

*Electrical and Computer Engineering
Department*

1998-99 Annual Report



September 1, 1998 - August 31, 1999

Table of Contents

Faculty Awards & Honors	4
Student Awards & Honors	7
Tenure & Promotion	9
New Faculty Recruitment	9
Faculty Appointments, Elections & Sabbaticals	9
ECE Committee Membership for AY 1998-99	9
Staff Appointments and Promotions	11
Curriculum	11
ECE Ph.D. Degrees Conferred in AY 1998-99	12
Biomed Ph.D. Degrees Supervised by ECE Faculty..... and Conferred in AY 1998-99	13
FY 1998-99 ECE Research Grant Awards and Expenditures	13
ECE Advisory Council	14
Institutional Advancement Activities	14
Facility/Laboratory Improvements	15
National Rankings	16
Other Departmental News	16
Major ECE Social Events in AY 1998-99	16
Challenges & Goals for the ECE Department in AY 1999-00	16
 Appendices:	
Appendix A: ECE Department FY 1998-99 Research Awards	19



Electrical and Computer Engineering Department

Memorandum

To: Dr. Constantine Papadakis, President
Dr. Richard Astro, Provost
Dr. Harvill Eaton, Vice President for Research
Dr. Raj Mutharasan, Interim Dean of Engineering
Dr. George Tsetsekos, Vice Provost/VP Academic Affairs

From: Nihat Bilgütay
Department Head

Date: November 29, 1999

Re: ECE Department Annual Report 1998-99

Enclosed please find the ECE Department Annual Report covering the period September 1, 1998 through August 31, 1999. It is my pleasure to share with you this report, which briefly highlights the key events and activities in the ECE Department, and the outstanding accomplishments of our faculty, staff, students, and alumni during the past academic year. I am pleased to note that the ECE Department and its faculty continue to play a key role in the development and vitality of our University.

cc: ECE Faculty
Selçuk Güçeri
Bill Parshall
Bruce Makous
Larry Blenner

ECE Department Annual Report

September 1, 1998 - August 31, 1999

Faculty Awards & Honors:

Dr. Bruce Eisenstein, Arthur J. Rowland Professor of Electrical and Computer Engineering, was elected President of the Institute of Electrical and Electronics Engineers (IEEE) on November 5, 1998. IEEE is the largest technical professional society with over 350 thousand members worldwide. Bruce will serve for three years as President-Elect in 1999, President in 2000, and Past-President in 2001. This is not only a tremendous personal accomplishment and honor for Bruce, but one that will bring a great deal of international visibility and recognition to our Department, College of Engineering and Drexel University. We enthusiastically congratulate Bruce on this major accomplishment and wish him the best as he assumes this important position.

- Dr. Afshin Daryoush was elected Fellow of the Institute of Electrical and Electronics Engineers, effective 1 January 1999, by the Board of Directors at its meeting on 15 November 1998. His Fellow citation reads: "For contributions to the field of nonlinear microwave photonics with applications to high-speed fiberoptic links." Election as an IEEE Fellow is a major professional accomplishment and one of the most prestigious honors the Institute can bestow its members; it is the highest grade of membership in the IEEE. The Fellow election process is extremely rigorous and only 235 will receive this honor in 1999 out of 587 nominations. The number of Fellows is restricted to 1% of the total membership (about 3300).

- Dr. Peter Herczfeld, Lester Kraus Professor of Electrical and Computer Engineering, received the 1999 Distinguished Educator Award given by the IEEE-MTT Society. The Award is conferred on a distinguished educator in the field of microwave engineering and science who exemplifies the special human qualities of the late Fred J. Rosenbaum, whose dedication to education inspired this tribute. The honoree is expected to have prior recognition as an excellent teacher at the undergraduate level, be a prominent researcher, demonstrate his/her dedication to MTT-S through service, and most significantly, the effectiveness of the educator should be supported by a list of graduates in the microwave field who have become recognized leaders of the profession. Peter joins a very select group of prominent professors who have received this honor before him. The Award citation reads: "For Outstanding Achievements as an Educator, Mentor and Role Model of Microwave Engineers and Engineering Students". The award consisting of a plaque and an honorarium of \$1,000 was formally presented to Dr. Herczfeld at the 1999 International Microwave Symposium in Los Angeles.

- Dr. Maja Bystrom received the National Science Foundation's prestigious and nationally competitive CAREER Award for her proposal entitled "Research and Education in Video Coding and Wireless Communications." Dr. Bystrom's research interests lie in the area of wireless transmission of data, particularly involving low-bit rate coded video. Her research focuses on the use of redundancy following source coding or data compression to improve the source decoding process, which can save valuable bandwidth and thereby improve the quantity

or quality of transmitted video. Dr. Bystrom joined the ECE faculty in September 1997 after receiving her Ph.D. in Electrical Engineering from Rensselaer Polytechnic Institute.

