fall 2002, was cited for his “development of strength-life relationships in composite materials and structures.”
In addition, during its spring banquet, the School inducted Dr. Reifsnider and David Crow, Distinguished Professor-in-Residence, Mechanical Engineering, into the Academy of Distinguished Engineers at the University of Connecticut. Drs. Reifsnider and Crow have built international reputations in their fields of expertise.

In April, Professor of Electrical & Computer Engineering Bahram Javidi was selected one of five Board of Trustees Distinguished Professors for 2004. This lifetime title is the highest honor bestowed on faculty at the University of Connecticut.

During its September faculty reception in 2003, the School honored six faculty members and one staff member for outstanding performance.

- The 2003 Distinguished Faculty Award was presented to professor of Mechanical Engineering Ranga Pitchumani, in recognition of his sustained research excellence and leadership, success in publishing the results of their research, and national recognition in the form of honors, awards, fellowships and editorships. The award confers a $10,000 annual professional development grant for a period of three years.
- The Outstanding Junior Faculty Award was presented to Alex Russell, associate professor of Computer Science & Engineering, and to Mark Aindow, professor of Metallurgy & Materials Engineering. The award is presented to assistant or associate professors who have established outstanding records of scholarly achievement in research, teaching and service with the promise of continued outstanding contributions in the future.
- For the first time, the Outstanding Teaching Award was presented to two outstanding individuals: Nelly Abboud, associate professor of Civil & Environmental Engineering, and Steven Demurjian, professor of Computer Science and Engineering. The award entails a $2,000 honorarium along with a $5,000 grant for professional development.
- The Outstanding Staff Service Award was presented to Susan M. Soucy, who is the Administrative Coordinator for the Chemical Engineering Department.

**PERSONNEL**

During the year, the School of Engineering made a groundbreaking appointment of the first female center director. Lisa Aultman-Hall, associate professor of Civil & Environmental Engineering, was named Director of the Connecticut Transportation Institute (CTI), a center affiliated with the School of Engineering that serves as an educational, research and technology transfer resource for the State as well as businesses and individuals concerned with the nation’s transportation infrastructure. Dr. Aultman-Hall took over from Interim Director Christian Davis, professor of CEE, whose term concluded September 1, 2003.

With the start of the fall 2003, despite a third consecutive year of drastic cuts to our operating budget, the School of Engineering welcomed eight new faculty members and administrators, including three entrepreneurs of international repute: Trent Molter and Frano Barbir – world leaders in the fuel cell arena who joined the Connecticut Global Fuel Cell Center in the fall, and Anthony DeMaria – a well-known expert in optics and photonics, who joins the Electrical & Computer Engineering Department in January 2004. The new faculty members are as follows:
Tenure-track Faculty

*Jun-Hong Cui* (Ph.D. University of California – Los Angeles, 2003) assistant professor, Computer Science & Engineering

*Jeong-Ho Kim* (Ph.D. University of Illinois, Urbana-Champaign, 2003), assistant professor, Civil & Environmental Engineering

*Ion Mandoiu* (Ph.D. Georgia Institute of Technology, 2000), assistant professor, Computer Science & Engineering

*Shengli Zhou* (Ph.D. University of Minnesota, 2002), assistant professor, Electrical & Computer Engineering

Non-tenure Track Faculty

*Franco Barbir* (Ph.D. University of Miami, 1992), professor-in-residence, Connecticut Global Fuel Cell Center

*Anthony DeMaria* (Ph.D. University of Connecticut, 1965), professor-in-residence, Electrical & Computer Engineering

*Trent M. Molter* (M.S. Rensselaer Polytechnic Institute, 1988), research scientist and business development office, Connecticut Global Fuel Cell Center

*Celal S. Tufekci* (Ph.D. Rensselaer Polytechnic Institute, 2003), assistant Department Head, Mechanical Engineering

In May, Nigel Sammes, UTC Chair Professor of Fuel Cell Technology, completed his term as Director of Operations and Kenneth Reifsnider, Pratt & Whitney Chair Professor of Design & Reliability in the Mechanical Engineering Department, was selected Director.

In addition, during the spring, three new Department Heads were selected by the majority vote of departmental faculty. Ranga Pitchumani, Distinguished Professor of Engineering, assumed the Department Head position in Mechanical Engineering for a three-year term effective July 1, taking the reins from Ted Bergman, who donned a new hat on July 1, 2004, when he was named Associate Dean for Research & Outreach. Doug Cooper, University Teaching Fellow and professor of Chemical Engineering, was appointed to a three-year term as Department Head effective July 15. Doug assumed the reins from former Head Joseph Helble, who is serving a one-year Revelle Fellowship in Washington, DC and will resume his regular faculty duties upon his return. The Metallurgy & Materials Engineering Department has a new interim leader in Leon Shaw. He received the baton from Nitin Padture, who completed his term as Interim Head in May.

Retirements

While enrollments rose, 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 members elected to take advantage of this offer, including professors John Morral, Norbert Greene, and Maurice Gell, all of Metallurgy & Materials Engineering; Ernest Uthgenannt of Civil & Environmental Engineering; Lee Langston and Herb Koenig of Mechanical Engineering; and Mike Cutlip and Bob Coughlin of Chemical Engineering. In addition, in March the School was saddened by the loss of research professor of Metallurgy & Materials Engineering Martin Blackburn, who succumbed to cancer.

ALUMNI

In April, the School of Engineering honored 11 exceptional alumni and friends before an audience of 650 during its annual banquet and awards ceremony. The School presented one Distinguished Engineering Service Award and inducted 10 new members and two honorary members into the School of Engineering Academy of Distinguished Engineers.
University of Connecticut Engineering alumni invested generously in the School during 2003-2004. Michael Cantor (B.S., Chemical Engineering/Materials Engineering, ’80), a partner in the law firm Cantor Colburn LLP, a leading national firm specializing in intellectual property law, donated $25,000 to establish an undergraduate scholarship in engineering. Samuel D. Ewing, Jr. (M.S., Electrical Engineering, ’64), President of Ewing Capital, Inc., donated $25,000 to establish an undergraduate scholarship, to be called the “Ewing Scholars Scholarship Fund.” The scholarship will target academically gifted students who demonstrate outstanding scholastic performance, who contribute toward to the diversity of the School of Engineering and who attended a public high school in an urban district. Alumnus Dominick Pagano (B.S., Electrical Engineering, ’68), President and CEO of Dapco Industries, Inc., Ridgefield, CT, committed to establish a generous endowment of $100,000 that will be used to fund an undergraduate scholarship in Engineering. The scholarship, to be known as the “Dominick A. Pagano Endowed Scholarship in Computer Science & Engineering,” will target economically disadvantaged continuing students enrolled in Computer Science or Electrical Engineering who demonstrate consistently high academic achievement. The endowment will be built over the course of four years and be fully funded in 2007.

Figure 1. Freshman and undergraduate enrollment in Engineering since 1997.
EXECUTIVE SUMMARY

The preceding statistics are a summary of the six (6) Academic Departments program course offerings in the School of Engineering, student contact hours and average teaching load per teaching faculty (tenure track and tenured faculty holding the rank of Assistant, Associate, & Full Professor and permanent lecturers or instructors). The date presented covers spring 2003 and fall 2003 Semesters and excludes independent study courses or equivalent courses. If course were team taught, the teaching load was divided equally between the teaching team.

Table 2. Undergraduate and graduate student Contact Hours and Teaching Load for spring 2003 and fall 2003 for the University of Connecticut School of Engineering. (Prepared by Marty Wood.)

<table>
<thead>
<tr>
<th>Department/Program</th>
<th>1997 Freshmen Enrollment</th>
<th>2003 Freshmen Enrollment</th>
<th>Percent Change (1997 vs. 2003 data)</th>
<th>1997 Total Undergraduate Enrollment</th>
<th>2003 Total Undergraduate Enrollment</th>
<th>Percent Change (1997 vs. 2003 data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical Engineering</td>
<td>20</td>
<td>5</td>
<td>N/A</td>
<td>16</td>
<td>16</td>
<td>N/A</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>20</td>
<td>19</td>
<td>-5%</td>
<td>120</td>
<td>93</td>
<td>-23%</td>
</tr>
<tr>
<td>Civil &amp; Environmental Engineering</td>
<td>16*</td>
<td>28*</td>
<td>75%</td>
<td>132*</td>
<td>157*</td>
<td>19%</td>
</tr>
<tr>
<td>Computer Science &amp; Engineering and Computer Science (CSE + CSCI)</td>
<td>59</td>
<td>103 (93+10)**</td>
<td>75%</td>
<td>230</td>
<td>408 (370+38)**</td>
<td>77%</td>
</tr>
<tr>
<td>Electrical &amp; Computer Engineering</td>
<td>13</td>
<td>24 (14+10)**</td>
<td>85%</td>
<td>107</td>
<td>158 (119+39)**</td>
<td>48%</td>
</tr>
<tr>
<td>Engineering Physics</td>
<td>No Program</td>
<td>5</td>
<td>N/A</td>
<td>No Program</td>
<td>16</td>
<td>N/A</td>
</tr>
<tr>
<td>Management and Engineering for Manufacturing</td>
<td>4</td>
<td>9</td>
<td>125%</td>
<td>??</td>
<td>46</td>
<td>N/A</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>23</td>
<td>71</td>
<td>209%</td>
<td>178</td>
<td>271</td>
<td>52%</td>
</tr>
<tr>
<td>Metallurgy &amp; Materials Engineering</td>
<td>No Program</td>
<td>7</td>
<td>N/A</td>
<td>No Program</td>
<td>24</td>
<td>N/A</td>
</tr>
<tr>
<td>Undecided Engineering</td>
<td>23</td>
<td>73</td>
<td>217%</td>
<td>??</td>
<td>123</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>158</td>
<td>376</td>
<td>138%</td>
<td>767</td>
<td>1401***</td>
<td>83%</td>
</tr>
</tbody>
</table>

Note:
* Includes both Civil & Environmental Engineering students
** Half of the Computer Engineering students are reflected in CSE & in ECE
*** This number excludes 11 double majors

Table 3. Freshman and total enrollment by department/program fall 1997 compared to fall 2003 for the University of Connecticut School of Engineering. (Prepared by Marty Wood.)
Figure 2. Total research expenditures including indirect costs by School/College per faculty member FY 2003.

Figure 3. Top 10 total research expenditures including indirect costs by Department per faculty member FY 2003.
Figure 4. Archival journal publications (1997-2003) for the UConn School of Engineering faculty.
Research activities in the Department of Chemical Engineering continued their steady growth during the 2003-2004 academic year. External sponsored research funding exceeded $3 million for the second consecutive year, more than 50 refereed journal articles were published by departmental faculty for the second consecutive year, and the number of conference presentations given by departmental faculty nearly doubled over last year’s already high levels. The number of Ph.D. students supervised by departmental faculty grew to more than 75 at its mid-year peak – an average of greater than 5 Ph.D. students per faculty member. Several faculty members received awards recognizing their research achievements from within and outside the university this past year; most notably, Monty Shaw received the Provost’s Research Excellence Award from the University and the Founders Award from the Society of Plastics Engineers.

Last summer, the Department held the second NSF-supported Research Experience for Undergraduates (REU) program in Chemical Engineering at the Nanoscale. In 2003, of an applicant pool of more than 130 prospective participants, 11 students were selected to participate in the 10-week residential REU program. The REU program for summer 2004, which commenced June 7, 2004, received 127 applications, from which 11 students were selected to join the program.

Scholarship

The Department made good progress toward its goal of becoming a top-ranked chemical engineering research department. During the past year, 74 active grants provided more than $3.6 million in research funding. Inclusion of faculty with joint appointments in the department brings the total to nearly $4.3 million. Average funding per faculty member for the 13 tenured and tenure-track Chemical Engineering faculty remained high at an annual level of greater $275,000. In addition, scholarly activity remained strong, with 51 archival journal articles published, 38 papers published in conference proceedings, over 43 invited presentations and seminars, and 110 contributed conference presentations delivered.

Consistent with these positive measures of research scholarship, the number of Ph.D. students supervised by departmental faculty reached record levels, with a total of 68 active Ph.D. students in June 2004. The table below, updated from last year’s report, shows the growth clearly. Because this increase in Ph.D. enrollments began in 1999, we expected to see a sharp increase in Ph.D. graduation rates beginning with the current academic year. This increase was indeed observed. During the period of July 2003 – June 2004, nine students working for chemical engineering faculty earned their Ph.D. degrees. Several others are expected to defend their theses during summer 2004.

<table>
<thead>
<tr>
<th>Year (June of)</th>
<th>Ph.D. students</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>68</td>
</tr>
<tr>
<td>2003</td>
<td>67</td>
</tr>
<tr>
<td>2002</td>
<td>59</td>
</tr>
<tr>
<td>2001</td>
<td>56</td>
</tr>
<tr>
<td>2000</td>
<td>48</td>
</tr>
<tr>
<td>1999</td>
<td>41</td>
</tr>
<tr>
<td>1998</td>
<td>27</td>
</tr>
</tbody>
</table>
With regard to graduate admissions, our program remained highly selective, admitting fewer than 10% of applicants to our Ph.D. program. The Department received 154 applications, including applications to the part-time M.S. program, with 17% offered admission. Notably, nine of the 11 Ph.D. students who accepted our offers and are planning to enter the program in fall 2004 are domestic students.

Several of the faculty again received honors for their research and educational achievements this past year. Professor Monty Shaw received the University of Connecticut Provost’s Research Excellence Award. Professor Shaw also received the Founders Award from the Society of Plastics Engineers. Professors Doug Cooper and Joseph Helble were elected to membership in the Connecticut Academy of Science & Engineering. Professor Helble was also named the 2004-2005 Revelle Fellow by the American Association for the Advancement of Science (AAAS). Assistant Professor Ranjan Srivastava received the 2003-2004 Rogers Teaching Award for excellence in undergraduate teaching by vote of the senior class. Assistant Professor Lei Zhu was awarded a prestigious five-year NSF Early Career Development Award (CAREER) in the amount of $430,000 for his work in nanotechnology that has future applications in nanorobotic drug delivery and sensors.

Ms. Susan Soucy of the Chemical Engineering office received the 2003 School of Engineering Outstanding Staff Award in a ceremony held in fall 2003.

STUDENTS

Enrollment in Chemical Engineering of undergraduate students participating in the Honors Program continued to lead the university. During the past academic year, more than 30% 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 senior year.

Raynaldo Scarlett, who graduated in May 2004, was selected by the university to receive one of just two Gant Scholarships for 2003-2004 in recognition of his outstanding academic accomplishments and leadership qualities.

ENROLLMENTS, RECRUITING & OUTREACH

Freshman enrollments are showing very positive trends. The number of entering students declaring chemical engineering as a major rose for the third consecutive year to 28 for fall 2004, up from 20 enrolled entering freshmen in the fall 2003 class and 17 in the fall 2002 class. Of these 28 students, 14 – half of the class – are entering the Honors Program based on data collected through June 15, 2004.

Undergraduate research remains a core strength of our Department. Twelve out of 15, or 80% of seniors participating in an exit survey 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.

To help our students in the process of seeking employment, the student chapter of the American Institute of Chemical Engineers organized the first “Chemical Sciences Career Fair.” Fourteen local firms and over 250 students from chemical engineering, chemistry, polymer science, biomedical engineering, environmental engineering, and molecular biology attended the fair. Plans are underway to build on this success and make this an annual event.
OTHER ACTIVITIES

During the year, the Department commenced planning for the third annual Frontiers in Chemical Engineering Distinguished Lectureship, slated for October 2004. The Frontiers Lectureship, funded by a grant from Alstom Power Inc., 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 will attend the general lecture and contribute essays on the subject of this lecture. One high school student will be chosen for special recognition at the awards dinner that evening based on his/her essay.

The fourth edition of Principles, the full color annual departmental newsletter, will be published in August 2004. Principles will again be sent to all departmental alumni, all chemical engineering Department Heads in the U.S., members of the Chemical Engineering Advisory Board, seminar speakers, and selected members of the university community.
CHEMICAL ENGINEERING DEPARTMENT
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2003-2004

Luke E. K. Achenie


Douglas J. Cooper


Can Erkey


“Enantioselective Hydrogenation of Tiglic Acid in Methanol and in Dense Carbon Dioxide Catalyzed by a Ruthenium-BINAP Complex Substituted With OCF3 Groups,” (with X. Dong), Journal of Molecular Catalysis A: Chemical, Vol. 211, No.1-2, pp. 73-81, 2004.


James M. Fenton


Joseph J. Helble


Patrick T. Mather


**Richard S. Parnas**


**Montgomery T. Shaw**


**Robert A. Weiss**


Thomas K. Wood


Lei Zhu


CHEMICAL ENGINEERING DEPARTMENT
BOOKS, BOOK CHAPTERS, BOOK SECTIONS AND EDITED VOLUMES
2003-2004

Douglas J. Cooper


Can Erkey

CHEMICAL ENGINEERING DEPARTMENT
CONFERENCE PROCEEDINGS AND OTHER PUBLICATIONS
2003-2004

Luke E. K. Achenie


Douglas J. Cooper


Michael B. Cutlip

“Enhancing Computer-Based Problem Solving Skills with a Combination of Software Packages,” (with M. Shacham), Session 3420, ASEE Annual Conference, Salt Lake City, UT, June 20-23, 2004.

Can Erkey


**James M. Fenton**


**Joseph J. Helble**


**Patrick T. Mather**


Richard S. Parnas


Montgomery T. Shaw


Robert A. Weiss


**Lei Zhu**

CHEMICAL ENGINEERING DEPARTMENT
ACTIVE RESEARCH GRANTS AND CONTRACT
2003-2004

Luke E. K. Achenie


“Simulation and Optimization of Materials Processing Under Uncertainties,” (with PI: R. Pitchumani and co-PI: E. Santos), National Science Foundation, 9/1/01-8/31/05, $409,140.

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


Thomas F. Anderson

“Galileo Engineering Ambassadors in Classrooms,” (with K. Kazerounian, R. Vieth, T. Reagan (Education) and M. Wood), National Science Foundation, 6/02-6/05, $1,430,000.

Douglas J. Cooper


UConn’s Process Control™ Consortium:

Honeywell Corporation, 7/00-6/04, $25,000.

Owens Corning, 7/00-6/04, $22,000.

Westinghouse Savannah River, 7/97-6/04, $178,000.

Mixed Industries, 7/03-6/04, $47,000.

Robert W. Coughlin


Can Erkey

“REU Site in Chemical Engineering at the Nanoscale,” National Science Foundation, (with co-PI: J. Helble), 2/01/02-2/28/05, $199,608.

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

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

“Processing of Inorganic Materials using Supercritical Fluids,” Norton/St. Gobain, 6/1/00-5/30/04, $123,500.


