

***Electrical and Computer Engineering
Department***

2001-2002 Annual Report



September 1, 2001 - August 31, 2002

Table of Contents

Department Head's Memo	2
Faculty Awards and Honors	3
Student Awards and Honors	7
Alumni Awards and Honors	10
In Memoriam: Dr. Denise Nicoletti	11
ECE Department Awards and Recognition Dinner Ceremony	12
FY 2001-2002 ECE Research Awards and Expenditures	14
Major Research Awards	15
Institutional Advancement Activities	17
Enrollments and Curriculum	18
ECE Ph.D. Degrees Conferred in AY 2001-2002	19
2002 ABET Review Visit	20
New Faculty Recruitment	21
Faculty Appointments and Promotions	23
Staff Appointments and Promotions	23
ECE Advisory Council	23
Facility/Laboratory Improvements	24
ECE Faculty Retreat	25
"ECE Dialog" with Students	26
Other Departmental News	27
ECE Social Events	28
Challenges and Goals for the ECE Department in AY 2002-2003	30
Appendix A: ECE Department FY 2001-2002 Research Awards	33
Appendix B: ECE Department FY 2001-2002 Research Expenditures	35
Appendix C: ECE Curricular/Research Groups AY 2001-2002	36
Appendix D: Electrical and Computer Engineering Department Committees 2001-2004	38
Appendix E: Curricular/Research Group Representation on ECE Standing Committees	41
Appendix F: CoE Honors Day 2002 Award Recipients	43



Electrical and Computer Engineering Department

Memorandum

To: Constantine Papadakis, President
Harvill Eaton, Provost
Ken Blank, Interim Vice Provost for Research and Graduate Studies
Barbara Spiro, Senior Vice President for Institutional Advancement
Anthony Glasscock, Vice Provost for Academic Affairs
Selcuk Gucer, Dean of Engineering

From: Nihat Bilgutay
Department Head

Date: November 15, 2002

Re: ECE Department Annual Report 2001-2002

Enclosed please find the Electrical and Computer Engineering Department's Annual Report for the AY 2001-2002. It is my pleasure to share with you the notable achievements and the key events and activities of our faculty, students, and alumni that have continued to make the ECE Department successful and a key part of the University Community.

Cc: ECE Faculty
ECE Advisory Council
Mun Choi
Richard Weggel
Lydia Kokolskyj

ECE Department Annual Report

September 1, 2001-August 31, 2002

Faculty Awards and Honors

- **Dr. Eli Fromm**, Roy A. Brothers Professor of Electrical and Computer Engineering and Director of the Center for Educational Research in the College of Engineering, was awarded the Bernard M. Gordon Prize for "Innovation in Engineering and Technology Education" by the National Academy of Engineering (NAE). The Bernard M. Gordon Prize was presented for the first time this year and will be awarded biennially in the future to an engineering educator who has developed practices that greatly improve engineering and technology education, prepare a stronger workforce, encourage innovation and inventiveness, and promote the development of technology.

The prize was named in honor of Bernard M. Gordon, chairman of Analogic Corporation, endowed by the Gordon Foundation, which consists of a gold medallion and a \$500,000 cash award. Mr. Gordon, who holds more than 200 patents, is widely recognized for his contributions in analog-to-digital conversion, tomography, and medical and other high-precision instrumentation. The cash award for the Gordon Prize is dispersed equally between the recipient and the institution to support the recipient in the continued development, refinement, and dissemination of the recognized innovation.

Dr. Fromm, along with the late Dr. Robert Quinn, are best known for their contributions in revolutionizing engineering education through the Enhanced Educational Experience for Engineers (E⁴) curriculum, which Drexel began implementing in 1989. Dr. Fromm, who has received numerous awards from organizations such as the IEEE, ASEE, ABET, the Smithsonian, and Drexel University, was honored at NAE's 2002 awards ceremony held in Washington, D.C. on February 19th.

- **Dr. Arye Rosen**, Research Professor of Biomedical Engineering and Electrical and Computer Engineering, and a Senior Member of the Technical Staff at Sarnoff Corporation, was elected to the National Academy of Engineering. Dr. Rosen was recognized for his "contributions to microwave and laser technologies and the medical applications of these technologies." Election to the National Academy of Engineering is one of the highest professional distinctions that can be accorded an engineer. There are a total of 1,857 active members in the U.S. Dr. Rosen is an alumnus of Drexel who earned his Ph.D. in Electrical Engineering under Dr. Peter Herczfeld's supervision.

- The ECE Department awarded two named professorships. **Dr. P. Mohana Shankar** was named Allen Rothwarf Professor of Electrical and Computer Engineering and **Dr. Moshe Kam** was named Robert Quinn Professor of Electrical and Computer Engineering. The professorships will serve to honor the memory of the late Drs. Rothwarf and Quinn, as well as to recognize members of the faculty who have made significant and lasting contributions to the ECE Department and to Drexel University, worthy of this special recognition.

Dr. Allen Rothwarf was the Ernest O. Lange Professor of Electrical and Computer Engineering at Drexel. He is remembered by students as an exceptionally dedicated teacher and mentor, and by his peers as a colleague that was extremely gifted in physical insight and experimental understanding. He accomplished a remarkable balance as both a theoretical physicist and a practical engineer, and was highly respected for his service to the university and to his department. He served as a mentor to younger faculty and an advisor to the Sundragon solar car team. His accomplishments include: IEEE fellow, a member of the American Physical Society, a CoE Teaching Award recipient, a Drexel University Research Achievement Award recipient, and the author of over one hundred technical papers.

Dr. Robert Quinn will be remembered for his instrumental role in co-developing Drexel's E⁴ Program (An Enhanced Educational Experience for Engineers), which today is referred to as tDEC, Drexel's Engineering Curriculum. The curriculum was designated a national model for undergraduate engineering education by the National Science Foundation, and is emulated by numerous universities worldwide. Quinn, along with colleagues Dr. Eli Fromm and Dr. Richard Woodring, sought to provide students with educational and professional challenges not available in traditional engineering curricula, and encouraged them to think in terms of the social, ethical, and political implications of their work.

A reception was held on Monday, November 19, 2001 at the Paul Peck Alumni Center to recognize and honor Drs. Kam and Shankar for receiving the named professorships.

- **Dr. Alexander M. Meystel**, Professor of Electrical and Computer Engineering, published two books with Dr. James S. Albus for John Wiley and Sons, Inc. He published a book entitled, "*Engineering of Mind: An Introduction to the Science of Intelligent Systems*" in August 2001 and a second book entitled, "*Intelligent Systems: Architecture, Design, and Control*," which was published in September 2001.
- **Dr. P. Mohana Shankar**, Allen Rothwarf Professor of Electrical and Computer Engineering, published a book through John Wiley and Sons, Inc. entitled, "*Introduction to Wireless Systems*" in September 2001.

- **Dr. Athina Petropulu**, Professor of Electrical and Computer Engineering, was a guest editor of the May 2002 issue of the *IEEE Signal Processing Magazine*, which is a widely read and disseminated magazine in the signal processing community. The topic of the May issue was Network Traffic: Scaling and Complexity, which is a topic of great current interest and relevance to networks. She also co-authored an article with her student Xueshi Yang in this issue.
 - **Dr. Peter Lewin**, Richard B. Professor of ECE and Biomedical Engineering, has been appointed as the associate editor of the international journal, *Ultrasonics*.
 - The College of Engineering recognized and awarded two Electrical and Computer Engineering faculty for their outstanding achievements and dedication to research and teaching at the College of Engineering Honors Day Ceremonies, which were held on Wednesday, February 20, 2002 in the Grand Hall of the Main Building. **Dr. Stewart Personick**, E. Warren Colehower Chair Professor and director of the Center for Telecommunications and Information Networking, received the Research Accomplishment Award and **Dr. Moshe Kam**, Robert G. Quinn Professor of ECE, was awarded the Teaching Accomplishment Award.
 - **Dr. Bruce Eisenstein**, Arthur J. Rowland Professor of Electrical and Computer Engineering, was recently elected to the position of East Region Director on the National Eta Kappa Nu Board of Directors. The term for this position is from July 1, 2002 until June 30, 2004.
 - **Dr. Karen Miu**, Assistant Professor of Electrical and Computer Engineering, was recognized at Eta Kappa Nu's 66th Annual Awards Banquet as a finalist in the National Outstanding Young Electrical Engineer Awards Program. The ceremony recognized many prominent individuals in ECE, and it was a pleasure to have Dr. Miu among those noted as the best.
 - **Dr. Karen Miu**, Assistant Professor of Electrical and Computer Engineering, received the IEEE Power Engineering Society Working Group Award for "Outstanding Technical Report" in the summer of 2002. She also received the Power Engineering Education Committee Working Group Award in Winter 2002.
 - **Dr. Kevin Scoles**, Associate Professor and Assistant Department Head for Undergraduate Affairs in the ECE Department, received the "Recruitment Recognition Award" given by Drexel's Enrollment Management.
- Dr. Moshe Kam**, Robert G. Quinn Professor of Electrical and Computer Engineering, received the Advisor of the Year award at the Student Life Awards Night for advising IEEE students as the group's Chapter Counselor.
- **Dr. Mahmoud El-Sherif**, director of the Fiber Optics and Photonics Manufacturing Engineering Center and research professor of Materials

Engineering and Electrical and Computer Engineering, was nominated by ASTF to direct the Research and Development programs in Materials Science.