- Dr. Peter Herczfeld received a one-year \$1M grant from the Office of Naval Research to conduct research on the "Hybrid Fiberoptic/Wireless System for High Capacity Military Communication".
- Dr. Banu Onaral served as the President of the Engineering in Medicine and Biology Society (EMBS) of IEEE during 1999. She was elected in 1997 and served as the President-Elect of EMBS in 1998. With nearly 9,000 members, the EMBS is the largest professional member-based biomedical engineering organization in the world. Founded in 1952, EMBS was the first society organized to meet the needs of engineers, educators, physicians and scientists working on engineering problems in medicine and biology.
- Dr. Robert Quinn received the 1999 Christian R. and Mary F. Lindback Award for Distinguished Teaching. This is one of the most prestigious and highly coveted awards at Drexel, and is made possible by a grant from the Christian R. Lindback Foundation. The recipients of the award are nominated by a committee composed of former winners.
- Dr. Kambiz Pourrezaei received the 1999 Harold M. Myers Award for Outstanding Service to the University. This award is given to a faculty member whose commitment and service to the University have enhanced its reputation and academic mission. The award celebrates the spirit of service that marks President Emeritus Harold M. Myers' long association with Drexel University.
- The ECE Department received the "Departmental Award for 1999" in recognition of its decade-long curricular restructuring efforts. The award also provides \$2,500 funds for the Department. This award was recently established by the Provost's Office to recognize a department for "outstanding achievement in teaching and learning through the collective efforts of its faculty." It is a tribute to the entire ECE Community to receive the inaugural Departmental Award and everyone can rightfully take pride in contributing to this success.
- Dr. Edwin Gerber received the "Senior Faculty Award for 1999" in recognition of his sustained contributions to undergraduate teaching and learning. The award also includes a \$2,500 prize for teaching related expenses. This award is also one of the new awards established by the Provost's Office to recognize and honor major contributions to the teaching-learning process at Drexel. Dr. Sami Ofeish (History and Politics Department) and Dr. Sandra Stewart (Media Arts Department) received the inaugural "Allen Rothwarf Teaching Award." The award was inaugurated to honor Dr. Allen Rothwarf who passed away on June 24, 1998.
- The National Institutes of Health has renewed funding for the Program Project "Developing Ultrasonic Tissue Characterization Method," a joint research effort of Drexel and Thomas Jefferson Universities and one of the building-block projects of the Drexel-Jefferson Academic Alliance. This Program Project, initiated in October 1990, aims to enhance the ability of

diagnostic ultrasound imaging to detect and to characterize tumors in humans. The new funding is for \$3.5M over four years.

The Program Project Directors are Jack Reid and Mohana Shankar. Dr. Barry Goldberg of Thomas Jefferson University serves as the Co-Project Director. Other faculty members participating in the project as project leaders or co-leaders are: N.Bilgutay, F. Cohen, P. Lewin, B. Onaral, A. Petropulu, O.Tretiak, M. Wheatley, N. Herrmann, P. Bloomfield; F. Forsberg (from Jefferson); K. Donohue (from University of Kentucky).

- Dr. Dov Jaron, Calhoun Distinguished Professor of Engineering and Medicine, has been elected a permanent member of the World Academy of Biomedical Technologies, which is based in Europe. The permanent membership in the Academy is limited to 120 individuals and is composed of biomedical engineers from 29 countries.

- Dr. Peter Herczfeld co-chaired the 1998 International Topical Meeting on Microwave Photonics with Dr. Chi H. Lee from University of Maryland. The meeting was held at Sarnoff Corporation, Princeton, NJ, October 12-14, 1998.

- The Richard R. Beard named professorship in Biomedical Engineering and Electrical Engineering was established to honor Dr. Richard Beard, Emeritus Professor, who has given Biomed and ECE many years of distinguished service. Dr. Beard has been a member of Drexel University Faculty for over 40 years. Dr. Beard has earned a position as one of the most distinguished, highly accomplished and respected members of the University. His highly successful collaboration with other higher learning and scientific institutions has brought significant recognition to Drexel University. In his research activities Dr. Beard collaborated with many world class scientists. He is highly respected by the leading scientists in the field of acoustics, sensors and biosensors, ultrasonics, chemistry, and measurements of non-electrical quantities.

- The 1998 Annual Service Awards were presented to the Drexel faculty and staff at a ceremony held on October 23, 1998. The following ECE faculty members were recognized for their dedicated service at the ceremonies:

Dr. Athina Petropulu	5 years
Dr. Itzhak Barkana	10 years
Dr. Stan Kesler	15 years
Dr. Peter Lewin	15 years
Dr. Kambiz Pourrezaei	15 years
Dr. Kevin Scoles	15 years
Dr. Mohana Shankar	15 years
Dr. Lazar Trachtenberg	15 years
Dr. Oleh Tretiak	25 years
Dr. Peter Herczfeld	30 years
Dr. Ed Gerber	40 years
Dr. Hun Sun	45 years

This is nearly two and a half centuries of total service, with Drs. Sun, Gerber, Herczfeld and Tretiak leading the group! We enthusiastically congratulate our colleagues for their dedicated and exemplary service to the ECE Department, the College of Engineering and Drexel University.

- The ECE Chapter of HKN awarded the 1999 “Best Teacher Award” to Dr. Chika Nwankpa. Drs. Maja Bystrom and Peter Lewin were runners-up.
- Dr. Dong Wei was selected as one of the twelve Excellent Young Chinese Scholars in the U.S. to participate in the Third Annual Summer Teaching Program at Tsinghua University. The program was held between August 16-27, 1999.
- The 1998-99 Honors Day Ceremony was held on February 24, 1999. Dr. Moshe Kam and Dr. Mohana Shankar were among the COE faculty members receiving this year's College of Engineering Faculty Achievement Awards. The awards were inaugurated this year to recognize teaching excellence and faculty achievements in the College of Engineering.
- Dr. Hun Sun received the Patent Recognition Award at the 11th Annual Sigma Xi Research Symposium held on May 6, 1999, for his patent entitled "System and Method for Analyzing Electrogastroic Signal."