James M. Fenton


“Training of Two University of Connecticut Graduate Students in Fuel Cell Research at UTC Fuel Cells,” UTC Fuel Cells, 1/19/04-12/23/04, $69,553.


Joseph J. Helble

“Mercury Transformations in Combustion Systems,” U.S. Department of Energy (subcontract to University of Utah), 9/1/03-8/31/06, $75,000.

“Modeling Mercury Chemistry,” Babcock and Wilcox, 9/1/03-8/31/04, $50,000.

“Dreyfus Post-Doctoral Fellowship in Environmental Chemistry,” (with PI: B. Holmén), Dreyfus Foundation, 2/1/04-1/31/06, $80,000.

“Development of a Novel Process for Mercury Emissions Control,” U.S. Environmental Protection Agency, 7/1/00-9/30/03, $224,900.

“Ash Formation Under High Pressure Conditions,” U.S. Department of Energy (subcontract to Fluent), 6/1/01-12/31/04, $149,000.

“REU Site in Chemical Engineering at the Nanoscale,” National Science Foundation, (with co-PI: C. Erkey), 2/1/02 – 2/28/05, $199,608.

EPA Hazardous Substance Research Center, U.S. Environmental Protection Agency (subcontract to Johns Hopkins University), 10/1/01-9/30/04, $87,000.

“High Capacity Thermally Regenerated Amines for CO₂ Capture,” NASA (subcontract to University of Florida), 6/15/02-8/31/04, $139,009.


“Novel Support Materials for CO₂ Capture,” NASA (Connecticut Space Grant Consortium), 6/1/03-8/31/04, $10,000.

Patrick T. Mather

“Material and Process Development of Shape Memory Polymers for Biomedical Devices,” Boston Scientific Corporation, 1/03-1/05, $416,408.


“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.

Richard S. Parnas


“Proposal to Measure Fuel Cell Membrane Operation with Fiber Optic Sensors,” (with T. Seery), through the Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/03-5/04, $80,000.

“Basalt Fiber Reinforced Polymer Composites,” New England Transportation Consortium, 10/15/03-10/14/05, $65,791.


Sandia/UConn Collaboration on Polymer Gels and Filled Polymers, U.S. Department of Energy/Sandia National Laboratory, 4/15/04-2/15/05, $48,000.

Montgomery T. Shaw


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

“Sealing of Small Movement Bridge Expansion Joints,” (with PI: R. Malla (75%)), New England Transportation Consortium, 8/1/03-7/31/04, $74,996.


Ranjan Srivastava

“Modeling of MS2 Viral Evolution Kinetics,” University of Connecticut Research Foundation, 6/1/03-5/31/05, $20,000.

Robert A. Weiss

“Fracture Toughening of Polypropylene with Liquid Crystalline Polymers,” National Science Foundation, 1/1/01-12/31/04, $20,540.

“Structure of Hydrophobically-Associating Hydrogels,” Petroleum Research Fund, American Chemical Society, 9/1/01-8/31/04, $60,000.

“Polymer Blends as High Temperature PEM Materials,” Department of Energy, 3/03-12/04, $191,000.


“Functional Polymers from Renewable Resources – Itaconic and Lactic Acids (TSE03-B),” (with co-PI: S.J. Huang), National Science Foundation, 2003-2006, $360,000.

Thomas K. Wood


“Plant Biofilms Inhibitors to Discover Biofilm Genes,” Sequoia Sciences, 2004-2005, $85,000.


“Molecular Evolution of Oxygenases for Biosensor Arrays,” The Korean Ministry of Environment, 2/03-2/06, $75,000.

“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.


“Redirecting Cellular Metabolism for the Biodegradation of Mixtures of Chlorinated Solvents,” (with co-PI: K. Reardon (Colorado State University)), National Science Foundation, 9/15/00-9/15/04, $714,932.

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

Lei Zhu

“A New Bicontinuous Cubic Morphology in Diblock Copolymers as Photonic Bandgap Materials,” University of Connecticut Research Foundation, 01/01/03-1/8/04, $17,992.


“CAREER: Tailoring the Nanostructure and Morphology of Hydrogen-bonded Supramolecular Liquid Crystals using Immiscible Polymer Side Chains,” National Science Foundation, 1/1/04-12/31/09, $430,000.
Douglas J. Cooper


James M. Fenton


Joseph J. Helble


AAAS Revelle Fellowship for environmental policy, April 2004.

Montgomery T. Shaw


Appointed Fellow, the Society of Plastics Engineers, 2004.

Ranjan Srivistava

Excellence in Teaching Award, Rogers Corporation, 2003.

Robert A. Weiss


Thomas K. Wood


Lei Zhu

Early CAREER Award, National Science Foundation, 2004.
CHEMICAL ENGINEERING DEPARTMENT
MAJOR PROFESSIONAL ACTIVITIES
2003-2004

Luke E. K. Achenie

Guest Editor, Elsevier Publishers, Special Issue of Advances in Environmental Research (AER), Volume 8, 2003.

Chair, Topical Conference Session T1009, Systems Engineering in Pharmaceutical Processes and Biotechnology, American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 2003.


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

Member, American Institute of Chemical Engineers (AIChE), Minority Faculty Forum.

Presentations


Thomas F. Anderson

Treasurer, University of Connecticut Chapter of Sigma Xi.

Douglas J. Cooper

Presentations


Michael B. Cutlip

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

Presentations


Can Erkey


Session Chair, Reactions in Near Critical and Supercritical Fluids II, Annual American Institute of Chemical Engineers Meeting, San Francisco, CA, November 16-21, 2003.

Presentations


James M. Fenton


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

Advisor, Energy Technology Division, The Electrochemical Society.
Member, Programming Committee for Area 1E, American Institute of Chemical Engineers.

Presentations


Joseph J. Helble

Editorial Board, Fuel Processing Technology (Elsevier).

Board Member, American Chemical Society (ACS) Division of Fuel Chemistry (2003-2007).

Presentations


Patrick T. Mather

Member, Editorial Advisory Board, Polymer Engineering and Science (1998-present).


Member, Board of Directors, Polymer Analysis Division of Society of Plastics Engineers.
Member, International Research Award Selection Committee, Society of Plastics Engineers.

Chairman, Membership Committee, Society of Rheology.

Presentations


“Capillary Instabilities of Thin Nematic Liquid Crystalline Polymer Fibers Embedded in a Flexible Polymer Matrix” (with J. Wu), American Physical Society Annual March Meeting, DПOLY, Montreal, Canada, March 25, 2004.


“Rheological Behavior of Polystyrene (PS) With Incorporation of Hybrid Polyhedral Oligosilsesquioxane (POSS),” (with J. Wu and T.S. Haddad), 75th Annual Meeting of the Society of Rheology, Pittsburgh, PA, October 2003.


Richard S. Parnas

Member, Editorial Advisory Board, *Polymer Composites*.

Guest Editor, *Polymer Composites, Composites A*.

**Presentations**


Montgomery T. Shaw

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

Treasurer, Society of Rheology.
Presentations


Ranjan Srivastava

Presentation

Robert A. Weiss

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

Editor-in-Chief, *Polymer Composites*.

Member, International Advisory Board, *Polymers and Polymer Composites*.

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

Member, Publications Committee and Awards Committee, Society of Plastics Engineers.

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


Fellow, American Physical Society.

Fellow, Society of Plastics Engineers.

Member, Connecticut Academy of Sciences and Engineering.

Presentations


**Thomas K. Wood**

Editorial Board, *Applied and Environmental Microbiology.*

**Presentations**


“Directed Evolution of Toluene-o-Xylene Monooxygenase from *Pseudomonas stutzeri* OX1 for the Production of 4-Methyresorcinol, Methylhydroquinone, Pyrogallol, 1,2,4-Trihydroxybenzene, Nitrohydroquinone, 3-, and 4-Nitrocatechol,” (with G. Vardar and K. Ryu), American Society for Microbiology National Meeting, New Orleans, LA, May 2004.


'Directed Evolution of Toluene-\textit{o}-Xylene Monooxygenase from \textit{Pseudomonas stutzeri} OX1 for the Production of 4-Methylresorcinol, Methyldihydroquinone, Pyrogallol, and 1,2,4-Trihydroxybenzene,” (with G. Vardar), American Chemical Society National Meeting, Anaheim, CA, 2004.


“Oxidation of Benzene to Phenol, Catechol, and 1,2,3-Trihydroxybenzene by Toluene 4-Monooxygenase of \textit{Pseudomonas mendocina} KR1 and Toluene 3-Monooxygenase of \textit{Ralstonia pickettii} PKO1,” (with Y. Tao, A. Fishman and W.E. Bentley), Pseudomonas 2003, Quebec, Canada, September 6-10, 2003.


“DNA Shuffling and Saturation Mutagenesis of 2,4-DNT Dioxygenase of \textit{Burkholderia} sp. strain DNT for Enhanced 2,6-Dinitrotoluene Degradation,” (with T. Leungsakul, B.G. Keenan and B.F. Smets), Pseudomonas 2003, Quebec, Canada, September 6-10, 2003.

Lei Zhu

Session Chair, P29 DPOLY: Crystallization of Polymers, American Physical Society National Meeting, Montreal, QC, Canada, March 22-26, 2004.
Membership Chair, North American Thermal Analysis Society.

Presentations


“Self-assembly and Crystallization Behaviors in Crystalline Block Copolymer,” invited presentation, Chemistry Department, SUNY Binghamton, NY, February 27, 2004.


“Self-assembly and Crystallization Behaviors in Crystalline Block Copolymer,” invited presentation, Chemistry Department, University of Sherbrooke, QC, Canada, March 26, 2004.


The Civil & Environmental Engineering (CEE) Department continued solid growth in its programs. The faculty sustained vigorous research and scholarship programs and received numerous honors and awards. Enrollment trends in the department appear to be responding to active outreach and recruitment activities. The department was assigned 25% additional space. The department planned a new graduate program that will be implemented in the coming academic year.

**FACULTY**

Assistant Professor Jeong-Ho Kim joined the faculty January 1, 2004 following a brief post-doctoral fellowship at the University of Illinois at Urbana-Champaign. His area of expertise is in applied mechanics. During the year, the University disbanded the Geology & Geophysics Department and as a result, Associate Professor Lanbo Liu will be joining the CEE faculty July 1, 2004. His area of expertise is in geophysics, with particular emphasis on the use of ground penetrating radar. Among other courses, Professor Liu will be bringing GEOL 229 – *Engineering Geology* under the CEE umbrella, making the course more accessible to our students.

Associate Professor Lisa Aultman-Hall was appointed Director of the Connecticut Transportation Institute. In addition, she gained tenure effective the coming academic year. Associate Professor Norman Garrick was on a full-year sabbatical leave for the 2004 calendar year.

**RESEARCH AND SCHOLARSHIP**

The faculty continues to sustain a robust research program with slightly under $3 million in expenditures supporting more than 60 graduate assistants and 7 post-doctoral fellows. Scholarly production is growing rapidly, with nearly 200 journal articles, books, book chapters and conference proceedings published, with an average of over two publications per graduate student per year and over four publications per faculty per year.

**HONORS AND AWARDS**

Associate Professor Amvrossios Bagtzoglou was appointed a member of the New York State Academy of Sciences. Associate Professor Kenneth Demars received a Technical Editor’s Award from ASTM. Professor John DeWolf was inducted into the Connecticut Academy of Science & Engineering. In addition, Professor DeWolf was awarded the C. R. Klewin, Inc. Award for Excellence in Teaching. Associate Professor Norman Garrick received a Fulbright fellowship. Assistant Professor Jeong-Ho Kim received a “Student Benchmark Competition Award” from ASME and U.S. National Congress on Computational Mechanics. Associate Professor Ramesh Malla received an official citation from the State of Connecticut General Assembly for his many years of significant volunteer support of the Connecticut Invention Convention (CIC). In addition, Professor Malla was the General Chair for the 9th International Conference on Engineering, Construction and Operations in Challenging Environments for the ASCE Aerospace Division. Associate Professor Fred Ogden was co-chair of the national ASCE/EWRI Groundwater Issues Symposium. Northeast Utilities Foundation Chair Professor of Environmental Engineering Dani Or was selected to be a Fellow of the Soil Science Society of America. Associate Professor Barth F. Smets co-chaired a national invitation-only DOE/NSF-sponsored 3-day workshop on Horizontal Gene Flow in Microbial Communities.
WOMEN IN ENGINEERING LEADERSHIP INSTITUTE SUMMIT MAY 3-5

The Department is fortunate to have five women among its 22 faculty, leading the nation in percentage of female faculty. Three of those women, Drs. Britt Holmén, Lisa Aultman-Hall and Allison MacKay, organized the NSF-sponsored Women in Engineering Leadership Institute Summit, May 3-5, 2004. Over 75 engineering leaders from academia and industry participated in this hands-on summit held on the Storrs campus. Participants included representatives from several professional organizations, including women presidents of three national professional societies. The objective of the summit was to develop national cooperative strategies to increase the number of women in leadership roles in both industry and academia.

UNDERGRADUATE STUDENT TEAM WINS DESIGN COMPETITION

A team of CEE undergraduates won the first ever Metcalf & Eddy environmental engineering design competition. The winning team of Brian Canterbury, Dan Adanti, Jocelyn Michelini, Russell Ward, Haley Busch and Carlos Rexach beat out the other UConn team, which earned second place, as well as teams from Rensselaer Polytechnic Institute and Smith College. Both UConn teams were mixes of civil engineering and environmental engineering majors supervised by Associate Professor Barth Smets.

AWARDS TO ALUMNI

Alumnus Kumares C. Sinha (M.S. '66, Ph.D. '68) was inducted into the Academy of Distinguished Engineers at the University of Connecticut. William H. Hover (M.S. '79) and James Kilduff (B.S. '83, M.S. '87) each received a Distinguished Civil & Environmental Engineering Alumnus Award from the Department. In addition, David J. O’Hearn (B.S. '93, M.S. '97) received the Distinguished Civil & Environmental Engineering Junior Alumnus Award.

FACILITIES AND INFRASTRUCTURE

During the winter break, we received access to approximately 5,000 sq.ft. of additional and newly-renovated space in the Bronwell building, to complement our current space in the adjacent Castleman building. The space was assigned to additional environmental laboratories and water resources research computing. This allowed for significant reassignment of existing space in Castleman and to provide much better office environments for our graduate students. The additional space in Bronwell has significantly relieved the space crunch in Castleman, which has emerged recently with the sustained growth trends in our research programs. Notwithstanding, there remain some renovation/remodeling needs in Castleman.

ENROLLMENT

For the past few years, undergraduate enrollment has paralleled national growth trends. Currently, there are nearly 160 Civil Engineering and Environmental Engineering majors, of whom 22% are female, slightly ahead of national trends. Meanwhile graduate enrollment also continues to grow and is at 61 full-time (30% female) and approximately 20 active part-time students. Twenty-six undergraduate and 2 graduate students received 26 scholarship awards for the 2003-2004 year.

Course offerings continue to grow in response to increasing enrollments of CEE undergraduate majors and in service to other engineering majors. The Department offered 63 courses in 81 sections of which 43 courses and 61 sections were at the undergraduate level.

MASTER OF ENGINEERING PROGRAM

The department finalized plans for participation in the School of Engineering’s Master of Engineering program beginning fall 2004. Four graduate-level courses will be offered on-site at the easily-accessible
offices of Fuss & O’Neill in Manchester, CT. The Department looks forward to the success of this new program in service of the professional community.
CIVIL & ENVIRONMENTAL ENGINEERING DEPARTMENT
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2003-2004

Michael L. Accorsi


Emmanouil N. Anagnostou


Lisa M. Aultman-Hall


Amvrossios C. Bagtzoglou


Kenneth R. Demars


John T. DeWolf


Howard I. Epstein


Britt A. Holmén


John N. Ivan


**Jeong-Ho Kim**


**Allison A. MacKay**


**Ramesh B. Malla**


**Fred L. Ogden**


Dani Or


Barth F. Smets


**Guiling Wang**


CIVIL & ENVIRONMENTAL ENGINEERING DEPARTMENT
BOOKS, BOOK CHAPTERS, BOOK SECTIONS & EDITED VOLUMES
2003-2004

Lisa M. Aultman-Hall


Amvrossios C. Bagztooglou


John T. DeWolf


Britt A. Holmén

CIVIL & ENVIRONMENTAL ENGINEERING DEPARTMENT
CONFERENCES PROCEEDINGS & OTHER PUBLICATIONS
2003-2004

Nelly M. Abboud


Michael L. Accorsi


Emmanouil N. Anagnostou


Lisa M. Aultman-Hall


Amvrossios C. Bagtzoglou


Kenneth R. Demars


John T. DeWolf


John N. Ivan


“A New Approach for Including Traffic Volumes in Crash Rate Analysis and Forecasting,”


Allison A. MacKay


Ramesh B. Malla


**Rusk Y. Masih**


**Fred L. Ogden**


**Dani Or**


**Barth F. Smets**


CIVIL & ENVIRONMENTAL ENGINEERING DEPARTMENT
ACTIVE RESEARCH GRANTS AND CONTRACTS
2003-2004

Michael L. Accorsi


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

“Computational Modeling of Ceramic Matrix Composites,” Pratt & Whitney, 02/01/03-12/31/04, $141,404.

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


“Development and Application of Two Simulation Capabilities for Airdrop Systems,” U.S. Army Natick Soldier Systems Center, 6/01/04-12/31/04, $34,040.

Emmanouil N. Anagnostou

“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.

Lisa M. Aultman-Hall


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


“Route Behavior Analysis from a System Efficiency Perspective,” (with co-PIs: E. Parkany and W. ElDessouki), New England University Transportation Center, 9/1/02-2/29/04, $57,250.

“Program Development for the Connecticut Transportation Institute,” (with co-PI: C. Dougan (60%)), Connecticut Department of Transportation, 1/1/03-6/30-04, $105,240.

“Development of Internet-Based Computer Databases for the Connecticut Department of Transportation,” (with co-PI: J. Mahoney (80%)), Connecticut Department of Transportation, 1/1/04-12/31/04, $136,000.

“Evaluating the Long-Term Performance of Pavements Thermally Imaged During Construction,” (with co-PI: J. Mahoney (80%)), Connecticut Department of Transportation, 1/1/04-8/31/04, $48,000.

“Modeling the Spatial Distribution of Fine Particulate Matter Emissions from Transportation Vehicles,” (with co-PI: B.A. Holmén (50%)), National Science Foundation, 10/15/03-9/30/04, $318,000.


“Women Engineering Faculty Leadership Network,” (with co-PI: B.A. Holmén (50%)), National Science Foundation, 8/1/03-7/31/06, $100,000.