- **Dr. Mahmoud El-Sherif** also received a Certificate of Recognition from NASA for technical innovation in fabricating sapphire optical fibers for high-temperature use.
- ECE faculty members were recognized at the Research Day 2002 Awards Ceremony. The Research Day competition was held on May 7, 2002 at the John A. Daskalakis Athletic Center, which was followed by the awards ceremony held in the Grand Hall. ECE Faculty members that were recognized in the ceremony are:

10⁶ Club Awards

- * **Maja Bystrom**
- * **Peter Herczfeld**
- * **Karen Moxon**
- * **Banu Onaral**
- * **Stewart Personick**
- * **Athina Petropulu**
- * **Kambiz Pourrezaei**
- * **Warren Rosen**

Patent Awards:

- * **Robert Fischl, Chika Nwankpa and Arye Rosen** for "Fault Tolerant Electric Current Regulator"
- * **Richard Beard, Kambiz Pourrezaei, et al.** for "Detection of Defects in Protective Boundaries"

Research Synergy Grant

- * **Bahram Nabet, et al.**

- The 2001 Annual Employee Service Awards were presented to the Drexel faculty and staff at a ceremony held December 10, 2001 at George Behrakis Grand Hall in the Creese Student Center. The following members of the ECE faculty and staff were recognized for their dedicated service:

Dagmar Niebur	5 years
Prawat Nagvajara	10 years
Chika Nwankpa	10 years
Afshin Daryoush	15 years
Wayne Hill	20 years

Student Awards and Honors

- The following ECE students received top honors in the June 2002 graduation:

1st Honors EE	Gregory Goppold
1st Honors CE	Carl Angstadt
2nd Honors EE	Andrew Kee
2nd Honors CE	Edward Dobeck

- A team of ECE students won the IEEE Region 2 Best Paper Award. The paper, entitled "Elimination of Clutter through Signal Processing for Landmine/Ordnance Detection (ECSPLOD)," was authored by **Vasileios Nasis**, **Aniket Hirebet** and **Gabriel Ford**, and was based on a senior design project advised by **Dr. Athina Petropulu**. ECSPLOD paper presents a set of algorithms that were developed to reduce clutter from ground penetrating radar images for detection of landmines rapidly, accurately, and efficiently with the ultimate goal of making the process real-time. The 2002 IEEE Region 2 Conference for Best Student Paper, took place April 26-28 at the University of Scranton in Scranton, PA. There were ten universities represented at the competition, where Penn State's team took second place and the Rowan University team came in third.
- ECE graduate student, **Xiyang Chen**, received the Best Student Paper Award at this year's IEEE Sarnoff Symposium for his paper entitled, "Resonant Cavity Enhanced MSM Photodetector with Delta-Doped AlGaAs/GaAs Heterostructure for Short-Haul Communications." Chen, who is advised by Dr. Bahram Nabet, was last year's second place recipient. The ECE Department has an excellent track record of having their research recognized at the Symposium, which was continued through Chen's receipt of this year's first place award.
- Drexel University students performed experiments aboard the KC-135 "Vomit Comet" at the NASA Johnson Space Center in Houston, TX. They studied the influence of gravity on the physical and fractal properties of diesel and bio-diesel particulates. Team members are: George Cartwright, **Garrett Gross**, and **Nathaniel Curtis** from ECE, Brian DiPaolo (Biomed), Mac Haas (Environmental Eng.), Luly Rodriguez (CAE), and Mary Sullivan (Chemical Eng.). Students from CalTech, University of Washington, and Purdue joined them in the competition.
- ECE and IEEE members were honored during the Student Life Awards Night Dinner held May 15, 2002. IEEE had a strong showing with the following recipients:

Barbara Salami won Student Leader of the Year for her work with IEEE and EMBS

Eric Gallo, an Electrical Engineering senior and President of Drexel's IEEE Student Branch, was awarded the Alan L. Kirsch Outstanding IEEE Student Member Award at the 2002 IEEE Philadelphia Section Awards and Recognition Banquet held at the Union League of Philadelphia. He received the award for "outstanding leadership, perceptiveness, and peer impact." Eric's leadership has been instrumental in the continued growth of the Drexel branch, which has experienced 150% growth over the past two years to become the 23rd largest IEEE student branch and the fastest growing branch in IEEE Region 2. Eric has also been instrumental in establishing the IEEE sponsored "ECE Dialog" meetings between the ECE students and administration, tutoring programs and other successful professional and social activities. Other award recipients with ECE connections included **Dr. Itzhak Bar-Kana** and **Dr. Bryen Lorenz**. Dr. Bar-Kana, who previously held positions as a Research and Adjunct Professor in ECE, received the Benjamin Franklin Key Award for "advancing the theory and practice of control..." Kulicke & Soffa, Inc. presently employs Dr. Bar-Kana. Dr. Bryen Lorenz, who received his MSEE'76 and Ph.D.'81 from Drexel, was recognized with the Chapter of the Year Award (Magnetics Chapter) for his "exceptional leadership in developing effective Chapter programs." Dr. Lorenz is a professor of Electrical Engineering at Widener University.

- The Drexel Women's Softball Team honored **Lori Swanson** January 27, 2002 in the Grand Hall, Creese Student Center. She was named the 2001 Engineering Graduate and America East Scholar Athlete of the Year.
- **Xueshi Yang** was awarded the George Hill Jr. Fellowship for AY 2001-2002. The amount of the fellowship is \$5,000.
- **Arkady Kopansky** was awarded the Koerner Fellowship for AY 2001-2002. The Koerner Fellowship provides \$15,000 towards student stipends.
- ECE students, **Adam O'Donnell** and **Eric Gallo**, received the 2002 National Science Foundation Graduate Research Fellowships. Adam is a graduate student who works with Dr. Harish Sethu. Eric is completing his undergraduate studies and will be working with Dr. Bahram Nabet beginning this fall. **Benjamin Yellen**, an ECE Ph.D. student, also received an honorable mention at this year's NSF graduate Fellowship program.
- **Adam O'Donnell** and **Benjamin Yellen** received the 2002-2003 National Defense Science and Engineering Graduate (NDSEG) Fellowship. Benjamin is an ECE Ph.D. student working under the supervision of Dr. Gary Friedman.
- Three of the TA Excellence Award winners this year were ECE graduate students honored for their hard work and commitment as TAs at the Teaching Assistant Excellence Awards Ceremony and Reception held on May 28, 2002. **Vishruta Dumane**, one of the award recipients, is completing her Ph.D. this term under the

advisement of Dr. Shankar. Two of the College of Arts and Sciences winners, **Jayesh Iyer** and **Kavitha Sriraman**, are also ECE graduate students that were recognized for their contributions to tDEC.

- The Executive Committee of the IEEE Philadelphia Section approved a \$5000 IEEE Student-Branch Leadership Scholarship for Drexel ECE student **Richard Primerano** for the AY 2002-2003. Richard is a pre-junior in the Electrical and Computer Engineering Department at Drexel University and is an active student leader of our IEEE Student Chapter. He is in excellent academic standing and has remained on the Dean's List since his freshman year. Richard is also an Anthony J. Drexel Scholarship recipient.
- Joseph Michel, a student in the ECE evening program was awarded the American Society of Naval Engineers (ASNE) 2002-03 scholarship. The ASNE scholarship was established to encourage college students to enter the field of naval engineering.
- The following ECE students were awarded for their accomplishments at the CoE Honors Day Ceremonies held in February 2002. The awardees were:

Vishruta Dumane, *Graduate Student Research Award*
Anawach Sangswang, *Robert Fischl Award*
Xueshi Yang, *George Hill, Jr. Fellowship*
Arkady Kopansky, *Koerner Family Graduate Award*
David M. Smith, *Undergraduate Student Research Award*
Irene Yeung, *Blasi Family Award*
Carl A. Angstadt, *Lester A Kraus Award*
Harshal Shah, Kunal Shah, and Peter Lo, *Lockheed Martin Scholarship*
Eric M. Gallo, *Thomas W. Moore Award*
Paul J. Zipp, *Robert G. Zuin Scholarship*
Colin E. Ricketts, *NACME Engineering Vanguard Program*

*A Complete List of CoE Honors Day 2002 award recipients is attached in Appendix F.

- The ECE Senior Design Projects listed below received the 2001-2002 prizes at the ECE Senior Design Awards held May 17, 2002. Each team received a \$500 prize, which was distributed evenly among the team members.

Unisys Prizes:

ECE-11: LZW Decompression in Hardware

Team Members: **Itamar Gonen, Tom Kelleher, Shahriar Seyedhosseini, Anil Varghese** and **David Wu**

Advisor: **Dr. Constantine Katsinis**

ECE-13: Elimination of Clutter through Signal Processing for Landmine/Ordnance Detection (ECSPLOD)

Team Members: **Norman Butler, Gabriel Ford, Aniket Hirebet, and Vasileios Nasis**

Advisor: **Dr. Athina Petropulu**

ECE Department Prizes:

ECE-5: Improved Fuel Fill Control System Simulator for US Navy

Team Members: **Ed Dobeck, Joshua Fischer, Kevin Lavelle, Amy Mason and Lindsey Mock**

Advisor: **Dr. Moshe Kam**

ECE-18: A Three-Phase Variable Frequency Converter

Team Members: **Brian Carroll, Jarrod DePasquale, Thomas Matty and Brian McCann**

Advisors: **Drs. Karen Miu and Chika Nwankpa**

ECE-23: Computer Controlled Temperature and Applied Voltage Controller and Monitor

Team Members: **David Broscius, Patrick Cawthorne, Jeffrey Synnestvedt and David Winans**

Advisor: **Dr. Kevin Murphy**

- The Senior Design Committee also selected the following two teams that represented the ECE Department at the COE Senior Design Competition, which was held on Wednesday, May 29, 2002.