Student Awards & Honors:

- The following ECE students graduated with top honors in June 1999:

1st Honors Richard Delp
2nd Honors Steven Ferrante

- Adam McInvale and Salil Kanhere were the recipients of the 1998-99 Drexel University TA Excellence Award. This award is presented annually to the top teaching assistants at Drexel University who are nominated by students and faculty in recognition of their excellence as teaching assistants. It is indeed a special event to have two of our graduate students recognized with this special award in the same year. The following students were also nominated for this award: Ivan Andjelkovic, Larry Dinozo, Eray Kulcu and Ed Zielenski. We are proud of our graduate students for their dedication to teaching and for their outstanding performance as teaching assistants.

- The following projects received the 1999 ECE Senior Design Awards:

First Place: ECE-26 "Self-Contained Computer Controlled Helicopter"
Team Members: Jonathan Adams (ECE), Michael Balog (ECE), Ryan Buchert (ECE) and Robert Leach (MEM).
Faculty Advisor: Dr. Prawat Nagvajara

Second Place: ECE-10 "Bird Sound Recognition Algorithm"

Team Members: Steven Ferrante (ECE) and Michael Starsinic (ECE)

Advisor: Dr. Athina Petropulu

Third Place: ECE-8 "Automated Restoration Model for Electrical Distribution"

Team Members: David Bradley (ECE), Richard Delp (ECE), Christopher Kwoka (ECE), Jon Sauer (ECE) and S. Jay Waller (ECE).

Advisor: Dr. Karen Miu

Third Place: ECE-9 "The Modulation Station"

Team Members: Raymond Huber (ECE), John Iovacchino (ECE) and John McGuckin (ECE).

Advisor: Dr. Maja Bystrom

The following ECE awards were divided equally among the team members: \$500 for first prize, \$300 for second prize, and \$200 for each of the third prize teams. The top three ECE Senior Design teams participated in the COE Senior Project Design Competition. The "Self-Contained Computer Controlled Helicopter" project won the Second Place Award and a \$1,000 prize, while the remaining two projects received the Runner-Up Award and \$300 prize each.

• Drexel's 11th Annual Sigma Xi Research Symposium was held on May 6, 1999.

Following is a list of the 1999 Sigma Xi awards received by ECE students and faculty:

Top Scholarship Awards (\$1000 each)

D. El-Sherif (with R. Shimp and M.A. Wheatley), "Ultrasound Triggered Drug Delivery with Contrast Imaging: Effect of Microencapsulation Method."

Winning Posters-College of Engineering/Graduate:

\$500 Prize: S. P. Carullo, with C. O. Nwankpa, "Instrumentation of Drexel University's Interconnected Power Systems Laboratory."

School of Biomedical Engineering and Science/Graduate:

Honorable Mention: S.J. Kwon, with R. M. Lec, P. A. Lewin, and E. Radulescu, "A Novel Acoustic Emission Medical Sensor".

Undergraduate:

\$500 Prize: H. Alparslan, R. M. Lec, P. A. Lewin, S.J. Kwon, and E. Radulescu, "Acoustic Wave Homogeneous Immunosensor."

• The annual Dietrich W. Botstiber Engineering Entrepreneurial Design Competition and Workshop was held on February 23, 1999. The competition aims to support and encourage entrepreneurial studies and initiatives in engineering. Funds from the Dietrich W. Botstiber Foundation are used to support cash awards to the winners of the competition; funds from the Drexel Family Fund in Entrepreneurial Studies are used to support scholarships for students in the College of Engineering. The ECE projects and students dominated the competition this year, with the vast majority of the student participants and award winners coming from the ECE Department (nine out of eleven).

- A number of our students were recognized at the 1998-99 Honors Day Ceremony, which was held on February 24, 1999. The award recipients include:

George Hill, Jr. Endowed Fellowship to Georgia Georgiou
Blasi Family Annual Award to Adam Tong
Robert Fischl Annual Prize to Richard Delp
Lester Kraus Award to Patrick Kelsey
Thomas W. Moore Scholarship to Joseph Sorial
Arthur W. and Blanche Garroway Vanaman Scholarship to Paul Daniel, Harry Grannis and David Tack
John Raymond Vollmar Scholarship to David Tack
I. Ray Dunlap Scholarship to Steven Ferrante and Sean Kelly
Arnold H. Kaplan Scholarship to Brian Reardon
Harry E. Muchnic Scholarship to Ron Haberman, Henry Heyser, Lit-Hsin Loo, Kevin McAllister, Adam O'Donnell, Adeline Yen and William Zotter
NACME Engineering Vanguard Program Scholarships to Quahatemoc Cruz, John Denson, Jabari Foster, Monique Harris, Aaron Henry, Crystal McGee, Nicholas Mingle and Richard Preston
Milton Rosenberg Scholarship to Vy Huy Ho and Tien Hoang
Herman Schaevitz Memorial Scholarship to Richard DeBolt, William Kenworthy and Joseph Kopanic
William T. Schleyer Endowed Scholarship to Dhruv Ramesh
Alvin W. Wene Engineering Scholarship to Hung Huynh

