OKLAHOMA STATE REGENTS FOR HIGHER EDUCATION
STATE CAPITAL COMPEX, OKLHOMA CITY

ACADEMIC UNIT/ DEGREE PROGRAM REVIEW

FOR

SCHOOL OF ELECTRICAL & COMPUTER ENGINEERING

MARCH 1, 2005

Table of Contents

OKLAHOMA STATE UNIVERSITY
ACADEMIC PROGRAM REVIEW
EXECUTIVE SUMMARY

DEPARTMENT OR DEGREE PROGRAM: Electrical and Computer Engineering

Address items specified in OSRHE policy on program review (VI-Content of Program Review Reports): description of review process, program objectives, student outcomes assessment, and program recommendations. Please limit the summary to 1 or 2 pages.

This review was completed by the School Head, Dr. Keith A. Teague, with extensive assistance from the Assessment Coordinator, Dr. Alan Cheville. The entire faculty assisted with the compilation of reports and data.

Electrical and Computer Engineering (ECEN) has a distinguished history at OSU that dates back approximately 100 years. For nearly 70 years (since 1936) the program has held accreditation from the Accreditation Board for Engineering and Technology (ABET), originally the Engineers' Council for Professional Development (ECPD) which was established in 1932.

ECEN operates two undergraduate programs (Electrical Engineering and Electrical Engineering with Computer Option) as well as MS and PhD programs in Electrical Engineering. ECEN is an active participant in several interdisciplinary programs, including the MS in Telecommunications Management (MSTM), MS in Control Systems Engineering (MSCSE), and Photonics.

Our primary objective is to meet the critical demand for graduates needed in the areas of Electrical and Computer Engineering which has been steadily growing for the past 20 years, a trend that is expected to continue for the foreseeable future. Although the economy has been in a downturn recently, demand for our graduates continues to be high. Average salaries in the region are approximately $54,000 for BS graduates and over $60,000 for MS graduates, with salaries ranging to more than $70,000 recently in the Dallas area for new MS graduates.

We continue to strive to become recognized as a Top 50 Electrical and Computer Engineering program. As part of this effort we began a process for strengthening both instruction and scholarly activities within ECEN. During the past five years we have developed and deployed a comprehensive system of assessment for ensuring the quality of our graduates and the improvement of our program. At the same time, research expenditures within the School have more than doubled to more than $3,200,000 annually (based on CEAT records of expenditures). In 2003 we received a renewal of our ABET accreditation, following the most successful accreditation visit and subsequent report in perhaps 20 years.

Our program at OSU-Tulsa continues to grow, although there is a critical need for additional resident faculty and development of a strong graduate program. These challenges will be met in time as additional resources, including funds, research facilities, and on-campus student housing become available on the Tulsa campus.

Dean Karl M. Reid *(Signature)* Date 3/4/05

Note: Complete one of these forms for each degree program

OKLAHOMA STATE REGENTS FOR HIGHER EDUCATION

2004 - 2005
ACADEMIC PROGRAM REVIEW

BACCALAUREATE, MASTERS & DOCTORAL DEGREES

OKLAHOMA STATE UNIVERSITY

Electrical and Computer Engineering - BS
Title of unit or degree program reviewed (Level III)

With options (Level IV) in: Computer Engineering

Electrical Engineering
Degree designation as on diploma (Level II)

ECEN
Formal degree abbreviation (Level I)

Degree-granting academic unit School of Electrical and Computer Engineering (Name) 505 (Cost Center)

CIP code 141001

HEGIS code 0909

Instructional Program code 071

Name of department head
(person who oversees degree program listed above) Keith A. Teague

Program holds specialized accreditation from ABET

Name and title of contact person Keith A. Teague
(Name)
Department Head
(Title)

Date of Institutional Governing Board Review: _____

President _____ Date: _____
(Signature)

Note: Complete one of these forms for each degree program

OKLAHOMA STATE REGENTS FOR HIGHER EDUCATION

2004 - 2005
ACADEMIC PROGRAM REVIEW

BACCALAUREATE, MASTERS & DOCTORAL DEGREES

OKLAHOMA STATE UNIVERSITY

Electrical Engineering - MS
Title of unit or degree program reviewed (Level III)