* ECE-5: Improved Fuel Fill Control System Simulator for US Navy

* ECE-13: Elimination of Clutter through Signal Processing for Landmine/Ordnance Detection (ECSPLOD)

Alumni Awards and Honors

- **Louis Litwin** (BSEE, 1997) was awarded the 2002 Eaton Award in Design Excellence at Purdue. Litwin earned his MSEE from Purdue University in 1999, and was awarded this honor for his outstanding contributions to the field of design.
- **Dr. Timothy Brophy** was appointed Vice President of Product Development at Qusion Technology, Inc.

- Two ECE alumni were awarded for their achievements at the CoE Honors Day Ceremony held in February 2002. The awardees were:
 - **Dr. Edward C. Ross** ECE '64, *2002 Circle of Distinction Award*
 - **Mr. Ron Vidal** ECE '83, *2002 Circle of Distinction Award*
- **John E. Davies, Jr.** (BSEE, 1979) was promoted to Executive Vice President of Worldwide Operations, and elected as a corporate officer by Checkpoint Systems, Inc. Board of Directors. Checkpoint Systems, located in Thorofare, NJ, is a provider of supply chain management and security solutions.
- **Phillip L. Kershner** (BSEE, 1992) of Entech Engineering, a full-service engineering and architectural firm, has been named Manager of Electrical Engineering.
- **Edward J. Marino** (MSEE, 1978) was appointed as President and Chief Executive Officer of Presstek, Inc., a direct digital imaging technology provider that is located in Hudson, NH.
- **Sigmond Mosko** (BSEE, 1958), a retired Senior Researcher from Oak Ridge National Lab, was named to Diversified Product Inspections, Inc. Technical Council. Diversified Product Inspections, Inc., based in Oak Ridge, TN, is a provider of independent failure analysis air contamination and fire investigations for the insurance industry.
- **Bill Hall** (BSEE, 1980) was appointed to the position of Vice President of Corporate Marketing Fairchild Semiconductor International (South Portland, ME), a global company that designs, manufactures and markets high-performance building block semiconductors.
- **Larry Schwerin** (BSEE, 1979) was promoted to General Partner of Vanguard Ventures (Palo Alto, CA), a venture capital firm specializing in seed and early stage technology investments.
- **Brian Burns** (BSEE, 1985) was named Chief Information Officer for Indian Affairs by Neal A. McCaleb, the U. S. Interior Assistant Secretary for Indian Affairs.

In Memoriam

Denise W. Nicoletti, an associate professor of electrical and computer engineering at the Worcester Polytechnic Institute and an ECE alumna, died Monday, July 22 in a tragic automobile accident. Denise received her B.S., M.S., and Ph.D. degrees in Electrical Engineering from Drexel University. Drs. Nihat Bilgutay and Banu Onaral were her

doctoral advisors. While at Drexel, Denise was the recipient of the Outstanding Graduate Student Award, the Outstanding Teaching Assistant Award, and gave the graduate student address at the 1991 graduation ceremony. She was the founder and director of Camp REACH (Reinventing Engineering And Creating new Horizons), a two-week long residential program for seventh grade girls, which was established in 1997. In 1998, she created WPI's WECE (Women in Electrical and Computer Engineering) organization to support and inspire WPI's female students. She was a member of the IEEE, the Acoustical Society of America, the American Society of Nondestructive Testing, the Society of Women Engineers, the American Society of University Women, the Women in Engineering Programs Advocates Network, and the Tau Beta Pi, Eta Kapa Nu, and Sigma Xi honor societies. Her husband Richard and their three children Lucio, Marcello, and Celeste survive Denise. Her funeral service was held on July 27 at the First Congregational Parish Unitarian Church in Petersham, Mass.

ECE Department Awards and Recognition Dinner Ceremony

The Annual ECE Department Awards and Recognition Dinner Ceremony was held April 15, 2002 at Behrakis Grand Hall, Creese Student Center.

*The ECE Distinguished Alumnus Award: **Xiang Wang***

Xiang Wang holds a doctorate in Electrical Engineering from Drexel University, and a law degree from the University of Maryland, which he received in 1991 and 1998, respectively. Dr. Wang earned a M.S. in Electrical Engineering from Drexel in 1987, and a B.S. in Electrical and Computer Engineering in 1982 from Sichuan University, Sichuan, China.

Dr. Wang has eighteen years of experience that spans medical technology issues in the U.S. and China. He has extensive knowledge of Chinese health care and the Chinese medical technology industry, complemented by a strong background as a U.S.-based executive for an American hospital and medical technology company. Dr. Wang has worked as an engineer, inventor, hospital research director, and technology-company executive. Awarded four U.S. medical-technology patents, Dr. Wang is the author of 40 books and journal articles, including a recent article on China's new regulatory requirements for medical devices and pharmaceuticals.

His extensive professional accomplishments include his current positions as Director of Asian Services at Aventor in Washington, D.C., as Attorney at Law with Baker & Daniels in Qingdao, China and Washington, D.C., and as an Adjunct Prof. of Electrical and Biomedical Engineering at Drexel University.

*The Martin N. Kaplan Service Award: **Nihat Bilgutay***

Nihat Bilgutay received his B.S.E.E. from Bradley University in 1973, and his M.S.E.E. and Ph.D. degrees from Purdue University in 1975 and 1981, respectively. In 1981, he joined Drexel University as a Drexel Fellow. He rapidly advanced through the

academic ranks and became a Full Professor in 1992. He is an active participant and leader in educational research and reform, and has spearheaded numerous College of Engineering initiatives, including the development of a comprehensive educational assessment program.

His research interests are in the areas of ultrasonic nondestructive testing, medical imaging, digital signal processing, and ultrasonic tissue and material characterization. He has been Principal Investigator or Co-PI on a host of research grants and has received support from such bodies as the NSF, AFOSR, ONR, EPRI, ARPA, as well as industry and private foundations. He has been instrumental in gaining support for the University for traditional disciplinary research, interdisciplinary research, and educational research.

He has held a number of leadership positions at Drexel University. He has served as Assistant Department Head for Development (1989-90), Associate Dean for Graduate Programs and Research (1990-95), and ECE Department Head (1995 to the present). He has held various leadership offices including chair of the Philadelphia Section of the IEEE and the IEEE Education Society. He is a Senior Member of the IEEE, and the recipient of the IEEE Third Millennium Medal and the IEEE Philadelphia Section award for exemplary service.

*The ECE Research Award: **Dagmar Niebur***

Dagmar Niebur joined Drexel's Electrical and Computer Engineering Department as an Assistant Professor in 1997. Dr. Niebur graduated from the University of Dortmund, Germany in 1984 with an MSc in mathematics and a minor in physics. She received an MSc in Computer Science (1987), the Postgraduate Certificate in Artificial Intelligence (1987), and a Ph.D. in Electrical Engineering (1994) from the Swiss Federal Institute of Technology, Lausanne, Switzerland.

Her current research focuses on intelligent information processing techniques for industrial applications and power systems. Her research projects include work capacitor switching, sponsored by EPRI, and shipboard system monitoring and control, sponsored by ONR. In 2000, Dr. Niebur received the prestigious NSF Career Award as part of her research on power systems.

Dr. Niebur is a member of the IEEE Power Engineering Society Subcommittee on Intelligent Systems, where she co-organized the 1996 IEEE- PES Tutorial on Applications of Neural Networks for Power Systems and taught Fuzzy Control Applications at the 1997 IEEE- PICA Tutorial.

*The ECE Staff Recognition Award: **Kathy Bryant***

Kathy Bryant joined Drexel's ECE Department in 1982 as a receptionist. Since that time, she has advanced to Assistant to the Department Head.

Her dedication to the ECE Department over the past twenty years has earned her the gratitude and appreciation of all ECE faculty and staff. Kathy is recognized for her years of exemplary service and her commitment to the Electrical and Computer Engineering Department. She has played an integral part in the Department's success. She assists in the planning of all major departmental events and continues to ensure that the ECE office is well organized and run efficiently.

*The ECE Staff Recognition Award: **Wayne Hill***

Wayne Hill began his career with Drexel University in 1981 as a Digital Equipment and Computer Technician for the ECE Department. Over the past twenty-one years, Wayne has advanced to the Director of Laboratory and Technical Operations. He is responsible for the management of all technical staff and laboratory renovations.

Wayne continues to update and improve departmental facilities to support the innovative ECE curriculum. His commitment was key in establishing the laboratory component of the E4 curriculum. He designed the laboratory facilities and wrote the initial experiments used in E4. He is a tremendous asset to the Department's continued success and to building and maintaining state-of-the-art facilities.

*Robert Quinn Outstanding Undergraduate Student Award: **Gregory Goppold***

Gregory Goppold, an ECE senior, completed his B.S. in June in three disciplines: electrical engineering, digital signal processing, and telecommunications. His senior design project, under the advisement of Dr. Athina Petropulu, involves the study and implementation of equalization techniques in RF channels.

Greg is currently working part-time at Woodward McCoach Inc., where he designed a new PCB board. He will join Woodward McCoach Inc. full-time upon the completion of his degree.

*Allen Rothwarf Outstanding Graduate Student Award: **Vishruta A. Dumane***

Vishruta A. Dumane was born in Bombay, India in 1976. Vishruta earned her B.E. from the University of Bombay in 1998. She received her M.S.E.E. in Electrical Engineering in 2000, and is pursuing her Ph.D. at Drexel University.

Vishruta's research interests are in signal and image processing with applications in medical diagnostics. She is investigating ultrasonic tissue characterization with specific application for differentiating benign and malignant breast masses. Her future goals are to engage in research in image enhancement and interpretation.