- ECE students and faculty won two of the top prizes at the IEEE Sarnoff Symposium on Advances in Wired and Wireless Communication, held on March 17 at The College of New Jersey (Trenton State College):
 First Prize - A. McInvale (student), T. J. Brophy, A.S. Daryoush, "Dense WDM for CATV Applications."
 Third Prize - L. Chen (student), J-H Lee (student), W. A. Rosen, A.S. Daryoush, R. Lachenmaier, "An 8 GB/s Optical Link for High Performance Data Networks."
- Portia Morse received the First Place Award at the 1999 IEEE Philadelphia Section Student Writing Contest for her paper entitled "Who Wrote this Note?" Mr. Michael Balog received an Honorable Mention at the same competition for a paper entitled "Self-Contained Computer-Controlled Helicopter." Portia went on to win the Second Place Award at the IEEE Region 2 Student Paper Contest with the same paper.
- The following ECE students received the Outstanding Co-operative Education Seniors and Partners Award for 1999: Richard Delp (Schiller and Hersh Assoc.), William Kenworthy (V-COMM Telecommunications Engineering), and Brian Reardon (AMP,Inc.). In order to receive an award, students must be nominated by their employer. Fourteen Drexel students received the award in 1999.

Tenure & Promotion:

- The Board of Trustees, at its Spring 1999 meeting, approved the promotion of Dr. Kambiz Pourrezaei to Professor of Electrical and Computer Engineering, effective September 1, 1999.

New Faculty Recruitment:

- The top priority areas for the AY 1998-99 recruitment effort were computer engineering, telecommunications and electro-physics. Two new faculty positions were available. However, the search was terminated in June 1999 with no new hires. The AY 1999-2000 recruitment process was re-initiated in September 1999 to fill the three approved positions. The top priority will be to recruit computer engineering faculty to meet the rapidly growing enrollments in computer engineering.

Faculty Appointments, Elections & Sabbaticals:

- Dr. Edwin Gerber was appointed as the Assistant Department Head for ECE Evening Programs. He will be in charge of faculty teaching assignments, curriculum development, adjunct faculty recruitment, and other general administrative responsibilities involving the evening/part-time programs in the ECE Department.
- Dr. Fernand Cohen served as the Co-Chair of the Faculty Senate in AY 1998-99.
- Dr. Bahram Nabet served as the Faculty Senate Recording Secretary in AY 1998-99.
- Dr. Bahram Nabet was elected as the Vice-Chair of the Faculty Senate for AY 1999-2000.
- Dr. Fernand Cohen was granted sabbatical leave for Fall and Winter Terms of AY 1999-2000
- Dr. Bahram Nabet was granted a sabbatical leave for AY 2000-2001

ECE Committee Membership for AY 1998-99:

** ECE Faculty Advisory Committee*

Dick Coren
Moshe Kam
Bahram Nabet
Kevin Scoles
Oleh Tretiak

** ECE Graduate Affairs Committee*

Fernand Cohen, Systems
Afshin Daryoush, Electro-Physics

Gabriel Fielding (Maria Gabrani, Alternate), Graduate Students
Bahram Nabet, Electro-Physics (Chair)
Dagmar Niebur, Systems
Athina Petropulu, Systems
Oleh Tretiak, Computers

** ECE Undergraduate Affairs Committee*

Maja Bystrom, Systems
Ed Gerber, Electro-Physics
Paul Kalata, Systems
Stan Kesler, Systems
Prawat Nagvajara, Computers
Kevin Scoles, Electro-Physics (Chair)
Juana Morales, UG Student

** ECE Planning and Development Committee*

Bill Freedman, Computers
Georgia Georgiou, Graduate Students
Allon Guez, Systems
Peter Herczfeld, Electro-Physics
Wayne Hill, ECE Technical Staff
Kambiz Pourrezaei, Electro-Physics
Mohana Shankar, Systems
Oleh Tretiak, Systems (Chair)

** ECE Faculty Recruitment Committee*

Walid Ibrahim (Haris Pozidis, Alternate) Graduate Students
Moshe Kam, Systems (Chair)
Peter Lewin, Electro-Physics
Chika Nwankpa, Systems
Kambiz Pourrezaei, Electro-Physics
Lazar Trachtenberg, Computers

** ECE Promotion and Recognition Committee*

Promotion Sub-Committee

Richard Coren, Electro-Physics (Chair)
Bruce Eisenstein, Systems
Alex Meystel, Computers
Banu Onaral, Systems
Bob Quinn, Electro-Physics

Awards, Nomination and Recognition Sub-Committee

Moshe Kam, Chair
Frank Castro, Graduate Students
Afshin Daryoush, Junior Faculty Representative

Staff Appointments and Promotions:

- Two new technical staff members were hired during the past year (Michael Kennedy and Sam Fairweather). We reorganized and upgraded the secretarial positions by reducing the total number of positions from five to four. The resulting funds were used to upgrade the two classified positions to administrative positions and to re-classify the administrative secretary position as Administrative Assistant position. Kathy Bryant was promoted from the Administrative Secretary to the Administrative Assistant position. Two new administrative secretaries were hired (Phyllis Iorio and P. Delores Watson) to replace the three secretaries that left the Department to pursue new opportunities (Sandra Burgess, Carla Workman and Alyce Tyrrell).

Curriculum:

- Drexel University received the 1998 Enterprise Award for the “Educational Program of the Year” for its innovative new engineering curriculum and nationally recognized co-operative education.