Amvrossios C. Bagtzoglou

“Sustainable Yield of the University of Connecticut Fenton River Well Field,” (with co-PIs: G. Warner (20%), F.L. Ogden (30%) and J. Starn (20%)), University of Connecticut, 01/1/03-5/31/05, $524,000.


Christian F. Davis

“Technology Transfer Center,” (with co-PI: D. Shea (90%)), Connecticut Department of Transportation, 1/1/03-9/30/03, $310,172.

“Continuation of the Cooperative Highway Research Program,” Connecticut Department of Transportation, 6/1/03-5/31/04, $349,473.

“Management of the New England Transportation Consortium,” (with co-PI: G. McCarthy (90%)), Connecticut Department of Transportation, 1/1/03-9/30/03, $124,259.


Kenneth R. Demars


John T. DeWolf


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

Norman W. Garrick

“Parking Demand Management for Sustainable Development: Learning from Innovative New England Communities,” (with co-PI: L.M. Aultman-Hall (33%)), New England University Transportation Center, 9/1/03-8/31/04, $63,348.


“Eisenhower Transportation Fellowship,” Connecticut Department of Transportation, 8/23/03-8/22/06, $103,500.


“Ability of Wood Fiber Materials to Attenuate Heavy Metals Associated with Highway Runoff,” (with co-PI: A.A. MacKay (50%)), New England Transportation Consortium, 08/23/03-08/22/05, $72,000.
Britt A. Holmén

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


“Women Engineering Faculty Leadership Network,” (with co-PI: L.M. Aultman-Hall (50%)), National Science Foundation, 8/1/03-7/31/06, $100,000.


“Modeling Modal Transient Events for Vehicle Emission Models,” (with co-PI: L.M. Aultman-Hall (50%)), New England University Transportation Center, 9/1/03-8/31/04, $53,421.

“Modeling the Spatial Distribution of Fine Particulate Matter Emissions from Transportation Vehicles,” (with co-PI: L.M. Aultman-Hall (50%)), U.S. Department of Agriculture, 10/15/03-9/30/04, $318,000.


“Postdoctoral Fellowship in Environmental Chemistry,” Dreyfus Foundation, (with co-PI: J. Helble (50%)), 2/1/04-1/31/06, $80,000.

John N. Ivan


“The Effect of Segment Characteristics on the Severity of Head-on Crashes on Two-Lane Rural Highways,” New England University Transportation Center (USDOT), 9/1/02-8/31/04, $60,990.

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 (45%) and A.T. Stone (Johns Hopkins University, 10%)), U.S. EPA Hazardous Substances Research Center, 10/01/01-09/30/03, $222,017.
Seasonal Controls of Arsenic Transport Across the Groundwater-Surface Water Interface at a Closed Landfill Site,” (with co-PI: B.F. Smets (45%) and H. Fairbrother (Johns Hopkins University, 10%)), University of Connecticut, 10/01/03-09/30/05, $273,966.

“Factors Controlling Veterinary Antibiotic Sorption to Soils,” (with co-PI: D. Vasudevan (Duke University, 50%)), 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 (Duke University, 50%)), National Science Foundation - Division of Bioengineering & Environmental Systems, 04/01/03-03/31/06, $378,094.

“Ability of Wood Fiber Materials to Attenuate Heavy Metals Associated with Highway Runoff,” (with co-PI: N.W. Garrick (50%)), New England Transportation Consortium, 08/23/03-08/22/05, $72,000.

“Identifying New Strategies for the Biochemical Treatment of Pharmaceutical Wastewater Effluents,” (with co-PI: B.F. Smets (50%)), Pfizer, Inc. Central Research Division, Groton, CT, 08/31/01-08/30/04, $171,620.

Ramesh B. Malla


“Sealing of Small Movement Bridge Expansion Joints,” (with co-PI: M. Shaw (25%)) New England Transportation Consortium, 8/1/03-7/31/04, $75,000.

“Establish Subgrade Support Values for Typical Soils in New England,” (with co-PI: V. Janoo (10%)), New England Transportation Consortium, 8/1/02-1/31/05, $80,000.

“Dynamic Failure of Frame Structures at High Temperature,” (with co-PI: E. Smith (10%)), University of Connecticut Research Foundation, 6/1/03-12/31/04, $18,000.


Fred L. Ogden

“Addition of Storm Drainage Capability to the U.S. Army Corps of Engineers GSSHA Model,” U.S. Army Corps of Engineers, 9/1/03-8/31/05, $111,220.

“Sub-Grid Erosion Features in a Distributed Hydrologic Model,” U.S. Army Corps of Engineers, 9/1/03-8/31/05, $119,888.

“Sustainable Yield of the University of Connecticut Fenton River Well Field,” (with co-PIs: G. Warner (20%), A.C. Bagtzoglou (30%) and J. Starn (20%)), University of Connecticut, 01/01/03-5/31/05.

“Studies of Evapotranspiration, Throughfall and Soil Moisture Dynamics in Panama,” U.S. Department of Defense DURIP, 5/1/04-4/30/05, $95,000.

“Water Quality Dynamics of Stormwater Retention/Detention Ponds,” (with co-PI: P. Visscher (80%)), National Science Foundation, 2/1/01-1/31/05, $244,000.

“A Community-Based Consortium for the Advancement of Hydrologic Science,” National Science Foundation, 8/1/03-4/30/04, $14,833.


Dani Or

“Hydraulic Conductivity of Unsaturated Porous Media - Film and Corner Flows in Angular Pore Space,” NRI-U.S. Department of Agriculture, 10/1/02-9/30/05, $160,000.

“Thermodielectric Measurement of Soil Specific Surface Area and Bound Water,” (with co-PI: J.M. Wraith), NRI-U.S. Department of Agriculture (Soils and Soil Biology), 10/15/01-10/31/04, (total $275,000) University of Connecticut portion $135,000.

“Physical Processes Affecting Microbial Habitats and Activity in Unsaturated Agricultural Soils,” (with co-PIs: S. Friedman (Israel) and J. Norton (Utah State University)), U.S.-Israel Bi-national Agriculture Resource and Development Fund (BARD), 10/15/02-10/14/05, (total $335,000) University of Connecticut portion $140,000.


“Compaction of Tilled Soils - Microscale Structural Dynamics Affecting Pore Space and Hydraulic Properties,” NRI-USDA, 7/1/03-7/31/05, $193,000.

Barth F. Smets

“A Graduate Fellowship Program in Environmental Biotechnology at the University of Connecticut,” (with co-PI: K.M. Noll (50%)), U.S. Department of Education, 08/15/00-08/14/04, $375,573.

“Geochemistry, Biochemistry, and Surface/Groundwater Interactions for As, Cr, Ni, Zn, and Cd with Applications to Contaminated Waterfronts,” (with co-PIs: A.A. MacKay (45%), A.T. Stone (Johns Hopkins, 10%)), U.S. EPA Hazardous Substances Research Centers, 2000-STAR-A1 (Johns Hopkins University, lead institution); 10/1/01-9/30/04, University of Connecticut portion $360,686.

Seasonal Controls of Arsenic Transport Across the Groundwater-Surface Water Interface at a Closed Landfill Site,” (with co-PIs: A.A. MacKay (45%), H. Fairbrother (Johns Hopkins, 10%)), U.S. EPA Hazardous Substances Research Centers, 2000-STAR-A1 10/01/03-09/30/05, $273,966.

“Mechanistic Role of Plant Root Exudates in the Phytoremediation of Persistent Organic Chemicals,” (with co-PIs: D. Gage (25%), J.C White (50%), M.P.N. Gent (5%), M. Incorvia Mattina (5%) CT Agricultural Experiment Station), U.S. EPA Joint Program on Phytoremediation 2001-STAR-C1, 8/15/01-8/14/04, (total grant $400,000) University of Connecticut portion $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, 8/01/01-8/01/04, $600,002.

“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, 08/31/01-08/30/04, $171,620.

“A Workshop on Horizontal Gene Flow in Microbial Communities,” (with co-PI: T. Barkay), National Science Foundation -MCB-MO/MIP & DOE-NABIR, 11/15/03-2/28/05 $96,055.

Erling Smith

“Dynamic Failure of Frame Structures at High Temperature,” (with PI: R.B. Malla (90%)), University of Connecticut Research Foundation, 6/1/03-12/31/04, $18,000.

Guiling Wang


“Response of the Land Climate System to Hydrologic and Radiative Forcings,” NASA/Georgia Institute of Technology, 1/1/04-12/31/04, $120,000.
CIVIL & ENVIRONMENTAL ENGINEERING DEPARTMENT
AWARDS, HONORS, PATENTS
2003-2004

Nelly. M. Abboud


Amvrossios C. Bagtzoglou

Elected Standing Member, the Science & Technical Advisory Committee, U.S. EPA Long Island Sound Study.

Kenneth R. Demars


John T. DeWolf

Elected member, Connecticut Academy of Science & Engineering.

Ramesh B. Malla

Official Citation, General Assembly, State of Connecticut in Recognition of significant volunteer support to the Connecticut Invention Convention (CIC), May 1, 2004.
Nelly M. Abboud


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


Member, U.S. EPA’s National Center for Environmental Research (NCER), Peer Review Panelist Information System (PRPIS), USEPA, Washington, DC, 2003-present.

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


Board Member, Organizing Committee, Natural Resources Council of Connecticut, Conferences in Hartford, CT, November 2003 and New Haven, CT, June 2004.


Member, Abroad Advisors, Arab Healthy Water Association, March 2004 - present.

Michael L. Accorsi


Emmanouil N. Anagnostou

Associate Editor, *Journal of Applied Meteorology*.

Organizer, Global Precipitation Measurement and Hydrometeorological Extremes Session of the 2004 EGU Joint Assembly.

Member, NASA’s New Investigator Program Peer Review Committee.

Member, NASA’s Science Team on Tropical Rainfall Measuring Mission.

International Advisor, National Observatory of Athens, Greece.

Lisa Aultman-Hall

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


Member, Advisory Committee, New England Transportation Consortium, University of Connecticut Representative to Research.


Presentations


Amvrossios C. Bagtzoglou

Editor, Water, Air, and Soil Pollution: Advances in Remediation Technology.

Associate Editor, Journal of Water Resources Research.

Associate Editor, Journal of the American Water Resources Association.

Member, Editorial Board, Journal of Environmental Forensics.

Member, Organizing Committee, 9th ASCE Biennial International Conference on Engineering, Construction and Operations in Challenging Environments, Houston, TX, 2004.


Presentations


Kenneth R. Demars

Member, Editorial Board, ASTM Geotechnical Testing Journal, (8/95 to present).

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

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

John T. DeWolf

Associate Editor, Structural Health Monitoring.

Member, Connecticut Board of Examiners for Professional Engineers and Land Surveyors.

Howard I. Epstein

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

Chair, “Structural Renovation of Building,” Workshop, Bishop Center, Storrs, CT, November 18, 2003.

Presentations


**Norman W. Garrick**

Member, NAS NCHRP Research Panel, Roundabouts and Visually Impaired Pedestrians.

Member, NAS NCHRP Research Panel, Aesthetic Guide Rails.

**Britt A. Holmén**


Member, Peer Review Panel, National Science Foundation, ADVANCE, October 2003.

**John N. Ivan**


**Jeong-Ho Kim**

*Presentations*


**Allison A. MacKay**


**Ramesh B.Malla**


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

Member, Editorial Board, *International Journal of Space Structures*, U.K.
General Chair, 9th ASCE Aerospace Division International Conference on Engineering, Construction and Operations in Challenging Environments (EARTH & SPACE 2004), Houston, TX, March 7-10, 2004.


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

Member: Committee on Dynamics and Controls, Aerospace Division; Advanced Composite Materials and Structures; and Space Engineering and Construction of the American Society of Civil Engineers (ASCE).

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

Presentations


“Experimental Studies of Activated Alumina Packed Beds for Processing Water in Space Station,” (with N. Díaz), poster, Connecticut Space Grant Consortium Award Reception, Windsor Locks, CT, April 26, 2004.

Rusk Y. Masih

Presentation

**Fred L. Ogden**

Associate Editor, *ASCE Journal of Hydrologic Engineering*.

Co-Chair, ASCE/EWRI Symposium on Groundwater Issues, Salt Lake City, UT, June 27- July 1, 2004.


Chair, ASCE Task Committee on Distributed Hydrologic Models, 2003-present.

Member, Board of Directors, Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI), 2002-present.

Member, CUAHSI Hydrologic Observatory Design Team, 2003-present.

**Dani Or**

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

Member, Steering Committee, Earth and Space 2004 - 9th ASCE Aerospace Division, March 2004, Houston, TX.

Chair and Organizer, Soil Physics Division (S-1) Annual Meeting, Soil Science Society of America, Denver, CO, November 2-6, 2003.

Chair, Soil Physics Division (S-1), Soil Science Society of America.

Proposal Reviewer: Bi-National Science Foundation (Israel –US) and National Science Foundation.

**Barth F. Smets**


Member, Distinguished Lecture Committee, Association of Environmental Engineering and Science Professors.

Member, Research Committee and Project Subcommittee, Water Environment Federation.

**Presentations**


COMPUTER SCIENCE & ENGINEERING DEPARTMENT
ANNUAL REPORT SUMMARY
2003-2004

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 area of computer engineering.
- Enhanced research programs, with both sustained and new funding initiatives.

EDUCATIONAL PROGRAMS HIGHLIGHTS

During the year, we continued to revise and fine-tune our undergraduate programs. In particular, we: (1) reduced the number of credits needed to graduate for two of our three programs: Computer Science & Engineering and Computer Engineering; and, (2) introduced a course in Bioinformatics that is cross-listed with the Biomedical Engineering program. We also commenced work on the self-study report of the Computer Engineering program in preparation for an accreditation visit in fall 2004. In addition, our enrollment continues to be high (our 2004 freshman class is 25% of the total freshman class for the School of Engineering). Our graduate program also 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 2004 semester, we have received in excess of 150 applications from around the world. Currently, the Department has more than 40 Ph.D. students and 50 M.S. students. The popularity of our programs allows us to significantly raise our acceptance standards. Lastly, during the year we developed a new qualifier examination for all Ph.D. students; this examination will mandate an assessment that Ph.D. students are able to conduct research in an area of their interests early in their program.

FACULTY RECRUITING AND DEPARTMENTAL PERSONNEL

Recognizing that faculty are the heart of any department in a Research I university such as the University of Connecticut, we continue to search for the best faculty candidates from the top-ranked universities. We successfully recruited and hired a new tenure-track assistant professor who will start in the fall 2004 semester. Dr. Zhijie “Jerry” Shi, a researcher in the area of Computer Architecture and Security, received his Ph.D. from Princeton in Electrical Engineering in May 2004. We are extremely proud of our departmental growth in tenured and tenure-track faculty: we have added a total of 10 faculty members in the last four years (nine assistant professors as well as Sanguthevar Rajasekaran, UTC Chair Professor of Computer Science and Engineering and the Director of the General Electric e-Engineering Clinic).

Lastly, we welcomed a new Administrative Coordinator, Ms. Debra Moreau, who joined the Department in November 2003 and has taken the lead in organizing the office and budgetary accounts, and a new Secretary I, Ms. Amy Wiener, who joined the Department in May 2004 to handle purchasing, travel, and graduate program paperwork. Together, they have fostered a highly professional and efficient day-to-day operation of the Departmental office.
RESEARCH HIGHLIGHTS

Our research productivity, both in terms of funding and publications, continues to increase with both ongoing and new funding efforts. Drs. Rajaskaran, Reda Ammar and Chun-Hsi Huang, in collaboration with faculty members from the University of Florida and Dartmouth College, received a National Science Foundation-ITR grant totaling $1,206,003 ($581,000 for UConn). Dr. Dong-Guk Shin continues his successful NIH funded research program in Bioinformatics. DARPA funded $500,000 to Dr. Ian Greenshields and several CSE and ECE faculty members to study the project “Transformation Spaces: Specification and Characterization.” NSF also extends Tom Peters’ grant of $767,000 for the third year. Drs. Alex Russell and Alex Shvartsman added a new NSF grant of $155,000 to their list of funding. Drs. Steven Demurjian and Shin continued to receive more than $329,998/year in funding from the State of Connecticut Insurance Department. Similarly, Dr. Eugene Santos received additional grants from the Department of Defense via Securboration, Inc. ALO awarded Dr. Ammar $99,914 to establish a partnership program with Ain Shames University of Egypt. This year, our publication achievement includes more than 140 archival and conference papers. These are just examples and a complete list is given in the enclosed faculty reports.

Our faculty members 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. Of particular note is the news that Dr. Jerry Engel was named president-elect for the IEEE Computer Society (IEEE’s largest society). Faculty members have also been invited to present their research directions and results, including keynote addresses in several major international and national conferences. In addition, faculty members have been invited to present their research at institutes such as Yale University, Cornell University and Brown University.

CONCLUDING REMARK

The Computer Science & Engineering Department is in an impressive growth path. The addition of 10 high quality faculty in the last four years has increased our tenured/tenure-track faculty to a total of 20. 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 research and teaching.
COMPUTER SCIENCE & ENGINEERING DEPARTMENT
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2003-2004

Reda Ammar


Jun-Hong Cui


Dina Goldin


Chun-Hsi Huang


Aggelos Kiayias

Lester Lipsky


Ion Mandoiu


Laurent Michel


Thomas J. Peters


Sanguthevar Rajasekaran


**Alexander Russell**


**Eugene Santos, Jr.**


**Alexander Shvartsman**


COMPUTER SCIENCE & ENGINEERING DEPARTMENT
PUBLISHED BOOKS, BOOK CHAPTERS, BOOK SECTIONS & EDITED VOLUMES
2003-2004

Steven Demurjian


Swapna Gokhale

“Specification-level Integration of Simulation and Dependability Analysis,” (with J.R. Horgan and K.S. Trivedi), chapter in Architecting Dependable System (Lecture Notes in Computer Science), Springer Verlag, pp. 245-266, July 2003.

Dina Goldin


Laurent Michel

COMPUTER SCIENCE & ENGINEERING DEPARTMENT
CONFERENCE PROCEEDINGS & OTHER PUBLICATIONS
2003-2004

Reda A. Ammar


Jun-Hong Cui


Steven Demurjian


Swapna Gokhale


**Dina Goldin**


**Ian Greenshields**


Chun-Hsi Huang


Aggelos Kiayias


Lester Lipsky

“Modeling Parallel and Distributed Systems with Finite Workloads,” (with A.M. Mohamed and R.A. Ammar), CD-ROM Proceedings of the 9th IEEE workshop on Fault-Tolerant Parallel and Distributed Network-Centric Systems (FTPDS04) in conjunction with the 18th International Parallel and Distributed Processing Symposium (IPDPS04), Santa Fe, NM, April 26-30, 2004.