FY 2001-2002 ECE Research Awards and Expenditures

The combined ECE Grant/Contract Awards including the multi-unit awards for FY 2001-02 (1 July 2001 to 30 June 2002) totaled \$15,048,450. This shows an increase of 37.4% from FY 2000-01. This amount includes \$1,678,308 in joint grant totals where ECE faculty members are Co-PIs with PIs from units outside the ECE Department. Also, please note this reflects the total research awards received in FY 2001-02, including the multi-year awards in accordance with the new reporting procedure initiated by the VPR's Office effective FY 1999-2000. The ECE total corresponds to 50.9% of the COE and 31.6% of the University totals for the same period. A list of the individual ECE research grant awards for FY 2001-02 is attached to the report (Appendix A).

<u>FY</u>	<u>Total ECE Awards</u>	<u>% of COE Awards</u>	<u>% of DU Awards</u>
96-97	\$2,252,137	35.5%	15.0%
97-98	\$2,247,896	33.7%	12.1%
98-99	\$3,010,375	31.5%	14.3%
99-00	\$9,040,071	61.5%	28.1%
00-01	\$10,951,621	49.5%	21.2%
01-02	\$15,048,450	50.9%	31.6%

• The combined ECE Grant Expenditures for FY 2001-02 (1 July 2001 to 30 June 2002) totaled \$11,497,668, showing an increase of 37.7% from FY 2000-01. This amount includes an estimated \$1M in joint grant expenditures with PIs from units outside ECE (i.e., recorded under these units). The ECE total corresponds to 61.1% of the COE and 26.5% of the University total expenditures for the same period. Note that beginning with FY '00-01, Gateway Central awards and expenditures are being included in the ECE/COE totals. A summary of ECE, COE and DU research expenditures for FY 2001-02 is attached to the report (Appendix B).

<u>FY</u>	<u>Total ECE Exp.</u>	<u>% of COE Exp.</u>	<u>% of DU Exp.</u>
96-97	\$2,817,939	37.6%	15.9%
97-98	\$2,406,672	37.1%	15.7 %
98-99	\$2,665,461	39.7%	15.0%
99-00	\$2,860,793	30.2%	15.7%
00-01	\$8,351,565	61.6%	29.5%
01-02	\$11,497,668	57.9%	24.2%

Major Research Awards

Drexel, in partnership with Sarnoff Corporation, has received a \$6.2 million contract from the Department of Defense (DoD) for "Phase-II" of the *Applied Communications and Information Networking* (ACIN) program, which is headed by **Dr. Stewart Personick** (PI), Warren E. Colehower Professor of ECE. Sarnoff Corporation is Drexel's partner in ACIN, and operates as a subcontractor. The Port of Technology is also a subcontractor, providing business development support and managing the ACIN Technology Incubator in Camden NJ. The goal of ACIN is to enable DoD to effectively leverage emerging information technologies to achieve its transformation to "Network-centric Operations" over the next 10 years. The work to be performed under Phase-II includes six research and development projects, plus several other activities including the following projects:

-**Dr. Stewart Personick** (ECE Department) is the ACIN General Manager, and the PI for ACIN's "Knowledge Dissemination" activities. Spiros Mancoridis (Math and Computer science) is Deputy PI for these activities.

-**Dr. Athina Petropulu** (ECE Department) is the investigator for a \$750K R&D project in the area of applications of wireless communications. Bill Regli (Math and Computer Science Department) and **Dr. Moshe Kam** (ECE Department) are joint investigators on an \$850K R&D project in the area of secure communications.

Dr. Eli Fromm (PI), Roy A. Brothers Professor of ECE, received a \$2.5 million grant from the National Science Foundation for the "Gateway Engineering Education Coalition."

Dr. Peter Herczfeld (PI), Lester A. Kraus Professor of ECE, was awarded a \$1M grant from ONR for his project, "Hybrid Fiber Optic/Wireless System for High-Capacity Military Communications."

Drs. Chika Nwankpa, Professor of ECE (PI), **Prawat Nagvajara**, Associate Professor of ECE (Co-I), **Karen Miu**, Assistant Professor of ECE (CoI), **Dagmar Neibur**, Assistant Professor of ECE (Co-I), and **Jeremy Johnson**, Interim Department Head and Professor of Computer Science (Co-I) will receive \$1M in funding over the next year from the Department of Energy. The project is in collaboration with NJIT, which will focus on the research and development of the "PowerGrid" simulator.

Dr. Gary Friedman, Professor of ECE was awarded a \$711K ONR grant for his project "Magnetographic Fabrication of Biochemical Microarrays."

Drs. Peter Lewin (PI), Richard B. Beard Professor and **Mohana Shankar** (Co-PI), Allen Rothwarf Professor and Assistant Department Head of Graduate Affairs, were awarded a NIH grant in the amount of \$705K. The project is entitled, "Ultrasound Hydrophone and Its Calibration up to 100 MHz."

Dr. Moshe Kam, Robert Quinn Professor of ECE was awarded a \$495K grant from ONR for his project, "Development of a Virtual Distributed Control System-Phase II."

Dr. Bahram Nabet, Professor of the ECE Department (PI), was awarded a \$300K grant by the NSF GOALI program. His work will focus on "2D and 1D Heterojunction and Heterodimensional Devices for Optoelectronics."

Dr. Athina Petropulu, Professor of ECE (PI), was awarded a \$225K grant by ONR to investigate, "Blind Source Separation Ideas for Battlefield Surveillance."

Dr. Harish Sethu (PI), Assistant Professor of ECE, was awarded a \$200K Northrup Grumman for his project, "Specialized Engineering Services for Advanced Sensor Modeling."

Institutional Advancement Activities

The Orthlip Foundation has submitted a \$30,000 donation toward the \$200,000 pledge for the establishment of the Harry F. Orthlip Systems Laboratory. A total donation of \$150,000 has already been received over the past three years. The funds have been used to establish and improve the Harry F. Orthlip Systems Laboratory in the ECE Department.

- Philadelphia Electric Company has submitted the last installment of the \$750,000 pledge toward the establishment of an endowed chair professorship in Power Engineering. The Department will continue its efforts to increase the endowed fund to \$1.5 to \$2 million range to provide annual funds to support an endowed chair professor in Power Engineering. In the meantime, the Department would like to seek PECO's approval to use the revenues generated by the fund to establish a PECO Doctoral Fellowship.

- Other donors include:

Unisys Corporation - Senior Design Project in Electrical and Computer Engineering

Independence Chapter/Old Crows -

The Independence Chapter of Old Crows Electrical Engineering Scholarship

InterDigital Communications Corporation - InterDigital Fellowship

Lockheed Martin NE&SS-

Lockheed Martin Scholarships in Electrical and Computer Engineering

Semiconductor Research Corporation-

Research on unusual electronic properties of Nanowires

- The following list summarizes ECE related industry visits, meetings, and Institutional Advancement/fundraising efforts by the Department Head in AY 2001-2002:

<u>Date</u>	<u>Company</u>	<u>Contact</u>
September 19, 2001	InterDigital	Alain Briancon
October 2, 2001	University City Science Center	Jill Felix
November 6, 2001	Exxon-Mobil	Dick Brown
December 6, 2001	Concurrent Computer Corp.	Fred Allegrezza
March 26, 2002	Hewlett-Packard	Stephen Squires
April 18, 2002	Novasol	Jim Karins/Hunter
Downs		
April 23, 2002	InterDigital	Don Boles
July 8, 2002	Continental Systems	Mike Zaharchuk

Enrollments and Curriculum

The FT freshman enrollments in ECE based on Fall 2002 November census figures is 230 (75 Electrical Eng. (EE), 144 Computer Eng. (CE) and 11 Software Eng. (SE)), which constitutes 43.4% of the COE freshman with designated engineering majors. There are also 151 engineering freshman with undeclared majors, and we expect approximately 66 of these students to eventually choose EE, CE or SE as their majors, which translates to an effective ECE freshman class of 296 for Fall 2002, which is an increase of 15% from Fall 2001 figures. 62.6% of incoming ECE students are choosing CE versus 32.6% EE and 4.8% SE. The average SAT score for engineering freshmen has increased from 1180 to 1204 compared to last year, with the EE student average SAT being among the highest at 1,220.

There are a total of 846 undergraduates enrolled in the ECE Department (445 in CE, 390 in EE and 11 in SE), which accounts for 40.2% of the designated engineering majors in the COE.

Fall 2002 census figures show that 65 new graduate students have enrolled this year, which is an increase of 20% compared to last year. This is a yield from the 141 graduate students who had submitted "intent to enroll." Following is a summary of distribution of the new graduate students:

Distribution by Degree Program:

MSEE:	27
MS Telecom	9
MS Comp. Eng.	11
MSSE	7
Ph.D.	11

Distribution by Country of Origin

India	55%
U.S.A.	23%
China:	16%
Other:	6%

There are a total of 206 graduate students enrolled in the ECE Department (157 in Masters and 49 in Ph.D. programs), which is 37.9% of the designated engineering majors in the COE. 20 of the 49 Ph.D. students have passed the Ph.D. candidacy examination.

The number of research assistants (RA), graduate assistants (GA) and teaching assistants (TA) for Fall 2002 are as follows:

62 RA (45.5 FTE)
4 GA (2.5 FTE)
28 TA (14.5 FTE)

The ECE Department initiated its third B.S. program this fall. Dr. P. M. Shankar, along with Drs. Gregory Hislop from the College of IST and Spiros Mancoridis from the MCS Department, spearheaded the development of a proposal for a University-wide Bachelor's of Science degree in Software Engineering. Dr. Raj Mutharasan merits special recognition for leading the initiative as interim Dean of Engineering. The faculty Senate approved the B.S. in Software Engineering on August 14, 2001. The ECE Department, MCS Department, and the College of Information Science and Technology offer the BSSE degree.