- Fall 1999 FT Freshman enrollments in ECE were 182 (61 EE and 121 CE), which constitutes approximately 43% of the COE freshman with designated majors. The number of new graduate students in Fall 1999 was 59, which is similar to last year's figure of 61. The total number of ECE graduate students in Fall 1999 was 165 (FT and PT), compared to 168 last year. ECE currently constitutes 33.7 % of the COE FTE undergraduate students (805 of 2389) and about 32% of the graduate students (166 of 520). The first "official" class of computer engineering freshman were accepted into the degree program in Fall 1999.

- The following number of ECE degrees were granted at the June 1999 commencement: 125 BSEE, 5 BSCE, 51 MSEE, 2 MSEE/Telecommunications and 8 Ph.D. (vs. 97 BSEE, 48 MSEE and 9 Ph.D. at the June 1998 commencement). The BS Computer Engineering and MSEE/Telecommunications degrees were granted for the first time at the June 1999 Commencement. Our BS graduating class received 2.6 offers on the average, with an average starting salary of over \$48K (salary range of job offers: \$32-62.4K).

- The final stage of the implementation of the new ECE-21 Curriculum was completed this year with the initiation of the new senior ECE courses in Fall 1998. This completes the total restructuring of the ECE curriculum built on the tDEC core engineering curriculum, which constitutes the first two years of ECE-21 Curriculum.

- COE Faculty approved the MS Computer Engineering degree proposal unanimously at its meeting on June 2, 1999. The proposal will next be reviewed by the Senate Committee on Academic Affairs (SCAA). An ad-hoc committee was appointed in November 1998 to develop a proposal for an MS degree program in Computer Engineering. The Committee members consist of: Constantine Katsinsis, Spiros Mancoridis (Math and Computer Science Department), Alex Meystel, Prawat Nagvajara (Chair), Harish Sethu , Lazar Trachtenberg, and Oleh Tretiak .

• The ECE Department has been leading the College of Engineering and the University in implementing outcomes-based course assessment. The COE Assessment Committee, co-chaired by Drs. Bilgutay and Scoles, piloted the new course assessment process on the web across the COE for the first time in the Spring 1999 term. During the Summer 1999 term, the process was extended to the majority of the courses taught in the COE. The goal is to achieve 100% implementation in the Fall 1999 term in all undergraduate courses, and to initiate the process for the graduate courses. The senior exit survey was also revised with "outcomes-based" focus and implemented for the first time on the web in June 1999. An additional survey assessing the level of our achievement of the "ABET a-k" criteria is being conducted twice a year to cover all engineering undergraduates that are in the two Coop cycles. The COE faculty has approved the posting of the numeric results of the course surveys on the web beginning with the Fall 1999 term. These outcomes-based surveys and the establishment of a "Continuous Quality Improvement" (CQI) Process for our curriculum will be crucial in meeting the new ABET 2000 accreditation requirements. The survey participation rate is the key challenge at this time and we have been able to achieve up to 31% participation rates thus far. Our goal is to achieve a minimum participation rate of over 50% in the first year.

ECE Ph.D. Degrees Conferred in AY 1998-99:

Praveen Dalakrishna

Dissertation Title: Properties of Ultrasonic Contrast Agents

Supervising Professors: P. M. Shankar and Vernon L. Newhouse

Gabriel Fielding

Dissertation Title: Optimal Fusion of Disparity and Flow in Dynamic Stereo

Supervising Professors: Moshe Kam

Maria F. Gabrani

Dissertation Title: Non-Linear Interpolation Registration Techniques for Surface-Based Alignment of Volumetric Data

Supervising Professors: Oleh Tretiak

Georgia Georgiou

Dissertation Title: Tissue Characterization Using Ultrasound Images

Supervising Professors: Fernand S. Cohen

Manouchehr Ghanevati

Dissertation Title: Self-Oscillating Mixing Active Antennas for Wireless Communication

Supervising Professors: Afshin S. Daryoush

Joong Hee Lee

Dissertation Title: Actively Mode-Locking Monolithic MQW Laser Diode Integrated with an EA Modulator

Supervising Professors: Afshin S. Daryoush

Haralampos K. Pozidis

Dissertation Title: Blind Identification and Application to the Equalization of Linearly Modulated Signals

Supervising Professors: Athina P. Petropulu

Walter J. Zubrzycki

Dissertation Title: Fabry-Perot Waveguide Modulator with Nano-Photonic Distributed Mirrors

Supervising Professors: Peter R. Herczfeld

Biomed Ph.D. Degrees Supervised by ECE Faculty and Conferred in AY 1998-99:

Ata Akin

Dissertation Title: Time-Frequency Methods for Detecting Spike Activity of the Stomach

Supervising Professors: Hun H. Sun

Henrick Bleeker

Dissertation Title: A New Method of Hydrophone Calibration Using the KXCK Time Domain Finite Difference Algorithm

Supervising Professors: Peter Lewin

Srinivas S. Dagalur

Dissertation Title: Estimation of the Arterial Model and the Blood Flow Rate from Blood Pressure Measurements

Supervising Professors: Dov Jaron

Estrella M. Forster

Dissertation Title: Quality Function Deployment as Applied to Research and Development

Supervising Professors: Leonid Hrebien

Jinsup Song

Dissertation Title: Foot Type Biomechanics and Diabetic Neuropathic Foot Function

Supervising Professors: William Freedman

FY 1998-99 ECE Research Grant Awards and Expenditures:

- The combined ECE Grant Awards (Research, Educational Services, and Academic Development) for FY 1998-99 (1 July, 1998 to 30 June, 1999) totaled \$3,010,375 (up by 33.9% from FY 1997-98). The ECE total corresponds to 31.5% of the COE and 14.3% of the University totals for the same period. A list of the individual ECE research grant awards for FY 1998-99 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%

• The combined ECE Grant Expenditures (Research, Educational Services, and Institutional Grants) for FY 1998-99 (1 July, 1998 to 30 June, 1999) totaled \$2,665,461 (up by 10.8% from FY 1997-98). The ECE total corresponds to 39.7% of the COE and 15% of the University totals for the same period.