Ion Mandoiu


**Robert McCartney**


**Laurent Michel**


**Thomas J. Peters**


**Sanguthevar Rajasekaran**


**Alexander Russell**


**Eugene Santos, Jr.**


**Dong-Guk Shin**


**Alexander Shvartsman**


COMPUTER SCIENCE & ENGINEERING DEPARTMENT
ACTIVE RESEARCH GRANTS & CONTRACTS
2003-2004

Reda A. Ammar


“Academic Scholarship Program in Computer Engineering,” (with co-PI: M. Anwar (30%)), National Science Foundation, July 2001-June 2004, $197,988.


“Efficient Query Processing in Heterogeneous Distributed Database System,” Egypt Cultural and Educational Bureau, September 2002-August 2004, $12,000.


Jun-Hong Cui

Steven Demurjian


Swapna Gokhale


Dina Goldin


Ian Greenshields


Chun-Hsi Huang


Aggelos Kiayias


Robert McCartney


Laurent Michel


Thomas J. Peters

“I-Tango: Intersections – Topology, Accuracy and Numerics for Geometric Objects (in Computer-Aided Design),” (with co-PIs: N.F. Stewart (University of Connecticut), C.M. Hoffman (Purdue University, 33%); N.M. Patrikalakis, T. Maekawa and T. Sakkalis (MIT, 33%)), National Science Foundation, May 1, 2002-April 30, 2005, $767,000 total, UConn portion $90,590.

“Computational Topology for Surface Reconstruction,” (with co-PIs: K. Abe (33%) and A.C. Russell (33%)), National Science Foundation, October 1, 2002-September 30, 2004, $109,995.

Sanguthevar Rajasekaran


Alexander Russell


“ITR: Communication and Data Sharing in Dynamic Distributed Systems,” (with co-PI: A.A. Shvartsman (80%)), 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 15, 2002-August 31, 2005, $125,000.

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


“Collaborative Research: Distributed Collaborative Computing and Adversity,” (with co-PI: A.A. Shvartsman (70%)), National Science Foundation, July 15, 2003-June 30, 2006, $155,000.

Eugene Santos, Jr.


“Using AI to Enhance VR Anxiety Disorder Treatment,” (with co-PIs: T. Gifford, I. Kirsch and N. Maltby), National Institute on Drug Abuse, National Institutes of Health, September 2002-August 2003, $102,000.


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


Dong-Guk Shin


“Storage Efficient Data Mining for High-Speed Data Streams,” (with PI: D. Day (50%)) Sonalysts Inc. DOD-STTR, June 1, 2003-May 31, 2005, $30,000.


Alexander Shvartsman


“ITR: Communication and Data Sharing for Dynamic Distributed Systems,” (with co-PI: A. Russell (20%)), National Science Foundation (subcontract with Massachusetts Institute of Technology), August 31, 2001-August 22, 2006, $463,000.


COMPUTER SCIENCE & ENGINEERING DEPARTMENT
AWARDS, HONORS, PATENTS
2003-2004

Gerald Engel

Fellow, Association of Computing Machinery.

Meritorious Achievement Award in Accreditation Activities, IEEE Educational Activities Board.

Dedicated Service Award, CSAB.

Alexander Russell

Outstanding Junior Faculty Award, School of Engineering, University of Connecticut, 2003.

Outstanding Faculty Award, Department of Computer Science & Engineering, University of Connecticut, 2003.

Eugene Santos, Jr.

Elected Senior Member, IEEE.

Alexander Shvartsman

Service Award, Association of Computing Machinery, 2003.
COMPUTER SCIENCE & ENGINEERING DEPARTMENT
MAJOR PROFESSIONAL ACTIVITIES
2003-2004

Reda A. Ammar


Member, Steering Committee, the IEEE Symposium on Computers and Communications.

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


Registration & Finance Chair, the IEEE Symposium on Computers and Communications, Turkey, July 2003.

Registration & Finance Chair, the IEEE Symposium on Signal Processing and Information Technology, Germany, December 2003.

Member, Organizing Committee, the International Conference on Intelligent Computing and Information Systems.

Member, Program Committee, the International Conference on Parallel and Distributed Computing, Louisville, Reno, Nevada, August 2003.

Member, Program Committee, Second International Workshop on Biomedical Computations on the Grid (BioGrid), April 19-22, 2004 held in conjunction with the 4th IEEE/ACM Symposium on Cluster Computing and the Grid.

Session Chair, the IEEE Symposium on Signal Processing and Information Technology, Germany, December 2003.


President, The Islamic Center of the University of Connecticut (ICUC).


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

Coordinator between the University of Connecticut and Egyptian Cultural and Education Bureau in USA.
Presentations


Jun-Hong Cui

Member: IEEE, IEEE Computer Society, IEEE Communications Society, IEEE Women in Engineering, ACM SIGCOMM (Special Interest Group on Data Communications).

Steven Demurjian


Member, Scientific/Program Committee of the IADIS International WWW/Internet 2003 Conference, Algarve, Portugal, November 2003.

Member, Academic/Industrial Advisory Board, Department of Computer Science, Central Connecticut State University, March 2000 - present.

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.

Member, Upsilon Pi Epsilon, the National Computer Science Honorary Society.

Presentations


Gerald Engel

Fellow, IEEE.

Fellow, Association for Computing Machinery.

Member, Editorial Board, Computer Science Education.

President Elect, IEEE Computer Society.
President, CSAB, Inc.

Member, Advisory Committee, NASA Project at the University of Puerto Rico, Mayaguez.

Member, Advisory Board for Study of Software Engineering Ethics, Center for Ethics in the Professions, Illinois Institute of Technology.

Member, Steering Committee, Coalition to Diversify Computing.

Member, IEEE Computer Society: Board of Governors and Executive Committee.

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

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

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

United States Representative to International Federation for Information Processing (IFIP) and member, IFIP Council.

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

**Dina Goldin**

Information Director and Member, Editorial Board, *ACM Computing Reviews*.

Publicity Director and member, Program Committee, International Conference on Data Engineering (ICDE’04) Boston, MA, March 2004.

Member, Program Committee, TAPOCS 2004 (Second International Workshop on Theory and Practice of Open Computational Systems), Modena, Italy, June 2004.

Member, Program Committee and Session Chair, CDB’04 (International Symposium on Applications of Constraint Databases), Paris, France, June 2004.

Session Chair, ICDE’04 (International Conference on Data Engineering), Boston, MA, March-April 2004.

CSAB/ABET national program evaluator, member of visiting team for national accreditation of Computer Science programs, October 2003.

Adjunct Assistant Professor, Brown University.

Panel Member, Geo Sensor Networks, Portland, Maine, October 2003.

Member: Association of Computing Machinery (ACM), IEEE Computer Society, ABET/CSAB.
School of Engineering Annual Report
2003-04

Presentations

“Indirect Interaction and Decentralized Coordination,” invited, DEIS (Department of Electronics, Informatics, and Systems), University of Bologna, Italy, December 2003.


Swapna Gokhale

Program Committee Member, International Symposium on Software Reliability Engineering (ISSRE), Denver, CO, November 2003.

Program Committee Member, International Conference on Computer Communications and Network (ICCCN), Chicago, IL, October 2003.

Program Committee Member, High Assurance Systems Engineering Conference (HASE), Dallas, TX, March 2004.

Member: IEEE Computer Society and American Association of University Professors.

Presentations


Ian Greenshields

Member, U.S. Army Peer-Reviewed Medical Research Program.

Member, Steering Committee, IEEE CBMS.

Chun-Hsi Huang


Member, Program Committee, 2nd European Conference on HealthGrid, Clermont-Ferrand, France, January 29-30, 2004.

Member, Program Committee, 5th Workshop on Parallel and Distributed Scientific and Engineering Computing with Applications (PDSECA) at the 18th International Parallel and Distributed Processing Symposium (IPDPS), Santa Fe, NM, April 26-30, 2004.

Granted Access to the Center for Computational Research (CCR), Buffalo, NY.

Presentations


“Parallel Data Mining of Bayesian Networks from Gene Expression Data,” (with L. Yin and S. Rajasekaran), poster, 8th Annual International Conference on Research in Computational Molecular Biology (RECOMB), San Diego, CA, 2004.

Aggelos Kiayias

Member, Program Committee, the 4th International Workshop on Information Security Applications. WISA 2003, Jeju Island, Korea, August 25-27, 2003.

Member, Program Committee, the 3rd ACM Workshop on Digital Rights Management (DRM 2003), Washington, DC, October 27, 2003.


Presentations


“Balancing Privacy and Anonymity in Electronic Transactions,” invited, Department of Informatics, University of Athens, Greece, April 5, 2004.


Ion Mandoiu

Publicity Chair and Member, Program Committee, 6th ACM Workshop on System-Level Interconnect Prediction (SLIP), Paris, France, February 14-15, 2004.

Member, Program Committee, 7th ACM Special Interest Group on Design Automation (SIGDA) Ph.D. Forum at DAC, San Diego, CA, June 8, 2004.

Presentation


Robert McCartney

Member, Editorial Board, Computer Science Education.

Member, Program Committee, Special Track in AI Education, FLAIRS ’03 (Florida AI Research Symposium).


Laurent Michel


Presentations


Thomas J. Peters


Presentations


Sanguthevar Rajasekaran

Associate Editor, Journal of Parallel and Distributed Computing.

Associate Editor, International Journal of Computers and Their Applications.


Co-Editor, Parallel Computing Journal Special Issue on High Performance Parallel Biocomputing.

General Co-Chair, International Symposium on Signal Processing and Information Technology, November 2003.

Co-Chair, Second International Workshop on Biomedical Computations on the Grid, April 19-22, 2004.

Member, IASTED Technical Committee on Biomedical Engineering.

Member, Program Committee, International Conference on Biomedical Engineering (BioMED), Innsbruck, Austria, February 2004.

Member, Program Committee, International Conference on Parallel and Distributed Computing and Systems (PDCS), 2003.

Member, Program Committee, International Parallel & Distributed Processing Symposium (IPDPS), Santa Fe, NM, April 2004.


Presentations


Alexander Russell


Session Chair (3 sessions) and Member, Program Committee, 36th ACM Symposium on Theory of Computing (STOC 2004), June 9-13, 2004.


Presentations

“Quantum Computation,” invited, Department of Computer Science Colloquium, Northeastern University, October 31, 2003.


Eugene Santos, Jr.

Associate Editor, IEEE Transactions on Systems, Man, and Cybernetics: Part B.

Associate Editor, International Journal of Image and Graphics.


Session Organizer, Conference on Modeling, Simulation, and Optimization: Deception Detection, Orlando, FL.

Member, Program Committee, Genetic and Evolutionary Computation Conference (GECCO-2004), Seattle, WA, June 2004.


Member, Program Committees: 17th International FLAIRS Conference Special Track on Artificial Intelligence in Medicine and Special Track on Uncertainty, Miami, FL, May 2004.

Member, Program Committee, 2004 IEEE International Conference on Networking, Sensing and Control (ICNSC 2004), Taipei, Taiwan, March 2004.

Member, Program Committee, Mexican International Conference on Artificial Intelligence (MICAI 2004), Mexico, April 2004.

Presentations


Dong-Guk Shin

Member, Study Section Committee, NIH Models of Infectious Disease Agent Study (MIDAS), November 12-13, 2003, Bethesda, MD.

Member, Study Section Committee, NIH Human Brain Project: November 19-20, 2003; February 5-6, 2004; May 26, 2004, Bethesda, MD.


Member: American Association of University Professors, IEEE Computer Society and Korean Scientists and Engineers in America.

Presentations


**Alexander Shvartsman**


Member, Program Committee, 9th IEEE Workshop on Fault-Tolerant Parallel, Distributed and Network-Centric Systems, April 2004.

Invited Visiting Professor, Massachusetts Institute of Technology, 2004-2005.

**Presentations**


“Reconfigurable Atomic Memory Service for Dynamic Networks,” invited, Cornell University, University of Toronto, June 2004.
ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT
ANNUAL REPORT SUMMARY
2003-2004

UNDERGRADUATE EDUCATION

The Electrical & Computer Engineering (ECE) Department offers undergraduate degrees in Electrical Engineering (EE), Computer Engineering (CompE, offered jointly with the Computer Science & Engineering Department), and Engineering Physics (jointly with the College of Liberal Arts & Sciences). Additionally, four ECE faculty members are key contributors to the rapidly growing interdisciplinary Biomedical Engineering Program. In fall 2003, 119 students were enrolled in Electrical Engineering, 77 in Computer Engineering, and 4 in Engineering Physics. During the year, we awarded 31 B.S.E. degrees in EE and 11 B.S.E. degrees in CompE.

To enhance the competitive advantage of these degree programs, the faculty decided to reduce the number of required credit hours from 134 to 126 for the EE and CompE programs. The reduction in required hours brings the programs in line with top national programs. This was accomplished by streamlining the curricula, in part by integrating laboratory courses with corresponding lecture courses – a widespread practice nationally. We added a new computer tools course, which has long been requested by our students and strengthens the program with respect to the ABET requirement of student proficiency in applications of relevant tools of the trade. The resulting optimized, sharper curricula give the students an improved opportunity to complete these challenging degrees in four years, saving time and money for the students and their parents and providing Connecticut and regional industry with talented engineers in a timely manner.

To further improve the undergraduate experience, we applied for and received a 3-year grant to provide opportunities for our students to perform original research. Funded by NSF, the ECE Research Experiences for Undergraduates (REU) program is directed by principal investigator Eric Donkor. Interested undergraduates apply for the available positions to work under the guidance of a faculty member doing research in an area of interest to the student. This early research experience is proven to be highly motivating, stimulating creative thinking and often leading to continued studies in graduate school.

STUDENT ACTIVITIES

The UConn student branch of the Institute of Electrical & Electronics Engineers (IEEE) held a Student Professional Awareness Conference (S-PAC) in January 2004. This event took months of planning and was held in the auditorium of the new Information Technologies Engineering Building, home of the ECE and CSE departments. Dr. John Ayers, ECE Associate Professor and Associate Department Head, is the IEEE faculty advisor. The officers of the IEEE student branch organized the conference. They were Satnam Singh, Chair; Mohammad Noman, Vice-chair; Madhukar Jalota, Secretary; and Michael Diaz, Treasurer. Tim Shrimplin and Wayne Blanding also contributed to the success of the meeting that had nearly 100 participants. Four guest speakers presented outstanding lectures on issues related to professional engineering practice and success.

FACULTY RECRUITMENT

Dr. Shengli Zhou, with a Ph.D. degree in EE from the University of Minnesota, joined the ECE department as an Assistant Professor in fall 2003. For this stage of his professional career, he is widely published in his research areas of wireless communications, space-time coding, wireless systems design,
and adaptive modulation techniques. Further, Dr. Anthony DeMaria came on board as a Professor-in-Residence. Dr. DeMaria is a respected engineer and entrepreneur with expertise in photonics, laser technology, and optoelectronics. His accomplishments are so numerous and significant that he is a member of both the National Academy of Engineering and the National Academy of Sciences.

During the year, we successfully recruited two faculty members with expertise in Computer Engineering who will join us in fall 2004. They are Dr. Yunsi Fei, who earned her Ph.D. from Princeton University, and Dr. Lei Wang, who received his Ph.D. from the University of Illinois Urbana-Champaign. These new faculty appointments meet strategic departmental needs and will strengthen capabilities in research and teaching in computer engineering and related areas.

**Research and Scholarship**

The ECE faculty had another stellar year in research and scholarship pursuing funded research in areas such as 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 papers, including 90 refereed journal articles, two book chapters, and 139 full conference proceedings papers. They also published three books and developed 9 software packages. They offered numerous professional short courses, were keynote speakers at four international conferences, and delivered 45 invited talks. ECE faculty worked on 95 sponsored grants with annual expenditures estimated to be $4.5 million. During the year, ECE faculty advised 143 graduate students; of these, eight successfully completed their Ph.D. degrees and 18 students garnered their M.S. degrees. ECE faculty members held six major journal editorships, 32 associate editorships or conference chair posts, and 24 other editorial or conference-planning appointments. Many of these productivity metrics have increased significantly from last year; for example, journal publication has increased by nearly 40%, conference proceedings publications have risen by 40%, and invited colloquia have grown by 55%.

**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: Bahram Javidi was named a University of Connecticut Board of Trustees Distinguished Professor. He was also IEEE Lasers and Electro-Optics Society (IEEE LEOS) Distinguished Lecturer during the year. Peter Luh received the Kayamori Best Automation Paper Award from the IEEE International Conference on Robotics and Automation. Additionally, he received the Distinguished Service Award from the IEEE Robotics and Automation Society. Krishna Pattipati was co-recipient of the Barry Carlton Award for the Best AES Transaction Paper.

**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. As usual, the ECE IAB met twice during the year, making sound suggestions for program enhancements and strategic initiatives. The growing list of companies represented currently includes SNET, ATMI, Naval Undersea Warfare Center, Pratt & Whitney, United Technologies Research Center (UTRC), Pitney Bowes, Phonon Corporation, Sikorsky Aircraft Corporation, General Electric Company, JDS Uniphase, Aptima, TranSwitch, and Hamilton Sundstrand.
ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2003-2004

Mehdi Anwar


Rajeev Bansal


Yaakov Bar-Shalom


**Steven Boggs**


**Nan Guang Chen**


**John D. Enderle**


Monty A. Escabi


Faquir C. Jain


Bahram Javidi


“Three-dimensional TV and Display with Large Depth of Focus and Improved Resolution,” (with J.S. Jang), *Optics and Photonics News Magazine*, (invited), April 2004.


**Hanho Lee**


**Peter B. Luh**


**Robert Magnusson**


Krishna R. Pattipati


Geoffrey W. Taylor


Peter K. Willett


Shengli Zhou


Quing Zhu


ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT
BOOKS, BOOK CHAPTERS, BOOK SECTIONS & EDITED VOLUMES
2003-2004

Mehdi Anwar


John E. Ayers


Eric Donkor


John D. Enderle


Peter B. Luh


Bing C. Wang

ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT
CONFERENCE PROCEEDINGS & OTHER PUBLICATIONS
2003-2004

Mehdi Anwar


John E. Ayers


“Photo Assisted Growth of ZnSe_{1-x}Te_x on GaAs by Metal Organic Vapor Deposition (MOCVD),” (with B.P. Yarlagadda, A. Rodriguez, P. Li and F.C. Jain), Proceedings of the 13th CMOC Symposium, p. 45, University of Connecticut, Storrs, CT, April, 7, 2004.