Degrees conferred in AY 2001-02:

128 BS

22 MS

6 Ph.D.

ECE Ph.D. Degrees Conferred in AY 2001-2002

Saffet Ayasun

Dissertation title: *Singularity Analysis of Differential-Algebraic Power System Models*

Supervising professor: **Chika Nwankpa**

Li Bai

Dissertation title: *Secure Electronic Mail*

Supervising professor: **Moshe Kam**

Ivan Bradaric

Dissertation title: *Blind Multiple-Input Multiple-Output System Identification with Applications in Multi-user Communications*

Supervising professor: **Athina Petropulu**

Binning Chen

Dissertation title: *Frequency Domain Blind Multiple-Input Multiple-Output System Identification*

Supervising professor: **Athina Petropulu**

Amro Anwar Seddick

Dissertation title: *Heterodimensional Schottky Contacts to Modulation-Doped Heterojunction with Application to Photodetection*

Supervising Professor: **Bahram Nabet**

Xueshi Yang

Dissertation title: *Impulsive Self-Similar Processes with Applications in Broadband Communications System Modeling*

Supervising Professor: **Athina Petropulu**

2002 ABET Review Visit

The Accreditation Board reviewed the Electrical and Computer Engineering Programs for accreditation for Engineering and Technology (ABET) on November 11-14, 2002. This was the first time the Computer Engineering Program was reviewed for accreditation as a new degree program. Both Programs received excellent reviews. Shortly after their visit, ABET officially notified the Department that the Electrical Engineering and Computer Engineering programs received the full six-year accreditation through September 30, 2008. Congratulations to the entire ECE Community and thanks to everyone for your valuable contributions to our successful ABET evaluation!

The following is a summary of the statements made by the ABET evaluators in the exit interview. The various "descriptors" ABET evaluators use to indicate the status of the program are:

Deficiency: Specific ABET criterion not met/cannot accredit program

Weakness: ABET criterion satisfied, but lacks strength of compliance and interim action will be required in the form of an interim report or visit.

Concern: Criterion is currently satisfied, but potential exists for future problems. positive action is required.

Observation: Comment or suggestion that does not directly relate to ABET criteria.

Electrical Engineering Program

Strengths:

- * superb job preparing the self-study; one of the best reviewed in many years as an ABET evaluator.
- * strong leadership and administration
- * tDEC has many strengths
- * excellent students; well-connected with department and faculty, enthusiastic
- * Co-op is an excellent asset to program
- * excellent opportunities available to graduates; high demand for graduates
- * excellent faculty; dedicated to undergraduate mission

Criterion Related Statements:

* No Deficiency

* No Weakness

* Concerns:

- 1) Institution needs to bring summer term budgets in line with the academic year to maintain the same level of academic quality throughout the program.
- 2) tDEC needs a course for EEs which would provide formal programming language experience

* Observations:

- 1) Co-op employer evaluations and student evaluation of Co-op experience should be provided directly to EE faculty advisors for review and discussion with students as part of the advising process to maximize Co-op advantage.

2) PT/Adjunct faculty, particularly in the Evening College program, should be better integrated with the ECE Department.

Computer Engineering Program

Strengths:

- * course work provides good variety and a good balance between depth and breadth
- * good design experience starting with freshman design and culminating with capstone senior design.
- * Co-op experience is invaluable for student preparation
- * faculty has excellent background and presents state-of-the-art material
- * students are highly enthusiastic and energetic

Criterion Related Statements:

* No Deficiency

* No Weakness

* Concern:

1) Summer term budgets should provide funding to maintain same level of academic quality.

* Observations :

1) Course objectives should be more directly related to specific outcomes and general program educational objectives.

2) A few faculty have not fully embraced the ABET criterion.

3) Some courses seem to have trouble covering all the intended material, which may be required for subsequent courses.

4) Uniformity and completeness of catalog information regarding the program should be maintained.

As evidenced by the above summary, both programs were reviewed highly positively. The few concerns raised are issues that we would generally agree with, but ones that require institutional actions beyond the Department's direct control. We will work with the administration to address these issues.

New Faculty Recruitment

Two new faculty members joined the ECE Department in Fall 2002:

Dr. Adam Fontecchio received all of his degrees in Physics from Brown University (BA in 1996, MS in 1998, and Ph.D. in 2002). His expertise is in novel electro-optical materials, with focus a on liquid crystal/polymer interactions in Holographic Polymer Dispersed Liquid Crystals (H-PDLC). Professor Gregory Crawford was his doctoral thesis advisor at Brown. Adam was a key participant in several outreach programs, and

has received numerous awards and fellowships during his graduate studies at Brown, including multiple NASA Graduate Student Researcher Program (GSRP) fellowships, NSF Visiting Scientist fellowships, and the NSF Summer Institute fellowship. Adam has published numerous journal and conference papers, including in the prestigious *Journal of Applied Physics*, *Applied Physics Letters*, and *Journal of Optical Technology*. He also has two patent applications related to his H-PDLC work. He has developed new techniques for modeling and implementation of liquid crystal displays, which have widespread use in computers, laptops, and cellular phones. LCDs are also an important component in high-strength fibers, which occur naturally in the cell membranes of many biological systems, and are becoming heavily investigated for optical switching technologies in optical communications. In addition to LCDs, Adam has worked on advanced and practical problems in holography, remote sensing, microscopy, and magnetic resonance.

Dr. Timothy Kurzweg received his BS in Electrical Engineering from the Pennsylvania State University in 1994, and his MS and Ph.D. degrees in Electrical Engineering from the University of Pittsburgh in 1997 and 2002, respectively. Tim's expertise is in modeling and simulation of Micro Electro-Mechanical (MEM) systems. His work spans optics, electronics and mechanics and has multi-domain and mixed-signal applications in MEMS and nanotechnology. Tim has published several journal papers on MEM systems, including in the prestigious *Applied Optics*. He has also published over twenty conference papers, one of which received the "Best Paper Award" at the 1997 Design Automation Conference. Tim was also a key participant in a multi-institution effort funded by DARPA, providing him valuable experience with large-scale team projects. He regularly reviewed papers for the Design Automation Conference, Design, Test, Integration and Packaging of MEMS/MOEMS, and for the Journal of Selected Topics in Quantum Electronics (IEEE-LEOS). Tim received the Wellington C. Carl Fund Scholarship between 1997 and 2000 and was elected as the Teaching Assistant of the Year in the Electrical Engineering Department at Pitt.

- AY 2001-02 Recruitment Statistics:

Applications Received:	152
On-Campus Interviews:	10
Offers Made:	4
Offers Accepted:	2

- The AY 2002-03 faculty distribution in the ECE Department will be as follows:
 - 32 Tenure Track,
 - 2 FT Auxiliary
 - 3 Research
 - 3 Adjunct
 - 9 Affiliated

Faculty Appointments and Promotions

- The Provost and President approved the promotions of Drs. Bahram Nabet, Chika Nwankpa and Athina Petropulu from Associate to Full Professor in May 2002. We congratulate Drs. Nabet, Nwankpa and Petropulu on achieving this major milestone in their professional careers!
- **Dr. Maja Bystrom** resigned from her position as Assistant Professor in the ECE Department to accept a position at Boston University as Associate Professor, effective September 1, 2002. Maja has been a member of the ECE faculty since September 1, 1997. She received the NSF CAREER award, NSF POWRE award, in addition to other grants from NSF and ONR, and has participated in the ACIN project as a Co-PI. She also received a Fulbright Award in 2001 and the GE Foundation "Faculty for the Future " award in 1998. One her most important contributions have been in providing departmental leadership in the reorganization and coordination of the Senior Design Program in ECE. She served as the Chair of the ECE Senior Design Committee for the past two years. Maja has been a wonderful colleague and a successful and productive member of our faculty. We wish Maja success in her new position.

Staff Appointments and Promotions

- **Mr. Vaughn Adams** resigned from his position as ECE System Administrator effective March 29, 2002 to pursue a new opportunity with InterDigital Communications in King of Prussia, PA. Vaughn was instrumental in raising the "ECE System Administrator" position to a new level. He played a key role in the establishment of the Web-based Assessment process in the College of Engineering. This was a crucial step that made our ABET accreditation visit a great success. **Mr. Jonathan Hoult** joined the Department as the new System Administrator on April 15, 2002. Jonathan previously worked at Navpoint Internet as the companies Systems/Network Administrator.

ECE Advisory Council

- The biannual ECE Advisory Council Meeting was held October 30, 2001. There was good attendance with nine Advisory Council members, Institutional Advancement representatives (Frank Glazer and Larry Blenner), Co-Op representative (Gerri Betka), Richard Weggel and Aly Valentine from the Dean's Office, and a number of ECE faculty. The Advisory Council members were highly enthusiastic, engaging, and actively participated in the discussions.

- The Advisory Council met again on May 29, 2002. There were eight Advisory Council members in attendance, Larry Blenner from Institutional Advancement, and numerous ECE Faculty. The main topic of concern was student retention. They recommended initiating an interviewing process for all incoming engineering freshman, creating faculty mentoring programs, and offering a “support system” through support from peers (study groups) or faculty (mentoring).
- Four new ECE Advisory Council members were appointed during the 2001-2002 academic year:

Dr. Alain Briancon, Executive Vic President and Chief Technical Officer, Interdigital

Dr. Richard Wolff, Vice President, Advanced Network Systems Research, Telcordia Technologies

Mr. Fred Allegrezza, Chief Technology Officer, Concurrent Computer Corporation

Dr. Stephen Squires, Chief Science Officer and VP of Hewlett-Packard Company

- Two members resigned from the Advisory Council in the AY 2001-2002.