<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%

ECE Advisory Council:

The ECE Advisory Council held its inaugural meeting on December 11, 1998 and was Chaired by Fred Palmer. The half-day meeting included a presentation by the Department Head reviewing the state of the ECE Department, and providing description of the current programs and initiatives, and the status of our near and long-term strategic plans. Dr. Harvill Eaton, Vice President for Research, made a presentation on the state of the University. There were also presentations by Dr. Robert Quinn on the Drexel Engineering Curriculum, by Dr. Kevin Scoles on the Undergraduate ECE Curriculum, and Dr. Bahram Nabet on the Graduate ECE Curriculum. Dr. Stewart Personick also made a brief presentation on the Center for Telecommunications and Information Networking. There was an Executive Session of the Council, where feedback and recommendations were provided to the Department on the key issues affecting the Department. One of our key objectives is to seek from the Council members their candid opinions, constructive criticisms, ideas, advice, and support for ECE Department's initiatives. We will then follow-up with the Advisory Council's recommendations and report to them on our progress at the subsequent meetings. A second meeting of the Advisory Council was held on June 15, 1999. A similar meeting format was followed and actions on the recommendations from the previous meeting were described. We plan to have regular Advisory Council meetings every six months.

Institutional Advancement Activities:

• Dr. Mian H. Jiang donated \$50K through Simtek International, Ltd. to the Allen Rothwarf Fellowship fund, which ensured the fund to reach an endowed status.

- Mrs. Bernice Rothwarf donated \$23K to the Allen Rothwarf Memorial fund, raising the fund balance to \$89K.

- The following list summarizes ECE related industry visits/meetings and institutional advancement/fundraising efforts by the Department Head in AY 1998-99:

	<u>Date</u>	<u>Company</u>	<u>Contact</u>
*	9/16/98	Havelsan/ETC-Turkey	Ahmet Denker/Husnu Onus
*	9/23/98	Trilogy	Maddie Fox
*	10/1/98	Bell Atlantic	Ray Alberts
*	10/2/98	Exxon	Dick Brown
*	10/20/98	Lucent Bell Labs	Mel Cohen
*	10/20/98	GEC Marconi	Clyde Grimm
*	11/6/98	Inrange	William (Buck) Rogers
*	11/13/98	Aberdeen Test Center	John Roth
*	11/19/98	Lockheed Martin	Fred Palmer
*	11/24/98	Donor/Vanguard Prog.	Suzanne Rocheleau
*	2/5/99	Unisys	David Houseman
*	2/24/99	Raytheon Technology	Linsay Quarrie
*	3/10/99	Aberdeen Test Center	John Roth
*	4/14/99	Locheed Martin	Helene McGarvey
*	4/15/99	Los Alamos	Carl Necker/ Melissa Velarde
*	6/10/99	Black & Decker	Roby Bailey
*	7/13/99	Unisys	C. Di Pietro, Don Varner
*	8/5/99	Leroy Resser	Chris Woehrl

Facility/Laboratory Improvements:

- Dr. Robert Quinn received a \$500K equipment grant from Hewlett-Packard to upgrade the undergraduate laboratories in ECE and tDEC. The grant includes 47 stations of which 32 will be used to upgrade the ECE undergraduate labs. The Electronics Laboratory, Circuits Laboratory and the Microwave/Logics Laboratory will be renovated to accommodate the new equipment at a cost of \$150K of which \$62.5K will be cost-shared by the Dean's Office. This will facilitate a major overhaul and modernization of the upper division ECE undergraduate laboratories. This has been a major need and a top priority for the ECE Department. Finally, we plan to establish a Senior Design Laboratory in ECE by renovating an existing lab at an estimated cost of \$13K. The ECE Department will make this facility available to all engineering seniors to support the senior design projects.

- The renovation of Commonwealth Hall remains as a top priority for the ECE Department. There have been positive developments in Drexel's efforts to secure state funding toward a major renovation of the building. \$10M was earmarked by the Pennsylvania legislature for the renovation of Commonwealth Hall. However, before these funds can be allocated the Governor's approval is required. Drexel is presently

actively lobbying the Governor. President and members of the Board of Trustees, including Chairman Chuck Pennoni, have visited the Governor in early Fall to seek the Governor's approval. The final budget decision will be made in Spring of 2000.

- The Power Lab renovation is slated for completion by the end of December 1999, as part of the new Woodring Lab Project. This will be a major addition to the Department's existing research facilities. A new research lab with three bays will be added to the Center for Electric Power Engineering, for a net gain of space and upgrading of the entire facility (addition of AC, enclosure for the high voltage lab, etc.). This is being done as part of the Woodring Lab Renovation Project and is partially covered by the \$200K Colehower stock gift.