Rajeev Bansal


Yaakov Bar-Shalom


**Steven Boggs**


**John A. Chandy**


Nan Guang Chen


Eric Donkor


John D. Enderle


“The University of Connecticut Biomedical Engineering Mentoring Program for High School Students,” (with C.M. Liebler, S.A. Haapala, J.L. Hart, N.T. Thonakkaraparayil, L.L. Romonosky,


**Monty Escabi**


**Martin D. Fox**


**Faquir C. Jain**


“Photo Assisted Growth of ZnSe$_{1-x}$Te$_x$ on GaAs by Metal Organic Vapor Deposition (MOCVD),” (with B.P. Yarlagadda, A. Rodriguez, P. Li and J.E. Ayers), *Proceedings of the 13th CMOC Symposium*, p. 45, University of Connecticut, Storrs, CT, April 7, 2004.

“Growth of p-ZnSe$_{1-x}$Te$_x$ Epitaxial Films on Lattice-matched InGaAs/InP by Photoassisted Metal Organic Vapor Deposition (MOCVD),” (with B.P. Yarlagadda, A. Rodriguez, P. Li and J.E. Ayers),


Bahram Javidi


Hanho Lee

Peter B. Luh


Robert Magnusson


**Krishna R. Pattipati**


**Bing C. Wang**


Peter K. Willett


Shengli Zhou


Quing Zhu


ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT  
ACTIVE RESEARCH GRANTS AND CONTRACTS  
2003-2004

Mehdi Anwar


John E. Ayers


“Advanced SiGe Field-Effect Transistor Design and Processing Technology to Fabricate 10 Gb/s+Line Interface Circuits for Fiber Optic Communication,” (with PI: F.C. Jain (25%) and co-PIs: R. Bansal (25%) and F. Papadimitrakopoulos (25%)), TranSwitch, July 1, 2000-June 30, 2004, $100,000.


“Reconfigurable Interconnects, 200-500 GHz SiGe and InGaAs-InP Nanochannel FETs, and 1.55 um Quantum Well Laser Modulators on Silicon for Advanced Systems,” (with PI: F.C. Jain (31%) and co-PIs: F. Papadimitrakopoulos (23%) and R. Bansal (23%)), Office of Naval Research N000140210883, September 1, 2002-September 30, 2005, $247,000.

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.C. Jain (25%) and co-


“Reconfigurable Interconnects, 200-500 GHz SiGe and InGaAs-InP Nanochannel FETs, and 1.55 um Quantum Well Laser Modulators on Silicon for Advanced Systems,” (with PI: F.C. Jain (31%) and co-PIs: J.E. Ayers (23%) and F. Papadimitrakopoulos (23%)), Office of Naval Research N000140210883, September 1, 2002-September 30, 2005, $247,000.

Yaakov Bar-Shalom


“Feature Aided Tracking for Robust BMD,” (with co-PI: P.K. Willett (10%) and K.R. Pattipati (10%)), Office of Naval Research N00014-00-1-0740, June 1, 2000-December 1, 2004, $836,810.


“Multisensor Surveillance and Tracking,” Office of Naval Research N00014-01-1-0079, October 1, 2003-September 30, 2006, $80,000.

Steven Boggs


“Implementation on On-Line Ultrasonic PD Location System,” Con Edison, June 1, 2001-October 31, 2004, $155,000.


“Development of Improved Film Dielectrics,” USA TASCOM, October 1, 2002-February 28, 2006, $158,869.

John Chandy


Nan Guang Chen


Eric Donkor


John D. Enderle


“Clinical Engineering Internship Program at the University of Massachusetts Medical Center, University of Massachusetts Medical Center, August 23, 2003-August 22, 2004, $16,186.

“Clinical Engineering Internship Program at the West Haven VA Hospital,” West Haven VA Hospital, August 24, 2001-August 31, 2004, $79,296.


“Industrial Internship Program in Biomedical Engineering at the University of Connecticut,” Whitaker Foundation, May 1, 1999-December 31, 2004, $180,000.


“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.


**Monty A. Escabi**


**Martin D. Fox**


Faquir C. Jain


“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-September 14, 2004, $375,000.


“Reconfigurable Interconnects, 200-500 GHz SiGe and InGaAs-InP Nanochannel FETs, and 1.55 um Quantum Well Laser Modulators on Silicon for Advanced Systems,” (with co-PIs: J. Ayers (23%), F. Papadimitrakopoulos (23%) and R. Bansal (23%)), Office of Naval Research N000140210883, September 1, 2002-September 30, 2005, $247,000.

Bahram Javidi


Hanho Lee


Peter B. Luh


“Toshiba’s Scholarship Award,” Toshiba Corporation, April 1, 2002-March 31, 2004, $5,302.


“ESS: Scheduling, Inventory Optimization, and Coordination of Maintenance Networks,” National Science Foundation DMI-0223443, August 1, 2002-January 31, 2005, $149,453.


Robert Magnusson


Krishna R. Pattipati


“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, $836,810.


Geoffrey W. Taylor


Bing C. Wang


Peter K. Willett


“Intelligent Quantization for Measurement Fusion Assuming Particle Filter Tracking,” QinetiQ Ltd., January 1, 2002-December 31, 2003, $89,900.


“Feature Aided Tracking for Robust BMD,” (with PI: Y. Bar-Shalom (80%) and co-PI: K.R. Pattipati (10%)), Office of Naval Research N00014-00-1-0740, June 1, 2000-December 1, 2004, $836,810.


Shengli Zhou


Quing Zhu


ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT
AWARDS, HONORS AND PATENTS
2003-2004

John E. Ayers

Martin D. Fox

Faquir C. Jain

Bahram Javidi
Board of Trustees Distinguished Professor Award, University of Connecticut, 2004.

Peter B. Luh


Peter K. Willett
ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT
MAJOR PROFESSIONAL ACTIVITIES
2003-2004

Mehdi Anwar

Editor, *IEEE Transactions on Electron Devices*.

Rajeev Bansal


Associate Editor, *IEEE Microwave Magazine*, 2000-present.


Vice-Chairman, Technical Coordinating Committee, MTT-10 of the IEEE.


Microwave Theory & Techniques Society Delegate, IEEE-USA Medical Technology Policy Committee, 2002-present.

IEEE Antenna Propagation Society Liaison to COMAR, 2001-present.

Honorary Member, The Electromagnetics Academy, 1990-present.

Yaakov Bar-Shalom

Member, Program Committee, FUSION 2003, July 8-11, 2003.

Member, Program Committee, FUSION 2004, June 28-July 1, 2004.

Elected Member, Board of Governors, International Society for Information Fusion (ISIF).

Vice-President for Conference Activities, International Society for Information Fusion (ISIF).


Panel Member: Department of Defense Single Integrated Air Picture Task Force and NRC Air Space Systems Panel.

Presentations


Short Course – “Multitarget Tracking and Multisensor Fusion” presented at:

International Radar Symposium India, Bangalore, India, (180 participants), December 2003.


Steven Boggs

Contributing Editor, IEEE Electrical Insulation Magazine.

Invited Visiting Advisory Professor, Southwest Jiaotong University, Changdu, China, November 2003.

Presentations


Series of six invited lectures, Southwest Jiaotong University, Chendu, China, November 2003.


“High Field Phenomena in Dielectrics as Related to Film Capacitor Technology,” Army Research Laboratory, Adelphi, MD, October 20, 2003.

“Implications of Cable Ground Shield Semicon Conductivity,” Union Carbide - Division of Dow Chemical, Bound Brook, NJ, August 5, 2003.


John A. Chandy


Eric Donkor

Member, Editorial Board, *Journal of Nanoscience and Nanotechnology*

Program Chair, SPIE Conference on Quantum Information and Computation, Orlando, FL, April 2004.

Editor/Chair, Enabling Photonics Technologies for Aerospace Applications VI, Orlando, FL, April 2004.


Vice-Chair, IEEE LEOS Connecticut Chapter.


Presentations


John D. Enderle

Editor-in-Chief, *IEEE EMB Magazine*.

Member, Editorial Board, Academic Press Biomedical Engineering Book Series.

Evaluator, ABET/EAC Engineering Accreditation Commission Program for Bioengineering Programs.

Member, Board of Directors, Rocky Mountain Bioengineering Symposium.

Member, Publications Committee, IEEE EMBS.
Member, Academic Council, AIMBE.

**Monty A. Escabi**

*Presentation*


**Martin D. Fox**

Member, Steering Committee, New England Doppler Conference.

**Faquir C. Jain**


Coordinator, CMOC.

Member, IEEE Nanotechnology Advisory Board, representing SMC Society of IEEE.

Granted access to Cornell Nanofabrication Facility.

Member, Nanotechnology Council.

*Presentations*


Bahram Javidi


Topical Editor, *Optical Signal and Image Processing*, Marcel Dekker.


Member, Committee, Great Lakes Photonics Symposium, Air Force Research Lab, Optical Society of America, International Society for Optical Engineering (SPIE), IEEE-LEOS, Cleveland, Ohio, June 7-11, 2004.


Member, Program Committee, Electro-optics Sensors and Systems Committee, Institute of Electrical and Electronics Engineers Annual Meeting of the Lasers and Electro-Optics Society, Tucson, AZ, October 2003.


Chair, Technical Committee, Electro-Optics Sensors and Systems, Institute of Electrical and Electronics Engineers, Lasers and Electro-Optics Society.

Member, Committee, Institute of Electrical and Electronics Engineers Annual Meeting of Lasers and Electro-Optics Society, November 2003.


Member, Committee, Three Dimensional Video and Display: Systems and Devices, ITCOM 2003 and SPIE, Orlando, FL, September 2004.

Session Chair, conferences of IEEE, OSA and SPIE.

Presentations


IEEE LEOS, Cleveland Chapter, distinguished lecture, June 2004.


IEEE LEOS, Inha University, Integrated Micro-Photonics Advanced Research Center, distinguished lecture, Inchon City, South Korea, October 2003.


Peter B. Luh


Associate Editor, IIE Transactions on Design and Manufacturing, 1997-present.

Associate Editor, Discrete Event Dynamic Systems, 1999-present.

SNET Professor of Communications & Information Technologies, 2000-present.

Member, Publication Activities Board and Technical Activities Board, IEEE Robotics and Automation Society.


Member, Program Committee and Session Chair, 2003 IEEE/RSJ International Conference on Intelligent Robots and Systems, Las Vegas, NV, October 2003.
Session Chair, 2003 International Workshop on IT-Enabled Manufacturing, Logistics and Supply Chain Management, Bangalore, India, December 5, 2003.


Member, Program Committee and Session Chair, 2004 IEEE International Conference on Robotics and Automation, New Orleans, LA, May 2004.

Member, International Program Committee and Best Paper Prize Selection Committee, Fifth World Congress on Intelligent Control and Automation, Hangzhou, China, June 2004.

Member, Program Committee, International Conference on Control and Automation, Budapest, Hungary, June 2004.


Member, Nominating Committee, Connecticut Academy of Science and Engineering, 2003-present.


Member, King-Sun Fu Memorial Best Transactions Paper Committee, IEEE Transactions on Robotics and Automation, September 2003.

Member, Best Paper Prize Selection Committee, The Fifth World Congress on Intelligent Control and Automation, June 2004.

Examiner, Department of Automation and Computer Aided Engineering, Chinese University of Hong Kong, 2001-2004.

Examiner, Department of Automation, Tsinghua University, Beijing, China.

Member, PTR Review Committee, Helsinki University of Technology and Chinese University of Hong Kong.

Invited Visiting Professor, Tsinghua University, Department of Automation, 2001-2004.

Presentations


Robert Magnusson

Topical Editor, *Applied Optics-Optical Technology & Biomedical Optics*, August 1, 2001-present.

Associate Editor and Member, Board of Editors, *Optical Engineering*, January 2004-present.


Pre-ABET External Accreditation Examiner, Electrical Engineering Department, The City College of New York, (invited), October 2003.

Presentations


Krishna R. Pattipati

Member, Board of Directors, Aptima, Inc., Woburn, MA.
Presentations


Granted Access to Internet 2; Naval War College, Innovation Lab; SPAWAR, San Diego, CA.

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.


Member, Program Committee, 2004 American Control Conference, Boston, MA, June 30-July 2, 2004.


Session Chair, Conference on Decision and Control, Las Vegas, NV, December 2003.

Presentations

“An Introduction to Particle Filters,” IEEE Atlanta Chapter of the AES and GRS Societies, August 2003 and Cornell University, March 2004.


“Particle Filtering for Particular People,” University of Salerno, Italy, June 2004.


**Shengli Zhou**


*Presentation*

“MIMO Communications with Partial Channel State Information,” *invited*, Electrical and Computer Engineering Department, University of Massachusetts, Amherst, MA, April 15, 2004.

**Quing Zhu**

Associate Editor, *IEEE Transactions on Systems, Man and Cybernetics*.

Committee Member, SPIE International Symposium on BioMedical Optics, OSA BioOptics Topical Meetings.

*Presentation*

Invited Speaker, UConn Health Center Cancer Center Seminar Series Seminar, BioPhysics and Biochemistry Dept., University of Pennsylvania.
MECHANICAL ENGINEERING DEPARTMENT
ANNUAL REPORT SUMMARY
2003-2004

During the 2003-2004 academic year, the Department of Mechanical Engineering had an undergraduate enrollment of 280 students and a graduate enrollment of 78 students. The fall 2003 freshman enrollment of 71 students is more than triple the freshman enrollment in the department in 1997. Thirty-nine bachelor’s degrees were conferred. In total, the department faculty served as advisors to 17 graduating master’s and 4 graduating Ph.D. students.

FACULTY RECOGNITION

The year’s milestone event was the election of Professor Kenneth Reifsnider, Pratt & Whitney Chair Professor of Design and Reliability, to the National Academy of Engineering (NAE). Dr. Reifsnider’s citation reads: “for the development of strength-life relationships in composite materials and structures.” Dr. Reifsnider joins Ed Crow, Distinguished Professor-in-Residence, as faculty members of the department who are members of the NAE. Among all public departments of mechanical engineering throughout the New England states, as well as in New York, New Jersey, Pennsylvania, Delaware, and Maryland, there are a grand total of four NAE members.

FACULTY AND STAFF

The tenure track faculty size stands at 18. The department has 4 additional full-time, non-tenure track faculty members, three clerical staff, and two professional staff members. Dr. Horea Ilies will join the department as Assistant Professor in August of 2004. Professor Ted Bergman finished his second term as Department Head and became Associate Dean for Research & Outreach effective July 1, 2004. Professor Ranga Pitchumani became Department Head, effective that same date.

UNDERGRADUATE TEACHING AND CURRICULUM

Forty-one undergraduate courses were taught by faculty in the Mechanical Engineering Department during the 2003-2004 academic year. Included were five courses taught in the Management & Engineering for Manufacturing program. Nineteen industry-sponsored senior design projects were included in the Major Design Experience.

GRADUATE PROGRAM

During the year, the department offered 20 courses to our graduate students. The Mechanical Engineering department received 172 applications and admitted 120 students; of these, 23 students joined the program. Six of the 20 graduate courses were taught on-site at Pratt & Whitney under the auspices of the Master of Engineering (MENG) Program.

SCHOLARLY ACTIVITY AND RESEARCH

Department faculty members were associated with approximately 75 active or approved grants. Annual expenditures (direct costs) are estimated to be $3.75 million for the academic year. In comparison, for the 2000-01 academic year expenditures were $1.3 million, and for the 1998-99 academic year expenditures were just $0.8 million. Faculty members published 47 full-length journal articles as well as 49 conference papers. In addition, our faculty were awarded four patents during the year. The faculty serve as editors-in-chief of three leading international journals and serve on the editorial boards of 17 other top journals.
STUDENT RECRUITING AND STUDENT ORGANIZATION ACTIVITIES

Freshman enrollment in Mechanical Engineering for the fall of 2004 is expected to be at least 70. The department participated in the Engineering 2000 program for high school sophomores and juniors, as well as the da Vinci Project for high school math and science teachers.

ALUMNI

Mr. Craig Ashmore (B.S. 1985) was inducted into the Academy of Distinguished Engineers at the University of Connecticut. Mr. Ashmore is Group Vice President, Telecommunications Products, of Emerson Electric Company in St. Louis, MO.
MECHANICAL ENGINEERING DEPARTMENT
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2003-2004

Frano Barbir


Theodore L. Bergman


Baki M. Cetegen


Wilson K.S. Chiu


Amir Faghri


Eric H. Jordan


“Highly Durable Thermal Barrier Coatings Made by the Solution Precursor Plasma Spray Process,”
(with M. Gell, L. Xie, X. Ma and N.P. Padture), *Surface Coatings and Technology*, Vol. 177-178,

**Kazem Kazerounian**

“From Mechanisms and Robotics to Protein Confirmation and Drug Design,” *ASME Journal of

“Pseudo-interference Stiffness Estimation, a Highly Efficient Numerical Method for Force

“On the Rotational Operators in Protein Structure Simulations,” (with C. Alvarado), *Journal of

**Kevin D. Murphy**

“Mechanical Measurements of Adhesion in Micro-Cantilevers: Transitions in Adhered Geometry

**Nejat Olgac**

“Active Vibration Suppression with Time Delayed Feedback,” (with R. Sipahi), *ASME Journal of

“A Practical Method for Analyzing the Stability of Neutral Type LTI-Time Delayed Systems,”

**Ranga Pitchumani**

“A Kinetics Model for Interphase Formation in Thermosetting-Matrix Composites,” (with F. Yang),

“Enhancement of Resin Flow in VARTM Using Induction Heating,” (with R.J. Johnson),


“Modeling of Spherulitic Crystallization in Thermoplastic Tow-Placement Process: Spherulitic

“A Micromechanical Model for the Elastic Properties of Semicrystalline Thermoplastic Polymers,”

“Effects of Interphase Formation on the Modulus and Strength of Fiber-reinforced Thermosetting-
matrix Composites,” (with F. Yang), *Composites Science and Technology*, Vol. 64, pp. 1437–1452,
2004.
Michael W. Renfro


Nigel M. Sammes


Jiong Tang


Bi Zhang


Peng Zhang

Frano Barbir


Lee S. Langston


Nejat Olgac


Ranga Pitchumani


Nigel M. Sammes

MECHANICAL ENGINEERING DEPARTMENT
CONFERENCE PROCEEDINGS & OTHER PUBLICATIONS
2003-2004

Thomas J. Barber


Franco Barbir


Zbigniew M. Bzymek


Baki M. Cetegen


**Wilson K.S. Chiu**


**Amir Faghri**


**Eric Jordan**


Lee S. Langston


Kevin D. Murphy


Nejat Olgac


Ranga Pitchumani


**Kenneth L. Reifsnider**


**Michael W. Renfro**


Nigel M. Sammes


Jiong Tang

MECHANICAL ENGINEERING DEPARTMENT
ACTIVE RESEARCH GRANTS & CONTRACTS
2003-2004

Thomas Barber


Frano Barbir


John Bennett

“Thermal Analysis of Control Rod Drive Motor,” Westinghouse, 8/23/03 - 5/31/04, $5,000.