Mr. William Mitchell, VP for External Affairs, Bell Atlantic-Pennsylvania, retired

Dr. George Zysman, Chief Technical Officer, Wireless Network Systems, Lucent Technologies, Inc., retired

Facility/Laboratory Improvements

- Room 302 was converted into three (3) offices. The space was created in anticipation of new faculty appointments to the Department.
- With the completion of the Computer Engineering Labs, room 303 was decommissioned as a computer classroom. Room 303 will be converted into a research space.
- Room 202/203, the Computer Engineering Lab is complete and in use. New equipment was purchased for 15 stations. Each station has a high-end PC with a 17” Flat panel display, tri- output power supply, and a 68 bit Logic Analyzer. This room also provides an instructors station with a podium and a Smartboard display that allows the instructor to write on the computer display

in real-time. The display and the mark ups are displayed on a ten-foot diagonal screen.

- The Wireless Networking and Communication Lab in room 209 are complete. Ten communication educational training systems manufactured by Emona were purchased for this lab. These systems come with written experiments with many forms of wireless communication experiments available. Ten tri-output power supplies and two 2GHz analog signal generators were also purchased for this space.
- The carpet and furniture in room 405 were replaced to address student complaints about the room. Nine new computers with flat panel displays were also purchased.
- The carpet in room 406 was replaced. Two new Sun Microsystems v880's were purchased to replace the Enterprise 4000's. In addition, a UPS large enough to sustain the server systems and allow a soft shutdown due to power loss was purchased.
- Engineering Management was moved to Randell 116 and room 103 is being converted to research space.
- New computers with flat panel displays were purchased for the Machines Lab in Randell.
- Three faculty offices were re-furnished with two others to be completed by the end of the year.
- ECE assumed responsibility for the multimedia equipment in Hill Conference and CAT-186. Both multimedia systems are being upgraded with plans for Videoconferencing availability in CAT-178.

ECE Faculty Retreat

- The ECE Faculty Retreat was held on September 21, 2001 at the Sugarloaf Conference Center with 37 people in attendance. One of the topics discussed at the retreat was the status of the plans for the research building and Commonwealth Hall. The faculty expressed serious concerns about the potential adverse impact that these plans may have on the ECE Department and its faculty. The faculty passed a resolution with a vote of 28 in favor, 2 opposed and 3 abstentions.

“ECE Dialog” with Students

Dr. Nihat Bilgutay, Department Head, and **Dr. Kevin Scoles**, Associate Professor and Assistant Department Head for undergraduate affairs, continue to hold informal discussions with undergraduate students every quarter. The ECE dialogs allow students to discuss their views on education and related matters at Drexel, and to offer suggestions. The dialogs are organized to improve the learning atmosphere for students and faculty members, and to help the Department better understand students’ views. The ECE Dialog meetings are held every quarter and are organized by the Drexel IEEE Student Chapter. The meetings are held in the late afternoon/early evening and pizza and soft drinks are provided. The meetings provide an overview of actions taken to address the issues raised at the previous meeting followed by an open discussion with the students about their current concerns, needs, and wishes. The students have been very enthusiastic and engaging and expressed their satisfaction with the process. It is also clearly evident that the satisfaction level of the students has been steadily increasing since these meetings were initiated in AY 1999-00. The dialog meetings were held on October 24, 2001, January 23, 2002, April 24, 2002 and July 18, 2002 in AY 2001-02.

Other Departmental News

- **Dr. Prawat Nagvajara**, Associate Professor of Electrical & Computer Engineering, represented Thailand in cross-country skiing in the 2002 Olympic Winter Games. Nagvajara competed in the men’s 30 km free-technique event on February 9th in Salt Lake City, and carried the Thai flag at the opening ceremony February 8th. Nagvajara has competed in numerous races including the Idaho Spring Series in Sun Valley, Idaho; the Swiss Cup in Goms, Switzerland, and the US National Championship in Bozeman, Montana in order to qualify for the Olympic games. Nagvajara’s race was Thailand’s first participation in the Olympic Winter Games. Although he did not reach his goal of completing the 30 km race, he enjoyed competing against the world’s greatest athletes.
- The Department initiated a new “Graduate Fellowship for Doctoral Students,” which will provide support for three ECE graduate students. The fellowship’s guidelines as follows:
 - The ECE department will offer 3 Graduate Fellowships/year with a starting stipend of \$2000/month.
 - These students will also receive an additional stipend (\$500) to attend one professional society conference during the first year.
 - Students will be half time teaching assistants during the first year (~10 Hours a week)

- These students will choose a research advisor during the first year and will become Research Assistants or Teaching/Research Assistants in subsequent years.
 - Applicants must be post-MS students from US Universities
 - Applicants must have a GRE score of at least 1950 and GPA of 3.5 at the MS level
-
- The ECE Department sponsored three tables for our Ph.D. alumni, faculty advisors, and respective spouses/guests at the **2002 Blue and Gold Days Alumni Reunion Gala Dinner**, which was at Behrakis Grand Hall May 4, 2002. There were approximately 10 ECE Ph.D. alumni in attendance. The majority of the alumni were returning back to campus for the first time in many years. Wayne Hill gave a tour of the ECE Labs prior to the Gala. This was ECE Department's first major effort to reach out to our Ph.D. alumni. The Gala was extremely well organized and everyone in attendance had great fun. We hope to continue and expand our efforts in the future to reach out to our alumni at all levels.
 - The June 2002 edition of the ASEE Action newsletter featured **Dr. Robert Hesketh**, Professor of Chemical Engineering at Rowan University. He was awarded the ASEE Robert G. Quinn Award, which is one of the ASEE's national awards that is given.
 - Dr. Francis Linnehan of the Management Department received the 2001-2002 Allen Rothwarf Award, which is awarded annually as part of Drexel University's Awards for Teaching Excellence.
 - The ECEngineer Newsletter published by **M.P. Shankar** and **Allison Steever** was distributed in June 2002. The newsletter featured developments and notable achievements of the Electrical and Computer Engineering Department's faculty, alumni, and students. The newsletter is also located on the Department's web page at http://www.ece.drexel.edu/ECE/newsletter_1.pdf.
 - **Dr. Fred B. Kremer** ECE'72 presented a lecture, "Seeing Things as They Really Are" on October 26, 2001 at the Mandell Theater, Drexel University. Dr. Kremer is a surgeon, engineer, and entrepreneur that has designed dozens of refinements to laser eye surgery, leading to a completely new procedure, "Laser K," that the world soon dubbed LASIK. Originally educated as an engineer at Drexel University, Dr. Kremer has received patents on a half-dozen devices that revolutionized refractive surgery. In the past year, more than 1.5 million LASIK surgeries were performed in North America, prompting the *Philadelphia Business*

Journal to name Kremer Laser Eye Center one of the fastest growing businesses in the country.

- On Wednesday October 24, a short seminar was given on the ABET accreditation process. The seminar discussed ABET's expectations on program objectives and outcomes and our continuous quality improvement process.
- The ECE Web Page was completely reorganized and updated, thanks to the efforts of **Jennifer Hintze** and **Dr. M. P. Shankar**. The new page is operational at <http://www.ece.drexel.edu>.
- The ECE Senior Design Committee met on Thursday, May 16th to review the evaluation results for the senior design projects to determine the course grades and the Senior Design Award winners for AY 2001-2002. The high level of professionalism, excitement, and enthusiasm in this year's senior design projects were the result of extreme dedication, hard work and, commitment on the part of our students, faculty, staff, and the ECE Senior Design Committee chaired by Dr. Maja Bystrom.

ECE Social Events in AY 2001-2002

- New Graduate Student Welcoming Reception/Pizza Party (September 26, 2001)
- The Annual ECE International Holiday Party (December 13, 2001)
- ECE Department Annual Holiday Dinner (Twenty Manning, December 16, 2001)
- A reception honoring Dr. Prawat Nagvajara's participation in the Winter Olympics 2002 was held March 14, 2002
- A Surprise 50th Birthday Party for Dr. Nihat Bilgutay (April 1, 2002)
- A reception honoring Dr. Eli Fromm's receipt of the inaugural Bernard M. Gordon Prize from the NAE was held April 22, 2002 in the Paul Peck Alumni Center, Drexel University
- 2002 Blue and Gold Days Alumni Reunion Gala Dinner (May 4, 2002)
- Senior Design Pizza Party (May 17, 2002)
- The IEEE Spring Festival was held at the Daskalakis Athletic Center Grounds (May 24, 2002)

- Farewell Party for Vaughn Adams, ECE System Administrator (March 27, 2002)
- Eta Kappa Nu Annual Faculty Roast (Cavanaugh's, May 30, 2002)
- End of the Academic Year Faculty Meeting and Luncheon (June 4, 2002)
- Doctoral Student Degree Completion Pizza Party (June 5, 2002)
- ECE Spring Party at the Bilgutay's residence (June 9, 2002)
- Farewell Party for Dr. Maya Bystrom (August 22, 2002)
- Fall Pizza Party to Welcome Back Students (September 26, 2002)

Challenges and Goals for the ECE Department in AY 2002-2003

Hiring competitive faculty in areas of great demand both in academia and industry, such as computer engineering, nanotechnology, and MEMS continues to be the top priority for the ECE Department. These areas are expanding dramatically, both at Drexel and across the nation. We need to continue building our department and strengthening the critical curricular and research areas that are rapidly growing, particularly in computer engineering, nanotechnology, networking, and telecommunications. In order to meet the challenges and maximize the vast opportunities available to us, the ECE Department must continue hiring and developing research facilities in these critical areas. We believe our department has an excellent opportunity to increase its national and international visibility and to raise its rankings to even greater heights through sustained growth and continued excellence in teaching, research, and professional service. The ECE Strategic Plan focuses on achieving these key goals.