- The renovation of Commonwealth Hall 502 complex consisting of three bays (approximately 2,000 sq. ft.) was completed to provide laboratory space for our new faculty. This area was designated as the telecommunications and computer engineering research laboratories and now houses the research laboratories of Drs. Maja Bystrom, Constantine Katsinis, Prawat Nagvajara, Harish Sethu and Dong Wei. Through this major renovation, we have converted space that was the least useable and in most deteriorated condition in the ECE Department, to a modern and efficient laboratory for our new faculty and their students.

- Renovation of Commonwealth 112 and 113 as the new Robotics Research and Teaching Laboratory has been completed. This new teaching facility will serve the undergraduate students in the new ECE-21 Curriculum with the much needed state-of-the-art controls and robotics equipment.

- Equipment worth \$60,000 was purchased for the undergraduate laboratories, partially funded through the State Equipment Matching Funds (i.e., \$20K from the state and \$40K from ECE restricted gift accounts).

- The renovation of the hallways on all seven floors of the Commonwealth Hall has been completed through cost sharing of expenses (\$30K from ECE and Biomed, and \$45K from Facilities Management).

National Rankings:

- COE Graduate Program was ranked 59th nationally among 340 programs by the US News and World Report in "America's Best Graduate Schools in 1999."

- COE Undergraduate Program was ranked 46th nationally in 1999 among "America's Best Undergraduate Engineering Schools with Ph.D. Programs."

Other Departmental News:

- Dr. Leon Hrebien and Danuta were married on September, 1998. We congratulate Leon and Danuta and wish them all the happiness in the world.

Major ECE Social Events in AY 1998-99:

- 1998-99 AY Kick-Off Faculty Meeting & Luncheon (September 18, 1998)
- Eta Kappa Nu Game Day 98 (November 19, 1998)
- ECE Department Annual Holiday Dinner (December 13, 1998)
- ECE Department International Holiday Party (December 17, 1998)
- Reception honoring Dr. Bruce Eisenstein's election as President-Elect of IEEE March 5, 1999, The Pyramid Club.
- Eta Kappa Nu Micro Mouse Competition and Pizza Party, March 11, 1999.
- IEEE Student Chapter Pizza Party, April 22, 1999.
- Eta Kappa Nu Spring BBQ, May 21, 1999
- Annual Faculty Roast (June 4, 1999)
- Promotion celebration in honor of Dr. Kambiz Pourrezaei (June 12, 1999).

Challenges & Goals for the ECE Department in AY 1999-00:

Hiring new faculty continues to be the top priority for the ECE Department. We need to continue building our Department and strengthening the critical curricular and research areas that are rapidly growing, particularly in computer engineering 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 feel our Department has an excellent opportunity to increase its national and international visibility and rankings to even greater heights through sustained growth and continued excellence in teaching, research and professional service.

Our key goals are to:

- Provide a strong supporting environment for our new and established faculty alike, to facilitate their continuous professional development and success. We must ensure the development and maintenance of state-of-the-art facilities combined with academic, research and general administrative support to provide our faculty with the means to successfully

compete for external funding opportunities and to reach their professional potential in both teaching and research.

- Continue the development of the “Center for Telecommunications and Information Networking” under the leadership of Dr. Stewart Personick, the E. Warren Colehower Professor of Telecommunications. This is essential to ensure the continued development of the Center into a nationally recognized laboratory. We will also target the development of other major national research centers in the ECE Department to reflect the growing strengths in the Department.
- Maintain and further strengthen the close ties that have been established with the newly reconstituted ECE Advisory Council through regular Council meetings and communications with individual members. As we enter a rapid growth period where enrollments, faculty size, and research activity will continue to expand, the role of the ECE Advisory Council will be increasingly critical in providing us guidance, feedback and assistance to reach our full potential.
- The graduate programs and research have seen significant decline during the period of shrinking faculty size in the early 90's. Although the decline in undergraduate enrollments have now been reversed dramatically with the significant increases in freshman enrollments during the past three years, the same trend has not occurred in graduate enrollments. The ECE faculty feels it is time to place similarly intense efforts to rebuild the graduate enrollments and research grant activity.
- Continue to strengthen the newly established MS programs in Telecommunications Engineering, Software Engineering, and Computer Engineering.
- The newly established MS degree program in Computer Engineering will be key to increase the graduate enrollments and strengthen the research and graduate programs in the ECE Department. The new BS Computer Engineering program has been received with great enthusiasm on the part of our undergraduates. 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 great demand for computer engineers to build and strengthen our undergraduate and graduate programs in computer engineering, and recruit faculty in this area commensurate with the growth we are experiencing.
- Continue the aggressive and pro-active student recruitment at the undergraduate level with focus on improving the student quality rather than increasing the class size. The overall student quality and level of preparation is a growing concern, and the ECE faculty would like to see a careful and serious examination of the underlying causes and the development of effective responses.
- Renovation of Commonwealth Hall will continue to be a top priority of the ECE Department. We will pursue all opportunities to accomplish the renovation of Commonwealth Hall. We are hopeful that the recent initiatives by the President with the state will yield the resources to address this longstanding need.

- Concentrate on fundraising for sustained "quality of life" improvements for the faculty and students, and to enhance the educational programs and facilities in ECE.
- Enhance and expand the off-campus programs, while maintaining parity in quality with the on-campus programs. Proactively pursue creating new opportunities through web-based delivery modes. This is an area that is rapidly developing and growing and we must make every effort to be an active player in the national scene.
- We will intensify our efforts in developing ABET 2000 assessment procedures and processes as we look toward the next ABET visit scheduled for Fall 2001. The past year has seen many successes in establishing an outcomes-based course assessment via the web and across the COE led by ECE faculty. This effort must continue to meet all ABET requirements successfully.
- Facilitate the development of the Evening College Electrical and Computer Engineering curriculum so that we have curricular parity between the full-time and part-time curricula prior to the ABET visit in 2001. However, this can only be achieved with the commitment of sufficient resources by the University.