“PATHS Toward the Future: A Community of Learners,” Nellie Mae Foundation (in support of the GEAR-UP Program), 9/01/99 – 8/31/05, $200,000.

Theodore L. Bergman


“Acoustic Energy Anti-Ice Concept,” (with M. Renfro, 50%), Pratt & Whitney, 5/15/04 - 9/30/04, $50,000.

“Development of a Large Scale Fuel Cell Testing Facility,” (with P. Bergman 33% and N. Sammes 33%), Clean Energy Fund/Connecticut Innovations, 5/1/03-4/30/04, $1,000,000.


Zbigniew M. Bzymek

“Clutch, One Way, Bi-Directional (No-Bak),” The Carlyle Johnson Machine Company, L.L.C., 8/23/03-5/31/04, $5,000.

“MEM Senior Design Project,” (with R. Jeffers 50%), Sikorsky Aircraft Corporation, Tool and Process Engineering Division, 8/03-5/04, $1,940.
Baki M. Cetegen


“Solution Spray Plasma Processing of Nano-Structured Ceramic Coatings,” (with M. Gell (25%), E. Jordan (25%), N. Padture (25%)), Office of Naval Research, 1/01-12/04, $1,000,000.


Wilson K. S. Chiu


“Understanding Hole Pattern Formation During Microstructured Optical Fiber Draw,” (with D.J. DiGiovanni (50%)), National Science Foundation, 10/03-9/06, $300,000.


“Transport Phenomena in the Chemical Vapor Deposition of Hermetic Optical Fiber Coatings: An Integrated Research and Education Program,” National Science Foundation, 1/01-12/05, $395,000.


Amir Faghri

“Microgravity Science & Application Division, Heat Transfer in Rotating Thin Liquid Films including Nucleate Boiling,” (with B. Cetegen (50%)), NASA, 6/01/00-11/20/04, $340,000.


Xinyu Huang

“Development of an In-situ NDE Method for Thermal Barrier Coatings Based on Electrochemical Impedance Spectroscopy,” NASA EPSCOR, 2/01/03-4/30/04, $10,000.
“Self-Service Pharmacy,” (with M. Fox (50 %)), General Electric, 8/23/03-5/31/04, $7,500.

“Mechanical Modeling of PEM Stack in Support of Failure Analysis,” (with K. Reifsnider (50%)), UTC Fuel Cells, 9/03-8/05, $152,869.

“Nanostructure Mixed Ionic/Electronic Conducting Catalyst for IT-SOFC,” (with K. Reifsnider (50%)), National Science Foundation/Inframat Corporation, 7/04-12/04, $16,000.

“Development of Fluoro-Oligomer for Sealants for PEMFC Stacks,” (with R Weiss (30%), M. Shaw (30%), K. Reifnisder (15%), and A. Asandi (10%)), Connecticut Innovations, 7/04-6/06, $300,000.

Robert Jeffers

“TableSource Manufacturing Method,” Wiremold Company, 8/23/03-5/31/04, $5,000.

“MEM Senior Design Project,” (with Z. Bzymek (50%)), Sikorsky Aircraft Corporation, Tool and Process Engineering Division, 8/03-5/04, $1,940.

Eric H. Jordan

“NR-1 Hatch Design,” Electric Boat Company, 8/23/03-5/31/04, $5,000.

“Measurement of Three Critical Parameters as a Basis for a Simple Life Prediction Method,” (with M. Gell (40%)), Department of Energy, 5/1/02-4/31/05, $478,495.

“Superior Thermal Barrier Coatings Using a Novel Solution Spray Process,” (with M. Gell (25%), N. Padture (25%) and B. Cetegen (25%)), Office of Naval Research, 1/02-12/04, $1,000,000.

“Superior Thermal Barrier Coatings for Industrial Gas Turbine Engines Using Novel Solution Precursor Plasma Spray” (with N.P. Padture (50%) and M. Gell (25%)), Department of Energy, Advanced Turbine Systems, 2/1/03-1/31/06, $540,000.

“Damage Detection For Integrally Bladed Rotor Utilizing Vibration Localization,” (with J. Tang (33%) and K. Murphy (33%)), Pratt & Whitney, 6/01/03-9/30/04, $81,000.

Kazem Kazerounian

“Seal Crane Design,” Westinghouse, 8/23/03-5/31/04, $5,000.


“Galileo Engineering Ambassadors in Classrooms,” National Science Foundation, (PI, with R. Vieth, T. Reagan (Education), T. Anderson and M. Wood), 6/01/02-5/30/05, $1,400,000.

“Control Strategies for Robotic Grinding,” ABB-Robotics Division, 7/01/02-6/30/04, $91,705.
Lee Langston


Kevin D. Murphy


“Development of Novel In-situ Tests and Modeling for Integrated MEMS Research and Education,” (with M.R. Begley), National Science Foundation, 1/01/01-12/31/03, $212,963.

“Damage Detection for IBR Utilizing Vibration Localization,” (with J. Tang (33%) and E. Jordan (33%)), Pratt & Whitney, 6/01/03-9/30/04, $81,000.

Nejat Olgac

“A Device to Damp Out Drive System Transient Responses,” Sikorsky Aircraft Corporation, 8/23/03-5/31/04, $5,000.


“Travel to Three Centers of Research Related to a Study on Microinjection Mechanics,” University of Connecticut Research Foundation, 6/02 - 6/04, $5,000.

Ranga Pitchumani


“Investigations on Transport Phenomena Governing Interface Development in Thermoplastic Composites Processing,” National Science Foundation, 9/01/00-8/31/05, $219,903.


“ITR/AP: Simulation and Optimization of Thermal Manufacturing of Materials Under Uncertainty: Application to Optical Fiber Drawing,” (with L.E.K. Achenie (33%) and E.S. Santos (33%)), National Science Foundation, 9/01/01-8/31/05, $409,140.

“Neural Network Onboard Engine Life Models,” United Technologies Corporation, Pratt & Whitney, 1/15/03-5/28/04, $75,000.

“Simulation and Optimization of PEM Fuel Cells,” through the Connecticut Global Fuel Cell Center, U.S. Department of Defense, 1/22/03-10/15/04, $75,003.
Kenneth L. Reifsnider


“Naval Collaborative Integrated Information Technology Initiative,” Office of Naval Research, Virginia Tech, 4/01/00 – 3/31/04, $11,000,000.

“Mechanical Modeling of PEM Stack in Support of Failure Analysis,” (with X. Huang (50%)), UTC Fuel Cells, 9/03 - 8/05, $152,869.

“Nanostructure Mixed Ionic/Electronic Conducting Catalyst for IT-SOFC,” (with X. Huang (50%)), National Science Foundation/Inframat Corporation, 7/04-12/04, $16,000.

“Development of Fluoro-Oligomer for Sealants for PEMFC Stacks,” (with R. Weiss (30%), M. Shaw (30%), X. Huang (15%) and A. Asandi (10%)), Connecticut Innovations, 7/04-6/06, $300,000.

Michael W. Renfro

“Acoustic Energy Anti-Ice Concept,” (with T. Bergman (50%)), Pratt & Whitney, 5/15/04-9/30/04, $50,000.

“In-situ Optical Diagnostics for Measurements of Water Vapor Concentration and Temperature in PEM Fuel Cells,” (with B. Cetegen (50%)), U.S. Army, 1/22/03-10/15/04, $145,659.

“CAREER: Characterization of Propagating and Receding Flame Edges in Composition and Velocity Gradients,” National Science Foundation, 2/1/03 - 1/31/08, $417,999.

“Study on the Structure of Nonpremixed Flames With High Stoichiometric Mixture Fractions,” University of Connecticut Research Foundation, 1/1/03 - 12/31/03, $16,334.

“Statistical Interpretation Of Scalar Time-Series Measurements In Turbulent Partially Premixed Flames,” (with N.M. Laurendeau (33%) and G.B. King (33%)), U.S. Air Force Office of Scientific Research, 12/15/02 - 12/14/05, $472,568.

“Characterization of Scalar Correlations in Turbulent Counterflow Nonpremixed Flames,” (with N. M. Laurendeau (50%)), National Science Foundation, 9/15/01 - 9/14/04, $272,000.

Nigel Sammes

“Development of a Large Scale Fuel Cell Testing Facility,” (with P. Bergman (33%) and T. Bergman (33%)), Clean Energy Fund/Connecticut Innovations, 5/01/03-4/30/04, $1,000,000.


“Electrolyzer Prototype Cermet Tube Development,” Lawrence Livermore National Laboratory, 4/15/03-1/31/04, $68,671.

“NanoCell,” University of Connecticut Foundation Account, $10,000.


“Fuel Cell Technologies, State and Perspectives Workshop,” NATO, 10/1/03-12/31/04, $26,396.

Contribution to Fuel Cell Technologies, State and Perspectives Workshop, European Office of Aerospace Research and Development, $1,000.

**Jiong Tang**


“Piezoelectric Valve System for Fuel Cell Applications,” University of Connecticut Research Foundation, 1/01/03-12/31/04, $17,084.


“Dynamic Shape Control Using Piezoelectric Network and Circuitry Dynamics,” NASA EPSCoR Core Funding Program, 3/17/03-5/30/04, $10,000.

“Damage Detection for Integrally Bladed Rotor Utilizing Vibration Localization,” (with E. Jordan (33%) and K. Murphy (33%)), Pratt & Whitney, 6/01/03-9/30/04, $81,000.

“Granular Damping Analysis and Design for Vibration Suppression (CMS – 0324436),” National Science Foundation, 8/15/03-7/31/06, $251,558.

**Marcelle Wood**


“Galileo Engineering Ambassadors in Classrooms,” (with K. Kazerounian, R. Vieth, T. Reagan (Education) and T. Anderson), National Science Foundation, 6/02-6/05, $1,430,000.
Bi Zhang

“Clip-On Rotational Lash Gage for Analysis of Steering Shafts,” (with Kevin Murphy (50%)), Timken Company, 8/23/03-5/31/04, $5,000.

“Study on Grindability of Thermal-Spray Coated Nanostructured Materials,” Office of Naval Research, 11/00-12/03, $194,311.


Peng Zhang

“Mechanical Wrinkle Remover,” Gerber Technology, 8/23/03-5/31/04, $5,000.

Frano Barbir


Theodore L. Bergman

Certificates (2) of Appreciation, ASME Heat Transfer Division, 2003.

Wilson K.S. Chiu


Nejat Olgac

Certificate of Appreciation for services as Associate Editor, ASME Dynamic Systems and Control Division, June 2003.

Ranga Pitchumani

Distinguished Professor of Engineering, School of Engineering, 2003.

Kenneth L. Reifsnider


Michael W. Renfro

Outstanding Junior Faculty Award, School of Engineering, 2004.

Nigel M. Sammes

Elected Fellow, Institute of Materials, Minerals and Mining (FIMMM), 2004.

Celal Tufekci

Bi Zhang

Outstanding Faculty Award, Department of Mechanical Engineering, University of Connecticut, 2003.
Frano Barbir

Associate Editor, *Fuel Cells Virtual Journal.*


Editorial Board, *EGE Journal.*

Internet Editor, *International Association for Hydrogen Energy.*

Chair, Awards Committee, International Association for Hydrogen Energy.

Presentations


John C. Bennett, Jr.

Vice Chair, Connecticut Department of Higher Education Advisory Committee of Accreditation.

Distinguished Technologist, Chair of the Program Committee, and member of the Board of Directors: the Connecticut Academy for Education in Mathematics, Science, and Technology.
Baki M. Cetegen

Board Member and Treasurer, Combustion Institute Eastern States Section.

Presentation


Wilson K.S. Chiu

Presentation


Amir Faghri


Honorary Member, Editorial Advisory Board, Communications in Heat and Mass Transfer.

Member, Editorial Board, Journal of Heat Transfer Research.

Member, Editorial Board, Journal of Applied Thermal Engineering.


Xinyu Huang

Presentations


Robert G. Jeffers


Kazem Kazerounian


Member, ASME Design Division Executive Committee.

Chair, ASME Mechanisms and Robotics Committee.

Lee Langston

Editor-In-Chief, *ASME Journal of Engineering for Gas Turbines and Power.*

Nejat Olgac


Member, Executive Committee, ASME *Dynamic Systems and Control Division.*

*Presentations*


Ranga Pitchumani


Member, Editorial Board, *Journal of Thermoplastic Composite Materials.*

Kenneth L. Reifsnider


North American Editor, *Journal of Applied Composites.*

Presentations


Michael W. Renfro

Presentations


Nigel M. Sammes


Regional Editor, *Journal of the Australasian Ceramics Society*.

Associate Editor, *Fuel Cells Virtual Journal*.


Associate Editor, *Journal of Power Sources*.

Associate Editor, *Journal of Fuel Cells: From Fundamentals to Systems*.

Associate Editor, *Ionics*.

Presentations


Bi Zhang

Member, Editorial Board, Chinese Journal of Mechanical Engineering (English Edition).

Overseas Editor, Journal of Nanotechnology and Precision Engineering.

Presentation

METALLURGY & MATERIALS ENGINEERING DEPARTMENT
ANNUAL REPORT SUMMARY
2003–2004

The past year was a challenging, yet exciting and successful year. It was challenging because several senior faculty and staff members retired in the previous year to take advantage of the State’s early retirement package. Their departure led to losses of expertise in several areas. In spite of this gap, the Department forged ahead with many exciting successes. US News & World Reports ranked our program as the number-one materials program at a public university in the New England region; we commenced the lengthy procedure involved in formally changing the department name to Materials Science & Engineering; our very first undergraduate class graduated; one new faculty member was hired; two new staff members were recruited; many undergraduates, graduates and faculty members received national and international awards; externally-sponsored research funding reached an all-time high; and the annual research expenditures per full-time equivalent faculty member was ranked second among all academic departments at University of Connecticut Storrs campus.

CHANGES IN PERSONNEL

Professor Nitin Padture, who served as the Interim Department Head starting from June 1, 2003, decided to return to the teaching and research arena. During his tenure as the Interim Department Head, Professor Padture led the departmental transition following Professor John Morral’s departure, initiated the application procedure to secure a formal change of department name to Materials Science & Engineering, and recruited one new faculty member, one Administrative Coordinator, and one Graduate Coordinator. Professor Leon Shaw, who has been a faculty member in the Department for 10 years, was named the Interim Department Head, effective June 1, 2004. Dr. Bryan Huey will join the Department as an Assistant Professor, starting June 2004. Previously, he was a postdoctoral fellow at the Ceramics Division of the National Institute of Standards & Technology (NIST). His expertise lies in scanning probe microscopy and functional materials. Ms. Cathy McCrackan joined the Department as the Department Administrative Coordinator, while Ms. Michelle Ross was hired as the Graduate Coordinator for both the Polymer Program in the Institute of Materials Science (IMS) and the Department of Metallurgy & Materials Engineering.

Searches are currently underway for two additional faculty members, one in the area of nanotechnology/computational materials science, and the other in the area of fuel cell science and technology.

In March 2004 we tragically lost Professor Martin J. Blackburn, who passed away after a long and courageous battle with cancer. Dr. Blackburn joined the University of Connecticut as a Research Professor in 2000 after retiring from the position of Deputy Director of the Materials and Processes Engineering Laboratory at Pratt & Whitney. In his four years at UConn, Professor Blackburn made tremendous contributions to the Institute of Materials Science and to the Department of Metallurgy & Materials Engineering. Professor Blackburn will be sorely missed as a colleague, mentor and friend.

UNDERGRADUATE PROGRAM

Our very first undergraduate class in Metallurgy & Materials Engineering graduated this year. Congratulations to the new graduates! Chris Gatto earned the singular distinction of being the only senior in the School of Engineering to graduate as both an Honors Scholar and a University Scholar. Eight scholarships were awarded to seven of our undergraduates (B.S. Berke, C.D. Gatto, S. Iddir, E.H. Jordan, N.J. Magdefrau, K.L. Michaelis, R. Prasad) at the Engineering Awards Banquet. Chris Gatto
and Neal Magdefrau, both of whom worked with Professors Aindow and Blackburn, won awards in the 2004 Frontiers of Undergraduate Research Poster Exhibition held at the University of Connecticut. Neal Magdefrau also had a scientific paper based on his work accepted for publishing in *Scripta Materialia*—one of the top journals in the field of materials science and engineering. The Department congratulates these students on their accomplishments.

Our current enrollment stands at 10 seniors, 3 juniors, 9 sophomores, and 9 incoming freshmen. In order to increase the undergraduate enrollment, a wide range of outreach activities was conducted. These included participation in University Open Houses, the Connecticut Invention Convention, Engineering 2000, the DaVinci Project, the Galileo Project, Departmental Visitation Days, Connecticut Science Fair, and CPTV Family Science Expo. Six middle and high schools were also visited as part of the Materials Roadshow, which included lectures, hands-on demonstrations, and videos. These activities were led by Professor Leon Shaw, who enlisted help from students, staff and faculty. In addition, a one-credit course, MMAT 100: Materials Engineering in Society, was offered by Professors Pamir Alpay and Mei Wei, with participation of many other faculty members to expose incoming undecided freshmen to the field of materials engineering.

**GRADUATE PROGRAM AND RESEARCH**

The current graduate enrollment is 65, which includes 30 full-time students and 35 part-time students. Five M.S. degrees (C. Lin, M. Qian, D. Logan, E. Mune, A. Sharma) and seven Ph.D. degrees (Z. Ban, L. Xie, E. Geiss, B. Li, J. Ruppen, Y. Sun, J. Wu) were awarded in the past year. Heartly congratulations to the new graduates! In the past year, five new Ph.D. and four new M.S. students were admitted with full assistantships.

The Department faculty members remain highly productive in obtaining external research funding. During the year, our faculty received many new grants from various funding agencies (e.g., DARPA, DOE, ITI Foundation, NSF, ONR) and private industry, including an award of $2.0 million ($1.6 million from DOE and $0.4 million in UConn matching) granted to Professor Leon Shaw to study and develop novel hydrogen storage materials. The total external research funding garnered in the year was $2,494,075, which on a per capita basis equals an average of $226,734 in annual research expenditures per faculty member (11 faculty members). The total value of the current multi-year, multi-investigator external grants for which our faculty members are Principal or Co-Principal Investigators stands at $10,561,229. Our faculty continue to be active scholars, producing an average of 6 journal articles and 3 proceedings papers per faculty member (11 faculty members), and a total of 29 invited talks in national and international conferences. Our faculty members are also highly active in professional service: reviewing papers and proposals, serving as journal editors and committee officers, organizing conferences and symposia, performing as committee members, and contributing scholarly talks.