Our key goals are to:

- Provide a strong, supportive environment for our new and established faculty alike and facilitate their continuous professional development and success. We must strive to develop and maintain state-of-the-art facilities combined with academic, research, and general administrative support to ensure that our faculty members have the means to successfully compete for external funding opportunities and to reach their professional potential in both teaching and research.
- Support the development of new, and the continuation of existing large-scale, grant/contract activity in the ECE Department such as those under the leadership of Drs. Fromm, Herczfeld, and Personick. It is also vital for the ECE Department to have funding diversity in wide-ranging research areas, involving the participation of a large segment of the faculty. These grants/contracts not only provide a more diverse research base for the Department, but also contribute significantly to enhancing the key quality metrics such as Ph.D. production, publications, and other scholarly activities. This is essential to guarantee the success of the ECE Department as a nationally recognized department. We will also support the development of other major research centers in the ECE Department to reflect both existing and emerging strengths of the Department, such as in Computers and Information Networking, MEMS, Nanotechnology, Microwave-Lightwave Engineering, Electric Power Engineering, and Imaging and Computer Vision.
- Maintain and further strengthen the close ties that have been established in recent years with the ECE Advisory Council through regular council meetings and communications with individual members. With continued growth in enrollments, faculty size, and research activity, the role of the ECE Advisory Council will be increasingly critical in providing us with guidance, feedback, and assistance to reach our full potential. The close ties established with the ECE

Advisory Council have been very helpful in creating and implementing the ECE Strategic Plan because we have had the full and active participation of the council members.

- Graduate programs have seen significant decline during the period of shrinking faculty size in the early '90s. Although the decline in undergraduate enrollments have now been reversed dramatically by significant increases in freshman enrollments during the past four years (particularly with increasing enrollments in Computer Engineering), the same trend is yet to be fully realized in graduate enrollments. The ECE faculty feels it is time to concentrate similar efforts on rebuilding the graduate curriculum and enrollments. We have initiated the graduate curriculum restructuring last year and plan to completely revamp our graduate programs in the next two years with focus on developing attractive state-of-the-art graduate curriculum with sufficient diversity of offerings at all levels.
- Continue to strengthen the BS and MS degree programs in Software Engineering and Computer Engineering.
- The MS degree program in Computer Engineering will be the key to increasing graduate enrollments and strengthening the research and graduate programs of the ECE Department. The BS program in Computer Engineering has been received with great enthusiasm on the part of our undergraduates, and has been accredited by ABET for the first time in AY 2001-02. The recently approved MS degree program in Computer Engineering will complement this effort and provide our department with greater opportunity and national visibility. We will take advantage of the tremendous demand for computer engineers to build and strengthen our undergraduate and graduate programs in computer engineering and to recruit faculty in this area commensurate with the growth we are experiencing. The newly approved BS in Software Engineering will provide additional opportunities and diversity for our students and faculty.
- Continue the aggressive and pro-active student recruitment at both the undergraduate and graduate levels with particular focus on improving the student quality. This effort will be coupled with a focus on recruiting domestic graduate students, particularly at the Ph.D. level. To attract top-notch graduate students to Drexel, we will focus on obtaining additional national fellowships and establishing endowed graduate fellowships.
- Renovation of Commonwealth Hall and the construction of the new Research Enterprise Building is a positive development for the University. However, this initiative must be coupled with the ECE Department being provided with modern, state-of-the-art facilities to maintain and strengthen the Department's significant contributions to the educational and research enterprises at Drexel.
- Proactively participate in fundraising efforts to enrich the academic and research programs, related resources and facilities in ECE with the goal of becoming one of the top 25 departments in the country.

- Over the past several years, we have made great strides in establishing an ABET 2000 outcomes-based assessment process and instruments in the College of Engineering. We have established an outcomes-based course assessment; ABET (a-k) Survey, and the Senior Exit Survey, all implemented via the Web and across the COE. We have also worked with the Institutional Research Office to revise the Co-op and the Alumni Surveys to incorporate the new ABET requirements. These efforts were essential to our highly successful ABET visit which occurred in November 2001. We will continue to implement and improve the process, with particular focus on the Continuous Quality Improvement (CQI) process.

Appendix A: ECE Department FY 2001-2002 Research Awards

Electrical & Computer Engineering Department FY 2002 Research Awards

Dar yoush, Afshin	Rydal R&D, Inc.	Eng. Support for Dev. of a High Performance Network for Satellites	50,000
Friedman , Gary	Office of Naval Research	Magnetographic Fabrication of Biochemical Microarrays	710,943
Fromm , Eli	National Science Foundation	Gateway Engineering Education Coalition	2,500,000
Herczfeld , Peter	Office of Naval Research	Hybrid Fiber Optic/ Wireless System for High Capacity Military Comm.	100,000
Herczfeld , Peter	Office of Naval Research	Hybrid Fiber Optic/ Wireless System for High Capacity Military Comm.	1,048,888
Kam , Moshe	Office of Naval Research	Development of a Virtual Distributed Control System - Phase II	495,068
Kam , Moshe	Fairmount Automation, Inc.	Automated Distributed Control (Phase 1)	94,959
Katsinis , C.	National Science Foundation	An Interconnection Network Architecture for Petaflops Computing	66,000
Katsinis , C.	U. S. Dept. of the Navy	Eng. Sup. for Dev. of a Low- Latency High-Throughput Network Switch	10,000
Meystel, Alex	NIST	IPA Agreement	46,671
Me ystel, Alex	Battlespace, Inc.	Research in Support of Advanced NICCI Concepts	58,000
Miu , Karen	National Science Foundation	CAREER: Electric Power Dist. Sys.: Theory, Appl., and Performance	12,000
Nabet , Bahram	Photonics Laboratories, Inc.	Novel Heterodimensional Sensors	90,000
Nabet , Bahram	National Science Foundation	2D and 1D Heterojunction and Heterodimensional Devices for Optoelect.	300,002
Nwankpa, C.	Office of Naval Research	Observability Issues in Furture Shipborad Power Systems	78,790
Nwankpa, C.	U. S. Department of Energy	PowerGrid - A Computation Engine for Large-Scale Electric Networks	969,000
Personick , Stewart	US Department of the Army	Applied Comm. and Info. Networking Program (ACIN) - Phase 2	13,297
Personick , Stewart	US Department of the Army	Applied Comm. and Info. Networking Program (ACIN) - Phase 2	200,000
Personick , Stewart	US Department of the Army	Applied Comm. and Info. Networking Program (ACIN) - Phase 2	6,021,950
Petro pulu, Athina	Office of Naval Research	Target Tracking and Sensor Fusion	224,997
Sethu , Harish	Northrop Grumman	Specialized Engineering Services for Advanced Sensor Modeling	200,000
Tretiak , Oleh	Chi Systems, Inc.	A Warpable Digital Rodent Brain Atlas	79,577

Sub. Total : 13,370,142

Awards Listed Under Other Units with ECE Faculty Co-PIs:

Lewin, Peter (PI) Mohana Health	National Institutes of Health	Ultrasound Hydrophone & Calibration	704,742	Shankar,
Onaral, Banu (PI) Health	National Institutes of Health	Optical Brain Imaging Sensor for IOA	400,000	Yazici, Birsen
Pourrezaei, K. (PI) Health	National Institutes of Health	Functional Optical Brain Imaging CT	300,000	Yazici, Birsen
Reddy, Agami (PI) Eisenstein, Bruce	NIST	Integrated Building Systems Environment	198,566	
Regli, William (PI) Sethu, Harish	Lockheed-Martin Energy	Support to Ship Mission Control System	75,000	
			Sub. Total:	1,678,308
			ECE Total:	15,048,450

Electrical & Computer Engineering Total: ***\$15,048,450****
College of Engineering Total: ***\$28,062,210***
Drexel University Total: ***\$47,679,093***

* includes \$1,678,308 for ECE faculty listed as Co-PI on awards listed outside ECE/COE

Appendix B: ECE Department FY 2001-2002 Research Expenditures

<i>Electrical & Computer Engineering Total:</i>	<i>\$11,497,668*</i>
<i>College of Engineering Total:</i>	<i>\$18,130,122</i>
<i>Drexel University Total:</i>	<i>\$43,307,705</i>

* includes estimated \$1M in joint grant expenditures with PIs from units outside ECE (i.e., recorded under these units).

Appendix C: ECE Curricular/Research Groups
AY 2001-2002

Telecommunications & Networking

Core Members

Maja Bystrom
Afshin Daryoush
Bruce Eisenstein
Stan Kesler
Stewart Personick
Mohana Shankar
Ruifeng Zhang

Affiliated Members

Peter Herczfeld
Ryszard Lec
Bahram Nabet
Prawat Nagvajara
Athina Petropulu
Harish Sethu
Birsen Yazici
Nihat Bilgutay
Mahmoud El-Sherif
Allon Guez

Coordinator

Stewart Personick

Computer Engineering

Core Member

Jeremy Johnson
Constantine Katsinis
Alex Meystel
Prawat Nagvajara
Warren Rosen
Harish Sethu
Lazar Trachtenberg
Suryadevara Basavaiah
Karkal Prabhu

Affiliated Members

Bill Freedman
Stewart Personick
Ruifeng Zhang

Coordinator

Harish Sethu

Controls, Robotics and Intelligent Systems

Core Member

Bill Freedman
Allon Guez
Paul Kalata
Moshe Kam
Karen Moxon
Eli Fromm

Affiliated Members

Karen Miu
Dagmar Niebur
Chika Nwankpa
Stewart Personick
Birsen Yazici
Leon Hrebien
Alex Meystel

Coordinator

Paul Kalata

Image and Signal Processing and Interpretation

Core Member

Nihat Bilgutay
Fernand Cohen
Leon Hrebien
Banu Onaral
Athina Petropulu
Oleh Tretiak
Birsen Yazici