Appendix A: ECE Department FY 1998-99 Research Awards

College of Engineering

Electrical & Computer Engineering

SComputer Vision Center for Vertebrate Brain Mapping NIH	Tretiak, O.	\$597,600.00
SAssessment in Test Measurement and Analysis on MIMIC Clock Recovery Circuit and Hybrid Equivalent Growth Eng. & Meas. Services	Rosen, W.	\$10,000.00
SLarge Scale Power Systems Research (Presidential Faculty Fellow Program) NSF	Nwankpa, C.	\$100,000.00
SPOWRE: Wireless Transport of Low-Bitrate Multiresolution Video NSF	Bystrom, M.	\$74,513.00
SIntelligent Systems Architectures (ISA) Engineering NIST	Meystel, A.	\$60,744.00
? SFiber Optic Sensor Research Program Photonics Laboratories, Inc.	El-Sherif, M.	\$5,000.00
SResearch and Engineering Support University City Science Center	Pourrezzaei, K.	\$4,374.00
SResearch and Engineering Support University City Science Center	Pourrezzaei, K.	\$5,355.00
FTexture Attenuation Models for Soft Tissue Characterization (Ultrasonic Tissue Characterization Methods) NIH	Cohen, F.	\$73,236.00
FSignal Processing for Enhanced Tissue Imaging (Ultrasonic Tissue Characterization Methods) NIH	Shankar, P.	\$95,127.00
FModeling Ultrasound Backscattered Signals Using Alpha- Stabilized Distributions (Ultrasonic Tissue Characterization Methods) NIH	Petropulu, A.	\$58,061.00
FInformation Survivability and Continuity of Operations U.S. Army	Katsinis, C.	\$25,594.00
FPower System Monitoring and Control for Autonomous Naval Shipboard Electric Power Distribution ONR	Niebur, D.	\$160,000.00
FHigh Speed Optical Transmitter and Receiver Development for Lidar and Communications ONR	Herczfeld, P.	\$75,000.00
FArchitectural Design of an Ultra High Capacity Router U.S. Air Force Research Laboratory	Personick, S.	\$35,105.00
FModeling and Simulation of Advanced Computer Network Interfaces Rydal R&D, Inc.	Rosen, W.	\$8,250.00
FAssesment, Test Measurement and Analysis of MIMIC Clock Recovery Circuit and Hybrid Equivalent Growth Eng. & Management Services, Inc.	Rosen, W.	\$19,983.00
F Dense WDM Fiber Optic Links for CATV Applications Next Level Systems	Daryoush, A.	\$35,000.00

General Instrument		
W Wireless Networks for Delivery of Multimedia Services (Research Equipment) NSF	Petropulu, A.	\$60,000.00
W Design and Development of Large, Complex, Intelligent Architectures NIST	Meystel, A.	\$54,500.00
W High Speed Optical Transmitter and Receiver Development for Lidar and Communications ONR	Herczfeld, P.	\$75,000.00
W National Defense Science and Engineering Graduate Fellowships DOD Via SCREEE Services Corp.	Kam, M.	\$6,441.00
W Research and Engineering Support Medical Diagnostic Research Foundation	Pourrezzaei, K.	\$14,000.00
W Evaluations of Optical Detectors for Blue-Green Lidar Applications F&H Applied Science Associates	Daryoush, A.	\$10,000.00
W Trustworthy Networks: Portal Site Project U.S. West Advanced Technologies	Personick, S.	\$20,000.00
Sp Test Measurement and Analysis on MIMIC Clock Recovery Circuit and Hybrid Equivalent Growth Engineering & Management Services, Inc.	Rosen, W.	\$30,000.00
Sp Ultra High Capacity Router Switching Fabric Based on Photonic Technologies Lucent Technologies	Personick, S.	\$35,000.00
Sp Core Implementation for Signal Processing Math Star, Inc.	Nagvajara, P.	\$4,950.00
Sp Power Distribution Systems Curriculum NSF	Miu, K.	\$124,997.00
Sp Signal Reconstruction and Applications to Communications, Ultrasound Image Processing and Earthquake Engineering (Presidential Faculty Fellow) NSF	Petropulu, A.	\$100,000.00
Sp High Speed Electron Detector Devices Navy via F&H	Nabet, B.	\$10,000.00
Sp Hybrid Fiberoptic/Wireless System for High Capacity Military Communication ONR	Herczfeld, P.	\$948,000.00
Sp Testing of a Fiber Optic Stress Sensor Photonics Laboratories, Inc.	El-Sherif, M.	\$10,120.00
Sp Modeling and Simulation Support for Development of a High-Performance Optical Network for Satellite Applications Rydal R&D, Inc.	Sethu, H.	\$27,000.00
Sp Computer Simulation Model Development for Optical Filter Designs Telcordia Technologies, Inc.	Personick, S.	\$7,425.00
Sp Network Security and Reliability U.S. West Advanced Technologies	Personick, S.	\$30,000.00
	Electrical & Computer Engineering Total:	\$3,010,375
	COE Total :	\$9,569,652
	Drexel University Total:	\$21,127,078