**HONORS, AWARDS, AND PATENTS**

The ASM/TMS Joint Student Chapter won two national awards in the 2003-2004 academic year: (i) ASM/TMS Chapters of Excellence for Promotion of the Field in 2003, and (ii) the First Place Winner of the 2003 TMS World Materials Outreach Day Award. Professor Mark Aindow was named the Outstanding Department Member for 2003, while Professor Pamir Alpay was named the University of Connecticut School of Engineering Outstanding Junior Faculty Awardee for 2004. Professor Leon Shaw won the best poster award for the 14th Annual Solid Freeform Fabrication Meeting. Professor Mei Wei was awarded the K.C. Wong Fellowship by the Chinese Academy of Science for the year 2004. Professor Nitin Padture was awarded United State Patent No. 6,641,893 for his invention entitled “Functionally Graded Materials and the Engineering of Tribological Resistance at Surfaces.”
METALLURGY & MATERIALS ENGINEERING DEPARTMENT
ARCHIVAL TECHNICAL JOURNAL PUBLICATIONS
2003-2004

Mark Aindow


S. Pamir Alpay


Martin J. Blackburn


Maurice Gell


**Theodore Z. Kattamis**


**Harris L. Marcus**


**John E. Morral**


**Nitin P. Padture**


Leon L. Shaw


Leon L. Shaw


METALLURGY & MATERIALS ENGINEERING DEPARTMENT
CONFERENCE PROCEEDINGS AND OTHER PUBLICATIONS
2003-2004

Mark Aindow


S. Pamir Alpay


Martin J. Blackburn


Harold D. Brody


Theodore Z. Kattamis


Harris L. Marcus


John E. Morral


Leon L. Shaw


Mei Wei


Mark Aindow

“Interfacial Structure and Processes in Lamellar TiAl-Based Alloys,” National Science Foundation, 7/1/00–6/30/04, $431,815.


“Structural Amorphous Metals,” (with co-PI: M. Blackburn), DARPA (sub-contract from Boeing), 10/3/01–10/10/04, $557,198.

“NER: Nanochannel FETs and Quantum Dot Based Nonvolatile Memory Cells using Site-Specific and Layer-by-Layer Self-Assembly Techniques,” (with co-PIs: F.C. Jain, J. Ayers and F. Papadimitrakopoulos), National Science Foundation, 6/1/02–5/31/03, $100,000.


“Propulsions Systems Prognosis,” DARPA (sub-contract from Pratt & Whitney), 4/1/04–9/30/07, $359,704.

S. Pamir Alpay


Martin J. Blackburn


“Structural Amorphous Metals,” (with co-PI: M. Aindow), DARPA (sub-contract from Boeing), 10/3/01–9/10/04, $557,198.

“Low Cost Titanium,” Timet Corporation, 6/2/03-6/1/07, $113,908.

Harold D. Brody


“Real-time Observation and Analysis of Dendritic Solidification in Alloys,” (with co-PIs: B. Li (UConn), D. Black (NIST), and A. Kazimirov (Cornell)), Distinguished Professorship Account, Provost, and National Synchrotron Laboratories, $36,000.

Maurice Gell

“Measurement of Three Critical Parameter as a Basis for a Simple Life Prediction Model,” (with co-PI: E. Jordan), U.S. Department of Energy-UTSR, 2/1/02-1/30/05, $480,000.

“Superior Thermal Barrier Coatings Using a Novel Solution Spray Process,” (with co-PIs: E. Jordan, N. Padture and B. Cetegen), Office of Naval Research, 1/1/02-12/31/04, $1,000,000.


Harris L. Marcus

“Center for Advanced Deployable Nanosensors,” (with co-PIs: F. Papadimitrakopoulos, B. Huey, J. Rusling and K. Noll), ARO, 9/1/02-7/31/05, $1,970,000.

“Laser-assisted Solid Freeform Fabrication MFG of Micro/Meso ‘Photonic’ Crystals,” (with co-PI: F. Papadimitrakopoulos), Office of Naval Research, 03/01/00-08/31/03, $450,000.

John E. Morral

“Computational Modeling of Interdiffusion Microstructures,” (with co-PI: 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.


**Nitin P. Padture**

“Advanced Thermal Barrier Coatings for Combustors,” (with co-PIs: M. Gell and E.H. Jordan), Solar Turbines, 9/1/00-8/31/03, $216,000.

“Superior Thermal Barrier Coatings Using a Novel Solution Spray Process,” (with co-PIs: M. Gell, E.H. Jordan and B.M. Cetegen), Office of Naval Research, 01/01/02-12/31/04, $1,000,000.

“Superior Thermal Barrier Coatings for Industrial Gas Turbine Engines,” (with co-PIs: M. Gell and E.H. Jordan), U.S. Department of Energy, 07/01/03-06/30/06, $546,468.

“Microtubular Solid Oxide Fuel Cells,” through the Connecticut Global Fuel Cell Center, U.S. Department of Defense, 01/23/03-05/22/04, $75,000.

“Processing and Mechanical Properties of Nanostructured Ceramics and Composites,” Office of Naval Research/MIT, 09/01/02-12/31/04, $105,000.

“SGER: Engineered Nanowires and Devices,” National Science Foundation, 08/01/03-07/31/04, $60,000.

“Controlled Fabrication and Microstructural-Mechanical Characterization of Advanced Liquid-Phase-Sintered SiC Ceramics,” (with co-PIs: F. Guiberteau, A.L. Ortiz, F. Cumbrera and A. Dominguez), Government of Spain, 12/28/01-12/27/04, $167,000.

**Leon L. Shaw**

“A Novel Surface Nanocrystallization and Hardening (SNH) Process for Improved Fatigue and Wear Resistance,” National Science Foundation, 09/01/02-08/31/05, $388,000.

“Multi-Material Laser Densification for Dental Restorations,” National Science Foundation, 09/01/02-08/31/05, $360,000.

“Novel High Performance, Low Cost, Polydisperse Carbon Black/Polymer Blend Composites for Bipolar Plates of Micro/Portable PEM Fuel Cells,” through the Connecticut Global Fuel Cell Center, U.S. Department of Defense, 01/01/03-12/31/03, $75,000.

“Research Experience for Undergraduates in Nanomaterials,” National Science Foundation, 09/01/03-08/31/05, $8,000.

**Mei Wei**

“Bioactive Implant Guided Supracrestal Bone Formation,” (with co-PIs: M. Freilich, L. Kuhn and D. Shafer), ITI Foundation, 06/01/04-05/31/06, $149,374.

“Novel Partially Fluoride Substituted Hydroxyapatite Composite for Orthopedic Applications,” University of Connecticut Research Foundation, 01/01/03-12/31/03, $19,953.
METALLURGY & MATERIALS ENGINEERING DEPARTMENT
AWARDS, HONORS, PATENTS
2003-2004

S. Pamir Alpay
Outstanding Junior Faculty Award, School of Engineering, University of Connecticut, 2004.

Nitin P. Padture

Leon L. Shaw
Best Poster Award, “Comparisons Between Thermal Modeling and Experiments in Laser-Densified Dental Powder Bodies,” (with K. Dai and X. Li), 14th Annual SFF Meeting, the University of Texas, August 2003.

Mei Wei
Mark Aindow

Presentations


S. Pamir Alpay


Session Chair, Multi-Ferroics and Graded Ferroelectrics, 16th International Symposium on Integrated Ferroelectrics, Gyeongju, Korea, April 2004.
Session Chair, Electroceramics, 8th Conference and Exhibition of the European Ceramic Society - ECerS-2003, Istanbul, Turkey, July 2003.

Presentations


Harold D. Brody

UConn Representative to Council of Institutions, Universities Space Research Association.

Presentations


Harris L. Marcus

Co-organizer, Connecticut Nanotech Initiative’s Fall Symposium, Storrs, CT, October 2003.


Presentations


John E. Morral

Presentations


“Solving the Mystery of Zigzag Diffusion Paths,” invited presentation, Center for Materials Research, Ohio State University, Columbus, OH, November 23, 2003.


Nitin P. Padture

Principal Editor, Journal of Materials Research.

Associate Editor, Journal of the American Ceramic Society.

Session Chair: Sosman Award Lecture, Annual Meeting of the American Ceramic Society, Indianapolis, IN, April 2004.

Member, International Advisory Committee, EnCeram’04, Osaka, Japan, May 2004.

Presentations


“Next Generation Ceramic Thermal Barrier Coatings,” invited presentation, National Institute of Standards and Technology, Gaithersburg, MD, September 2003.


“Next Generation Ceramic Thermal Barrier Coatings,” invited seminar, Ohio State University, Columbus, OH, January 2004.
Leon L. Shaw

Member, Executive Committee, ASM Nanomaterials Task Force.

Vice Chair, ASM-MSCTS Materials Synthesis & Processing Committee.

Member, Committee, Engineering Ceramics Division of ACerS.

Member, TMS/ASM Composite Materials Committee.

Member, TMS Powder Metallurgy Committee.

Member, TMS Mechanical Metallurgy Committee.

Member, Executive Committee, Hartford Chapter of ASM International.


Presentations


Mei Wei

Session Chair, 7th World Biomaterials Congress, Sydney, Australia, May 17-21, 2004.

Presentations

“Ceramic, Metal and Composite for Human Body Repair,” invited seminar, SPE, RTC, and ASM joint meeting, October 2003.


The mission of the Booth Engineering Center for Advanced Technology (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.

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 2003-2004 academic year include: aggressive pursuit and support of group and center-wide proposals; success in gaining strong funding for research activities, with 89 externally funded grants and contracts totaling about $10.5 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 integration of the School’s massive EDS software grant into the research community.

**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.
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 up to 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, Synopsis, 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;
- Installation and maintenance of the BECAT Beowulf Cluster and a new Aspen AMD-based Cluster;
- 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. Karen Slater; Secretary, Ms. Elizabeth Moore; Technical Support Peng Li and Shikui Yan; and undergraduate student support. Fifty-six faculty members are affiliated with BECAT and several had Research Specialists working with them this year, including 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; and Shahid Farooqi working with Robin Cote of Physics.
The Connecticut Global Fuel Cell Center began in 2001 as a partnership between the University of Connecticut School of Engineering, Connecticut Innovations Inc., and Connecticut industry. With a dedicated (16,000 sq. ft.) building, dedicated chaired faculty positions, staff and state-of-the-art facilities, the Center is quickly becoming a leader in research, development, and commercial deployment of fuel cell engineering and technology. The Center builds on a strong existing core of excellence at the University of Connecticut in research and development of fuel cells and related technologies concerned with renewable energy and a sustainable environment. The scope of the Center includes systems-to-science pure and applied research in fuel cell design and manufacturing, development, materials, fuels and reforming, and integration. Major thrusts in proton exchange membrane (PEM) and solid oxide fuel cell (SOFC) science and technology are complemented by active efforts for molten carbonate, phosphoric acid, and other fuel cell types, and by efforts in micro- and micro-miniature fuel cell systems.

PERSONNEL UPDATES

This past spring, Professor Ken Reifsnider, the Pratt & Whitney Chair in Design & Reliability, was elected to the National Academy of Engineers and assumed the Directorship of the Fuel Cell Center.

During the fall of 2003, Dr. Frano Barbir joined the Fuel Cell Center as Professor-in-Residence. Prior to this Dr. Barbir was the Director of Research and Development and Chief Scientist at Proton Energy Systems in Wallingford, CT. In that capacity, he was in charge of developing fuel cell stacks and systems, and planning all research and development activities for fuel cells and electrolyzers. Prior to his position at Proton Energy Systems, Dr. Barbir served as the Vice President of Technology and Chief Scientist at Energy Partners in West Palm Beach, FL. Dr. Barbir has authored or co-authored more than 100 publications, mostly on fuel cells and hydrogen energy. Dr. Barbir is the Associate Editor of the International Journal of Hydrogen Energy and is a member of the Editorial Board of the Journal of New Materials for Electrochemical Systems.

Also during the fall of 2003, Trent Molter joined the Fuel Cell Center as Research Scientist and Business Development Officer. Mr. Molter has been active in fuel cell research and technical development, as well as fuel cell business development. He is an original co-founder of Proton Energy Systems. Mr. Molter has extensive experience in developing new materials for both proton exchange membrane and solid oxide fuel cells and for electrolyzers. Mr. Molter has over 15 U.S. patents in the field of electrochemistry and has over 20 patents pending.

FUEL CELL RESEARCH PROGRAMS

A congressional earmark totaling more than $3 million from the Department of Defense was the focus for the Center during 2003 and 2004. This effort involved 38 faculty members from the School of Engineering, three from the Department of Chemistry and one from Biology & Life Sciences. Research conducted under this earmark covered a wide range of topics (reformation, material development, diagnostic development and modeling) and technologies (proton exchange membrane fuel cells and solid oxide fuel cells).
A subsequent congressional earmark, totaling over $1 million, was awarded in the spring of 2004 from the Department of Defense. This effort will leverage knowledge gained in the prior research activities and will result in the development of three small prototype fuel cells.

Research activities also included a number of programs over the past year with industrial partners such as: UTC Fuel Cells, Proton Energy Systems, FuelCell Energy, Lilliputian Systems, Aerogel Composites and GenCell.

**FACILITIES AND SERVICES**

During the past year, the test service laboratory began to take shape as a scanning electron microscope and additional PEM test stands were acquired and installed. The service laboratory will allow the fuel cell center to offer testing capability for early stage PEMFC, SOFC and MCFC prototype stacks and systems. This service will be valuable both for internal research activities and in servicing external clients who require third party objective analysis.

**EDUCATION AND OUTREACH**

In the spring, the Center sponsored the highly successful First International Conference on Fuel Cell Development and Deployment. The conference was attended by over 350 leaders in the area of fuel cells representing industry, academia, national labs and government. Over 100 oral presentations were given along with 50 poster presentations. The highlight of the conference was the presentation of the inaugural Francis T. Bacon Achievement Award to Dr. Hans Maru, Executive Vice-President and Chief Technology Officer at FuelCell Energy in Danbury, CT. This award was presented in recognition of Dr. Maru’s contributions to the field over the past 20 years.

Nigel Sammes, UTC Chair Professor in Fuel Cell Technology, is Editor-in-chief of the newly announced ASME *International Journal of Fuel Cell Science and Technology*, and Associate Editor is Ken Reifsnider. This unique fuel cell journal provides the Center with another important mechanism to contribute to the growth of the community at large. The first edition is scheduled for publication in the summer of 2004.

In addition, the Fuel Cell Center is engaged in a number of education and outreach programs. This spring, the center hosted 75 ninth graders from J.A. Foran High School in Connecticut. The visit provided the students an opportunity to augment their science curriculum with real life demonstrations of electrolyzers and fuel cells. Two senior design projects were also completed at the undergraduate level and involved engineering students from the departments of Mechanical Engineering, Electrical & Computer Engineering, and Civil & Environmental Engineering. These programs were sponsored by Rogers Corporation and UTC Fuel Cells. Finally, the Center funded more than 70 students on various fuel cell research programs as they pursued their graduate education.
The Connecticut Transportation Institute (CTI) is a multidisciplinary unit connecting many academic disciplines at the university in seeking to solve transportation-related challenges and problems. CTI has a particularly strong cooperative working arrangement with the Department of Civil & Environmental Engineering.

Currently, CTI has three primary faculty members, and eight additional faculty who conduct research in association with the Institute. CTI has three administrative staff who work with all programs, three technology transfer professionals, five full-time research staff and two part-time research staff. The support and funding for numerous graduate students is handled by CTI, including research assistantships and scholarships.

In September 2003, Dr. Lisa Aultman-Hall was appointed for a three-year term as director. One of Dr. Aultman-Hall’s main foci has been a comprehensive strategic planning effort. This collaborative effort started in spring 2003 with internal staff planning meetings. A Peer Exchange held in June 2003 included five national transportation center leaders and finally concluded with further internal planning sessions this year. CTI staff drafted a new strategic plan that was recently reviewed by the CTI faculty advisory committee for the Dean. In addition, for the first time, CTI will produce its own annual report in July 2004 for distribution within the region and transportation research sector. This report will make use of newly established performance measures to document all CTI activities, including those of associated faculty.

Constituents of CTI continued to be very visible and active within the northeast region for important transportation activities. The Institute manages a series of programs in collaboration with officials throughout the State and New England. The following programs operate within CTI: the Connecticut Advanced Pavement Laboratory (CAP Lab), the Connecticut Technology Transfer (T2) Center, the Connecticut Cooperative Highway Research Program (CCHRP), and the New England Transportation Consortium (NETC).

The current research and educational projects at CTI are funded by a diverse set of agencies: Connecticut Department of Transportation, CT Transit, National Science Foundation (NSF), Federal Highway Administration (FHWA), the New England University Transportation Center (NEUTC) and the states of Rhode Island, Vermont, Maine, New Hampshire and Massachusetts through the New England Transportation Consortium. The research topics are also diverse, ranging from safety, pavement design, structural bridge monitoring and freight transportation planning to air quality and context-sensitive solutions.

CTI is experiencing a period of significant growth. During 2003, a program development project funded by the Connecticut Department of Transportation (ConnDOT) was a critical impetus for growth and provided resources to ensure opportunities for development were maximized. Indeed, the conditions were ideal to pursue CTI research and service growth under a new Institute director, and this development project provided the focus and resources to seize the opportunities available to CTI. These opportunities included:

- The Institute’s very successful and growing Technology Transfer (T2) Center program;
The addition of faculty members in transportation-related fields;
ConnDOT’s substantial investment of capital equipment for the CAP Lab;
Increased regional leadership through NETC and other programs.

Growth at CTI is demonstrated in several ways:

- Between FY ‘03 and FY ‘04, the grant-funded research managed through CTI increased from $1.2 million to $1.7 million;
- The number of grants grew from 26 to 35 between FY ‘03 and FY ‘04;
- The number of individual principal investigators whose grants and contracts were processed through CTI grew from 10 to 14 between FY ‘02 and FY ‘04;
- Two new research engineers and one computer programmer were added to the staff this year.

PROGRAM HIGHLIGHTS

**Connecticut Technology Transfer (T2) Center Program**

- Provided 39 workshops to 3,500 participants
- Hosted the Technology Transfer Expo on campus for 650 visitors
- Co-hosted the Construction Career Day for 1,200 high school juniors and seniors
- Created a new online resource library
- Established a new Safety Town loan program. This program is designed to teach elementary school children various aspects of pedestrian safety, bicycle safety and school bus safety
- Established a formal training and outreach alliance with the Connecticut Occupational Safety & Health Administration. This alliance, focusing on safety, represents the first public sector agreement with this agency
- One of four centers nationally to participate in the development of National Local Technical Assistance Program performance measures for the Federal Highway Administration
- Hosted the May 3-5, 2004 Women in Engineering Leadership Summit

**Connecticut Advanced Pavement Laboratory (CAP Lab)**

- Conducted high profile research with the Department of Transportation and industry to determine the accuracy and measurement techniques for pavement quality assurance and contractor payment programs
- Presented certificate and educational programs to 150 transportation technicians and consultants from throughout the region
- Conducted research investigating temperature differentials occurring in HMA pavements at the time construction
- Developed Superpave® mix design procedure to be used with Hot In-Place Recycling paving process

**Connecticut Cooperative Highway Research Program**

- Funded research to evaluate the particulate matter emissions from CT TRANSIT’s new hybrid diesel electric buses
- Funded unique research on shared-use path safety for bicycles, pedestrians and other users on trails
- Continued modeling efforts to improve the truck portion of the statewide traffic model
- Funded research to develop and demonstrate new rheological characterization methods that allow rapid comparison of new asphalt formulations
A multidisciplinary team of researchers created a *Best Practices Guide for Context Sensitive Design*

**New England Transportation Consortium**

This program coordinates approximately $2.4 million in transportation research at the Consortium’s member New England state universities. This sum is in addition to the CTI totals listed above.