Affiliated Members

Moshe Kam
Stan Kesler
Ryszard Lec
Peter Lewin
Mohana Shankar
Lazar Trachtenberg
Ruifeng Zhang
Maja Bystrom
Bruce Eisenstein
Eli Fromm

Coordinator

Fernand Cohen

Electrophysics

Core Member

Mahmoud El-Sherif

Gary Friedman
Ed Gerber
Peter Herczfeld
Dov Jaron
Ryszard Lec
Peter Lewin
Kevin Scoles
Bahram Nabet
Kambiz Pourrezaei

Affiliated Members

Eli Fromm

Karen Moxon
Stewart Personick
Warren Rosen
Suryadevara Basavaiah
Kapil Dandekar
Afshin Daryoush

Coordinator

Gary Friedman

Power Engineering

Core Member

Karen Miu
Dagmar Niebur
Chika Nwankpa

Affiliated Member

Kevin Scoles

Coordinator

Chika Nwankpa

**Appendix D: Electrical and Computer Engineering Department Committees
2001-2004**

ECE Faculty Advisory Committee:

Kevin Scoles, Undergraduate Affairs Committee - Chair
Mohana Shankar, Graduate Affairs Committee - Chair
Edwin Gerber, Assistant Department Head for Evening Programs
Oleh Tretiak, Planning and Development Committee – Chair
Moshe Kam, Faculty Recruitment Committee - Chair
Fernand Cohen, Promotion & Recognition Committee - Chair

ECE ABET Steering Committee:

Nihat Bilgutay, Co-Chair
Wayne Hill
Moshe Kam
Karen Miu
Prawat Nagvajara
Kevin Scoles, Co-Chair
Mohana Shankar

ECE Graduate Affairs Committee:

Mohana Shankar, Chair and Assistant Dept. Head for Graduate Affairs
Alex Meystel, Controls, Robotics and Intelligent Systems
Bahram Nabet, Electrophysics
Dagmar Niebur, Power Engineering
Stewart Personick, Telecommunications and Networking
Harish Sethu, Computer Engineering
Birsen Yazici, Image/Signal Processing and Interpretation
Steve Carullo, Graduate Student Representative

ECE Seminar Committee:

Athina Petropulu, Chair
Nihat Bilgutay (Ex Officio)
Gary Friedman
Allon Guez
Karen Miu
Harish Sethu
Birsen Yazici
Ruifeng Zhang

ECE Senior Design Committee:

Maja Bystrom, Chair
Nihat Bilgutay
Bruce Eisenstein
Edward Gerber
Wayne Hill
Leonid Hrebien
Moshe Kam
Kevin Scoles

ECE Undergraduate Affairs Committee:

Kevin Scoles, Chair and Assistant Dept. Head for Undergraduate Affairs
Ed Gerber, Electrophysics
Wayne Hill, ECE Staff
Leonid Hrebien, Image/Signal Processing and Interpretation
Paul Kalata, Controls, Robotics and Intelligent Systems
Stan Kesler, Telecommunications and Networking
Karen Miu, Power Engineering
Oleh Tretiak, Computer Engineering

ECE Undergraduate Track Advisors Committee:

Maja Bystrom, Telecommunications
Paul Kalata, Controls/Robotics
Constantine Katsinis, Computer Engineering
Stanislav Kesler, Telecommunications
Prawat Nagvajara, Computer Engineering
Dagmar Niebur, Power Engineering
Kevin Scoles, Electronics

ECE Planning and Development Committee:

Oleh Tretiak, Chair and Assistant Dept., Head for Planning and Development
Bruce Eisenstein, Telecommunications and Networking
Allon Guez, Controls, Robotics and Intelligent Systems
Peter Herczfeld, Electrophysics
Wayne Hill, ECE Staff
Alex Meystel, Computer Engineering
Dagmar Niebur, Power Engineering
Steve Carullo, Graduate Student Representative

ECE Faculty Recruitment Committee:

Moshe Kam, Chair

Maja Bystrom, Telecommunications and Networking

Constantine Katsinis, Computer Engineering

Peter Lewin, Electrophysics

Chika Nwankpa, Power Engineering

Athina Petropulu, Image/Signal Processing and Interpretation

Steve Carullo, Graduate Student Representative

ECE Promotion and Recognition Committee:

Promotion Sub-Committee:

Fernand Cohen, Chair

Afshin Daryoush, Telecommunications and Networking

Eli Fromm, Controls, Robotics and Intelligent Systems

Kambiz Pourrezaei, Electrophysics

Lazar Trachtenberg, Computer Engineering

Awards Nominations and Recognition Sub-Committee:

Afshin Daryoush, Chair

Chika Nwankpa, Power Engineering

Steve Carullo, Graduate Student Representative

Note: Awards, Nominations and Recognition Sub-Committee also include members of the Promotion Sub-Committee.

Named Professor Nominating Committee:

Bruce Eisenstein, Chair

Nihat Bilgutay

Peter Herczfeld

Stewart Personick

Oleh Tretiak

Appendix E: Curricular/Research Group Representation on ECE Standing Committees

Computer Engineering:

Oleh Tretiak, Undergraduate Affairs Committee
Constantine Katsinis, Faculty Recruitment Committee
Alex Meystel, Planning & Development Committee
Harish Sethu, Graduate Affairs Committee
Lazar Trachtenberg, Promotion & Recognition Committee

Controls, Robotics and Intelligent Systems:

Eli Fromm, Promotion & Recognition Committee
Allon Guez, Planning & Development Committee
Paul Kalata, Undergraduate Affairs Committee
Moshe Kam, Faculty Recruitment Committee
Alex Meystel, Graduate Affairs Committee

Electrophysics:

Edward Gerber, Undergraduate Affairs Committee
Peter Herczfeld, Planning & Development Committee
Peter Lewin, Faculty Recruitment Committee
Bahram Nabet, Graduate Affairs Committee
Kambiz Pourrezaei, Promotion & Recognition Committee

Image/Signal Processing and Interpretation :

Fernand Cohen, Promotion & Recognition Committee
Leonid Hrebien, Undergraduate Affairs Committee
Athina Petropulu, Faculty Recruitment Committee
Oleh Tretiak, Planning & Development Committee
Birsen Yazici, Graduate Affairs Committee

Power Engineering:

Karen Miu, Undergraduate Affairs Committee
Dagmar Niebur, Graduate Affairs Committee
Dagmar Niebur, Planning & Development Committee
Chika Nwankpa, Faculty Recruitment Committee
Chika Nwankpa, Awards Nomination & Recognition

Telecommunications & Networking:

Maja Bystrom, Faculty Recruitment Committee
Afshin Daryoush, Promotion & Recognition Committee
Bruce Eisenstein, Planning & Development Committee
Stan Kesler, Undergraduate Affairs Committee
Stewart Personick, Graduate Affairs Committee

Graduate Group Coordinators:

Paul Kalata, Controls/Robotics/Systems
Harish Sethu, Computers
Chika Nwankpa, Power
Gary Freidman, Electrophysics
Stewart Personick, Telecommunications & Networking
Fernand Cohen, Image and Signal Processing

Undergraduate Track Coordinators:

Paul Kalata, Controls and Robotics
Prawat Nagvajara, Computers
Chika Nwankpa, Power and Energy
Kevin Scoles, Electronics
Mohana Shankar, Telecommunications/Signal Processing

Appendix F: CoE Honors Day 2002 Award Recipients

Dr. Moshe Kam, Teaching Accomplishment Award

Dr. Stewart Personick, Research Accomplishment Award

Dr. Edward C. Ross ECE'64, 2002 Circle of Distinction Award

Mr. Ron Vidal ECE'83, 2002 Circle of Distinction Award

Graduate Student Research Award: Vishruta Dumane (Dr. Mohana Shankar, Advisor)

Undergraduate Student Research Award: David M. Smith (Dr. Maja Bystrom, Advisor)

Blasi Family Award: Irene Yeung

Robert Fischl Award: Anawach Sangswang

Lester Kraus Award: Carl A. Angstadt

Lockheed Martin Scholarship: Harshal Shah, Kunal Shah and Peter Lo

Thomas W. Moore Award: Eric M. Gallo

Robert G. Quinn Scholarship: Paul J. Zipp

Arthur and Blanche Garroway Vanaman Scholarship: Saturnino Garcia, Jong Ho Hyun, Santiago Serrano, Harshal A. Shah and Matthew J. Sternberg

I. Ray Dunlap Scholarship: Chi-Kai Huang, Prajwal Juvvadi, Yonghong Lee and Charles Remaley

Elmer W. Griscom Scholarship: Mark Ell and To Q. Ngo

George Hill, Jr. Fellowship: Xueshi Yang (Dr. Athina Petropulu, Advisor)

Arnold H. Kaplan Scholarship: Gustave W. Anderson, Millard G. Lockley and Emily S. Record

Koerner Family Graduate Awards: Arkady Kopansky (Dr. Maja Bystrom, Advisor)

Harry E. Muchnic Scholarship: James Chai Chen, Wang-Ching Lam, Glenn T. Lovercheck, Divyang K. Masrani, Julius Munyanthwali, Kunal A. Shah and Ryan Scott Spring

NACME Engineering Vanguard Program: Colin E. Ricketts

Milton Rosenberg Scholarship: Timothy J. Furman, Matthew D. Garfield, Sowmiya Jayachandran, Enrique Martinez, Joseph S. Michel and Binh Nguyen

Herman Schaevitz Memorial Scholarship: Abel Brook, Sophia S. Daka, Giuseppe DeMaso, Thao T. Nguyen and Murtaza Shah

Alvin W. Wene Engineering Scholarship: David E. Broscius, Michael Castiglia, Hai V. Le, Trung T. Mai, Maxim Malikov and Minh Nguyen