The following are some research projects currently underway that are coordinated through this program:

- An Investigation of Basalt Fiber Reinforced Polymer Composites as Alternative Materials for Transportation Applications; University of Connecticut.
- An Evaluation of the Performance and Effectiveness of Thin Pavements Using Geogrids and Drainage Geocomposites in a Cold Region; University of Maine, Orono.
- A Synthesis of Current Practice of the Use of Fiber Reinforced Polymer Products in New England’s Transportation Infrastructure and the Development of a Strategy for Increased Use; University of Massachusetts, Amherst.
- A Study of the Calibration of Traffic Simulation Models for Inclement Weather Conditions with Applications to Arterial Coordinated Traffic Signal Systems; University of Vermont.
- An Evaluation of a Field Permeameter as a Quality Control Indicator for Longitudinal Joints in Asphalt Pavements; University of New Hampshire.
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, four students at the end of our second year and five students at the end of our third year. Currently, there are approximately 120 BME undergraduate students. Admissions for 2004-2005 are up from the previous year with approximately 50 incoming students. Dr. Ion Mandoiu (Bioinformatics) joined the BME faculty in 2003-04.

Dr. John Enderle continues to serve as the BME Program Director and the Editor-in-Chief of the Engineering in Medicine and Biology Magazine.

In Spring 2004, the BME program moved into the renovated Bronwell Building. All undergraduate BME labs are located in three large laboratories in the Bronwell Building: Biomechanics and Biomaterials are in room 215, Senior Design is in room 213 and Biomeasurements and the freshman Biomedical Engineering Lab are located in room 212. All of the undergraduate labs are based on virtual instruments using National Instruments hardware and LabView. The Freshman Biomedical Engineering Lab received a large donation from Paul and Mary Mali for the purchase of seven Biopac Workstations, allowing entering students to work with state-of-the-art laboratory equipment.

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 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 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 in Storrs and at the University of Connecticut 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 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, UMass General
Hospital in Worcester, West Haven VA Medical Center, and the Baystate Medical Center in Springfield, MA. In addition, the program offers a BME Industrial Engineering Internship that permits graduate students to gain in-depth exposure to the conception, design and manufacturing of health care products.

During the academic year 2003-2004, the program graduated seven M.S. degree students. The BME graduate program has approximately 45 master’s degree students and 25 Ph.D. candidates. Seventy-five percent of the graduate students are full-time, and approximately 85% of the full-time students are supported via graduate assistantships.

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 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), 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), John 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), James Ligas (Respiratory Mechanics), Les Loew (Imaging), Ion Mandoiu (Bioinformatics), Andrew Moiseff (Neuroscience, Physiological Modeling), 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), Ranjan Srivastava (Biochemical Engineering), 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), 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, Pharmokinetics, Physiological Modeling, Rehabilitation Engineering, Tissue Engineering and Molecular Engineering.

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
2003-2004

STUDENTS AND GRADUATES

The Environmental Engineering Program (ENVE) has 11 M.S. and 21 Ph.D. graduate students and 17 undergraduate ENVE majors. Seven new undergraduate students were admitted as environmental engineering majors for fall 2004. The majority of graduate students are full-time and financially supported. During the year, the ENVE program graduated two M.S. students, one Ph.D. student and one environmental engineering undergraduate in May 2004. Thirty-nine full graduate applications were received: of these, 17 were offered admission into the program and five have accepted admission, bringing our projected total of graduate students to 27 for fall 2004.

A team of ENVE and CEE undergraduates won the first-ever Metcalf & Eddy environmental engineering design competition. The winning team of Brian Canterbury, Dan Adanti, Jocelyn Michelini, Russell Ward, Haley Busch and Carlos Rexach beat out the other UConn team, which earned second place, and teams from Rensselaer Polytechnic Institute and Smith College. Both UConn teams were supervised by Dr. Barth Smets of Civil & Environmental Engineering (CEE).

FACULTY

Detailed activities of the ENVE faculty can be found in the annual reports of their home departments. An indicator of their high level of collective scholarly activity is reflected in the more than 40 journal articles and book chapters written by our nine faculty members during the last year.

CEE Associate Professor Lanbo Liu joins us in July 2004. Dr. Liu was formerly with the University of Connecticut Geology & Geophysics Department, which was disbanded by the University in spring 2004. Dr. Liu brings expertise in geophysics focusing on wave propagation and ground penetrating radar for subsurface characterization. He will offer courses in Environmental Geophysics and Engineering Geology, filling in important knowledge gaps. Dr. Liu’s strong collaboration with the Geophysics branch of the U.S. Geological Survey will enhance opportunities for collaboration and student training.

The ENVE program lost two faculty members. Dr. George Hoag, professor of Civil & Environmental Engineering (CEE), left the University in the spring; and Dr. Smets resigned in June to accept a faculty position in Denmark.

Across the program, external funding continues at an all-time high with expenditures in excess of $2 million and active extramural grants totaling more than $10 million, including prestigious national research awards such as NSF Early Career Development (CAREER) Awards. Our ENVE faculty hold many positions of administrative authority. Dr. Joe Helble holds the position of Department Head of Chemical Engineering, and Dr. Kenneth Noll of Molecular & Cellular Biology is Chair of the graduate program in Microbiology. Dr. Fred Ogden, associate professor of CEE, serves on the board of directors of the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI), a consortium of 88 research universities seeking to establish a national network of hydrologic observatories. Dr. Dani Or, graduate director of the ENVE program, holds several posts with the Soil Science Society of America and serves on the organizing committee for the Gordon Conference on Flow in Porous Media. Dr. Baki Cetegen of Mechanical Engineering (ME) is a member of the...
Combustion Institute’s executive board; Dr. Smets co-organized and chaired an NSF/Department of Energy sponsored workshop on “Horizontal Gene Flow in Microbial Communities.”

Dr. Helble has appointments in the American Association for Aerosol Research and recently was selected a REVELLE Fellow by the American Association for the Advancement of Science; this fellowship provides Dr. Helble with opportunities to work on Environmental Policy issues at the executive and legislative branches of the U.S. government in Washington, DC. Dr. Jim Fenton (ChE) serves on numerous committees of the Electrochemical Society and Dr. Emmanouil Anagnostou (CEE) serves on NASA’s Tropical Rainfall Measuring Mission peer review committee and the International Precipitation Conference Steering Committee. Dr. Nelly Abboud (CEE), director of the undergraduate ENVE program, is a board member of the American Arab Engineers and Scientists Society and the Natural Resources Council of Connecticut; she also serves on the National Education Committee for the American Filtration and Separation Society and on a Peer Review Panel for the U.S. EPA in Washington, DC. Dr. Can Erkey (ChE) serves on the Green Chemistry Division Committee of the American Chemical Society; Dr. Thomas Torgerson (Marine Science), serves as a program director for NSF until his return in December 2004 and holds the positions of editor-in-chief of Reviews of Geophysics, associate editor of the Geochemical Journal, and AGU Board of Journal Editors. Drs. Cristian Schulthess, James Bryers, Anagnostou, Amvrossios Bagtzoglou and Or serve as associate editors of Soil Science Society of America Journal, Biotechnology & Bioengineering, the Journal of Applied Meteorology, Water Resources Research, and Vadose Zone Journal, respectively. Drs. Abboud and Smets serve on the editorial boards of Fluid/Particle Separation Journal, Soil Contamination, and Biodegradation, respectively.

At the international level, Dr. Anagnostou serves as an advisor to the National Observatory of Athens; Dr. Ogden continued 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. In March, Dr. Ogden and two of his graduate students spent seven days of rustic field work in a remote jungle watershed in Panama. As in previous years, the ENVE faculty had significant involvement in international conferences, including the joint AGU-EGU spring meeting in Montreal, which featured presentations by more than 10 ENVE faculty and students, and participation in numerous other international conferences. Dr. Abboud serves on the Board of Advisors for Arab Healthy Water Association, and served on the organizing committee of the international conference in Lebanon. In addition, our faculty developed several new international research proposals with colleagues from Denmark, Israel, Greece, Italy and the United Kingdom.

OUTREACH

Dr. Abboud continued to organize, chair and participate in many outreach activities and events for the undergraduate program. These activities included school career fairs, the CPTV Expo, the Connecticut Construction Career Fair, the Engineering 2000 summer program, YESS workshop summer program, the ENGR 100 environmental workshop, and visits to high schools throughout the state. Furthermore, she organized and hosted fun yet educational events for many senior and junior high school students and their families, from schools located in Connecticut, Massachusetts, Rhode Island, Pennsylvania and New York. Dr. Abboud initiated the “UConn CEE Partners in Education Program,” which involves collaborating with Connecticut civil and environmental firms and identifying corporate partners who are willing to offer internships and host field trips for Connecticut high school students. The program was well represented at the fall and spring open houses at the Storrs, Waterbury and Stamford campuses. During the year, Dr. Abboud was also invited to deliver a presentation for 12 female students and their teacher at Somers High School during their visit to the Storrs campus. The ENVE program supported and assisted in organizing many other events, including the engineering open houses, the Connecticut Invention Convention, and Engineering 2000.
PROGRAM

Revision is well underway for the graduate program structure, governance and procedures. The graduate curriculum was revised during the year, and we have been working with other units on campus to expand course cross-listing. A new graduate brochure and ENVE website are well underway with assistance from the Dean’s office and staff. We have established and maintain regular monthly ENVE forum meetings to discuss academic and research strategies and approve changes in the program. The weekly seminar series has been a success, as evidenced by high and steady attendance: it fosters interactions and enhances visibility. Through the dedicated efforts of Jon Drasdis (research associate), and support of the School of Engineering and CEE Department, we have formed an Environmental Measurement Laboratory (EML) that serves as a focal point for measurement-related teaching activities as well as open house and other recruitment activities.

ENVE faculty members were involved in several multi-investigator activities throughout the year to support research and education in Environmental Engineering. Our faculty submitted, as PI or co-PI, three separate proposals involving multi-disciplinary teams led to the 2004 Provost Grant Competition. A joint Johns Hopkins University-UConn-University of Maryland “Center for Hazardous Substances in Urban Environments,” funded by EPA with a total budget of $6 million for five years, entered its third year with participation by Drs. Helble, MacKay and Smets.

NSF’s Division of Undergraduate Education provides joint support with the Willimantic Water Commission for research on “Studies of Nutrient Loading to the Mansfield Hollow Reservoir, Connecticut.” This research is led by Drs. Ogden, Bagtzoglou and Glenn Warner (Natural Resources Management & Engineering). Growing collaboration between ENVE and other elements of CEE resulted in joint NSF-NASA proposals with structures, transportation and mechanics (Drs. Lisa Aultman-Hall, Michael Accorsi and Ramesh Malla) and with other units on campus.

Significant participation of ENVE faculty and students in national and international conferences, high-profile publications in archival journals, and involvement in seminars and collaborative research have helped the ENVE program gain national recognition and respect. The integration of new faculty and completion of curriculum revisions is gradually bringing the program to maturation, thereby providing students with an active research and academic environment.
The Management & Engineering for Manufacturing (MEM) program graduated 10 students during the 2003-04 academic year. Seven students completed their degrees in December '03 and three students finished in spring of '04.

During the year, a plant visit was made to Wiremold Corporation. Also a general plant visit schedule was continued for students in the MEM program and in the School of Business.

During the spring semester, six students participated in final design projects as part of the capstone course of the program, MEM 215W. Sikorsky Aircraft and MTU sponsored the projects. Dr. Zbigniew Bzymek coordinated the projects with Dr. Manuel Nunez and the mentors at Sikorsky and MTU. The students made a number of presentations on campus that included representatives from the company. There were also visits to both Sikorsky and MTU.

More than 50 students were associated with the program this year, an increase of two students over last year’s enrollment. We anticipate students again being admitted to the program as freshmen, and we already have spoken with a few of them.

The MEM Society continued to function as a student organization and held a number of meetings. The group provided support for open houses and related activities. The group will seek to interact with other student organizations next year.
During the 2003-2004 academic year, the School of Engineering Undergraduate Program continued to grow at a rate that far exceeded the growth rate at schools and colleges of engineering nationwide. The fall 2003 entering class of 376 students represented an increase of 110% compared with the fall 1997 entering class. The four-year undergraduate student body increased by 60% during this same period. Enrollments in our Biomedical Engineering, Computer Science/Computer Engineering/Computer Science & Engineering, and Mechanical Engineering programs continued to show the largest growth. Furthermore, the quality of entering engineering students continued to improve: the average SAT score of entering freshman students was 1265, which is approximately 135 points higher than the average SAT score of freshman students entering UConn’s other programs.

**Changing Makeup of Undergraduate Population**

The School of Engineering’s undergraduate pool reflected an unprecedented increase in ethnic and gender diversity relative to fall 2000. Our undergraduate female enrollment increased by 42% (17% throughout the greater University) compared to the male population growth of 25% (19% throughout the greater University). In addition, the School’s undergraduate ethnicity has experienced a similar change. Since fall 2000, the number of African American students enrolled in the School of Engineering has increased by 60% (19.5% for the University) and the number of Hispanic/Puerto Rican students enrolled in the School has increased by 41% (compared with 17% for the University).

The University of Connecticut has an excellent Honors Program that enriches the undergraduate experience for qualifying students throughout the four-year curriculum. Among the 12 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 12%. The number of enrolled transfer students continues to grow in response to the School’s outreach programs targeting Connecticut’s 12 community and technical colleges. The graduation rate from the School of Engineering is approximately 60% compared with the University’s graduation rate of approximately 70%. During the academic year, 220 undergraduate engineering students graduated. In spring 2004, the School of Engineering was able to offer more than $775,500 in scholarship to entering freshman and over $500,000 in scholarships to 204 continuing students.

Each of the School’s four-year undergraduate programs was reviewed during the year. This extensive review resulted in the consolidation of existing courses, replacement of existing courses with new courses and minor adjustments to course sequences. This comprehensive review resulted in a credit reduction of between 6 and 8 credits to earn an engineering degree in 11 of our 12 programs. The number of credits required to complete the BSE degree range from 126 to 128 credits. Additionally during this curricula review, departments identified where the $146 million software grant from EDS - Product Life-cycle Management (PLM) will be used across their respective programs.

**Outreach Activities**

The School of Engineering has 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 continues to conduct outreach to students and teachers in middle through high school. For the fifth consecutive year, the School of Engineering hosted and co-sponsored the Connecticut
Invention Convention. Over 650 K-8th grade students brought their inventions to Gampel Pavilion to be judged by more than 150 professionals and to be seen by more than 2,500 spectators.

The da Vinci Project, a one-week residential program for middle and high school mathematics, science and technology teachers, continues to be very popular. In August 2003, 16 teachers participated. Engineering 2000, another of the School’s major outreach activities, remained extremely popular. This one-week residential program allows participating high school juniors and seniors to explore engineering disciplines via a variety of hands-on experiments, and to focus in a particular engineering discipline. High school math and science teachers assist in the selection process. This year, in addition to the 80 students attending, we had a waiting list of 12 students. Of the participating high school students, 17.5% are female, which in turn has helped to increase the number of undergraduate women in engineering to 14%. 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 this 12-campus state system.

DIVERSITY

Diversity and gender recruitment are the responsibility of all faculty, staff and students. Engineering Diversity Director, Kevin McLaughlin, is the primary contact and coordinator of activities aimed at enhancing the diversity of the undergraduate engineering pool and increasing general awareness of engineering’s impact on society at large. Our Pre-Engineering Program (PEP) for 7th, 8th, and 9th grade under-represented students mostly from inner-city school districts has remained stable at 55–60 students. A one-day Multiply Your Options (MYO) workshop for 8th grade girls attracted more than 200 students and 30 teachers, who attended 21 different workshops. Each workshop presenter was a female professional in an area of science or engineering. Another important facet of the School of Engineering diversity enhancement activities is BRIDGE. This five-week residential summer program targets admitted underrepresented minorities and women and immerses participants in core math and science curricula (of chemistry, computer programming, mathematics, and physics) that forms the foundation of engineering studies. Forty-five students completed last year’s BRIDGE program.

Our student organizations are very involved in recruiting and retention efforts. The National Society of Black Engineers (NSBE) and Society of Women Engineers (SWE) student chapters attend recruiting activities in Bridgeport and Bloomfield. Members of SWE visited elementary schools and conducted age-appropriate engineering projects. Members of the 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.

ACADEMIC EXCELLENCE

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 $775,500 to recruit over 230 highly qualified students for the fall 2004 term. For the academic year 2003-2004, the School of Engineering admitted 41 valedictorians and salutatorians. During the Engineering Awards Banquet in April 2004, 204 continuing students were awarded more than $500,000 in scholarships. Additionally, 24 students continued to receive their Connecticut Innovations Technology Scholarships this academic year. More than 85 undergraduate students were members of the Tau Beta Pi Engineering Honor Society and 105 are members of the individual major honor societies. The Dean’s list acknowledged 276 students with a cumulative grade point average (CGPA) of 3.47; 62 seniors received the National Collegiate Engineering Award for having a minimum of 3.6 CGPA; 62 seniors were inducted into Who’s Who.
Among American Colleges and Universities for maintaining a minimum of 3.6 CGPA; and 62 juniors were inducted as All American Scholars for attaining a minimum of 3.4 CGPA.

**TUTORING & RETENTION**

A multi-tutoring and advising initiative helps the School of Engineering enhance its retention of undergraduate students. In 2003-2004, the School received a $500,000 gift from an anonymous donor that permitted us to expand our services to include mentoring, coaching, 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 are 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 peer 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. The newly renovated individual tutoring rooms established earlier this year have been re-claimed by the University and reassigned to the College of Liberal Arts. The loss of this space forced the Undergraduate Program to relocate the peer tutoring to a classroom. Additionally, four student honor/professional societies’ offices have been established in a newly renovated area, thus providing individual space to the student societies that span and serve the entire School. Several other engineering professional student chapters conduct tutoring in their related topics.