With options (Level IV) in:

Master of Science
Degree designation as on diploma (Level II)

MS
Formal degree abbreviation (Level I)

Degree-granting academic unit School of Electrical and Computer Engineering (Name) 505 (Cost Center)

CIP code 141001

HEGIS code 0909

Instructional Program code 072

Name of department head
(person who oversees degree program listed above) Keith A. Teague

Program holds specialized accreditation from ABET

Name and title of contact person Keith A. Teague
(Name)
Department Head
(Title)

Date of Institutional Governing Board Review: _____

President _____ Date: _____
(Signature)

Note: Complete one of these forms for each degree program

OKLAHOMA STATE REGENTS FOR HIGHER EDUCATION

2004 - 2005
ACADEMIC PROGRAM REVIEW

BACCALAUREATE, MASTERS & DOCTORAL DEGREES

OKLAHOMA STATE UNIVERSITY

Electrical Engineering - PhD
Title of unit or degree program reviewed (Level III)

With options (Level IV) in:

Doctor of Philosophy
Degree designation as on diploma (Level II)

PhD
Formal degree abbreviation (Level I)

Degree-granting academic unit School of Electrical and Computer Engineering (Name) 505 (Cost Center)

CIP code 141001

HEGIS code 0909

Instructional Program code 073

Name of department head
(person who oversees degree program listed above) Keith A. Teague

Program holds specialized accreditation from ABET

Name and title of contact person Keith A. Teague
(Name)
Department Head
(Title)

Date of Institutional Governing Board Review: _____

President _____ Date: _____
(Signature)

OVERVIEW

A. Description of the Departmental/Program Review Process *(Briefly describe how the review was conducted and who was involved)*

This Academic Program Review was prepared by Dr. Keith A. Teague, Head of the School of Electrical and Computer Engineering (ECEN) with help from several faculty and staff. Assessment information was compiled and analyzed by Dr. Alan Cheville, Assessment Coordinator for ECEN. The assessment information that is contained herein was collected using detailed assessment instruments and metrics applied over a period of several years.

B. Recommendations from Previous Program Reviews. *(Discuss actions taken to address the recommendations of program faculty from the last program review.)*

There were no specific formal recommendations included in the most recent Academic Program Review (1999). In 2000, the Accreditation Board for Engineering and Technology (ABET) implemented new accreditation criteria based primarily on outcomes assessment. As a result of these changes, ECEN began an aggressive program of self evaluation, assessment, and program modifications to ensure that we met the more stringent requirements that had been established. In this regard, ECEN has developed and implemented a comprehensive program of assessment for our curriculum, our students and our graduates. The data are collected, analyzed, and fed back to make changes that enhance the quality of the program and our graduates. Our 2003 ABET visit found no weaknesses in the program. The program is healthy and very active.

CRITERION I
Program Centrality

A. Goals & Objectives of Degree Programs *(List each degree option, its clientele, objectives, and expected student outcomes. For program clientele, briefly describe the students in the program, e.g., are they primarily full-time traditional college-age students in Stillwater or part-time nontraditional students in Tulsa? Expected student outcomes for the degree program are described in the program's Student Outcomes Assessment Plan)*

Degree Program: Electrical Engineering - BS

Program Clientele: Full-time students on the Stillwater campus (90%) and less traditional students on the Tulsa campus (10%) (approximate). There is significant overlap between these two populations with some Tulsa students commuting to the Stillwater campus.

Program Objectives: The published objectives for the program are defined as follows.

Graduates of Electrical and Computer Engineering at Oklahoma State University:

1) Who undertake engineering careers will be widely employed across a range

of disciplines and sub-disciplines. Our graduates will demonstrate a solid foundation in electrical engineering fundamentals, experience in the design process, and in-depth experience in a chosen area which leads to success in their chosen careers.

2) Will be confident about functioning in a professional environment. This confidence comes from the ability to function on multidisciplinary teams, being able to communicate effectively at a variety of levels, and understanding the engineering design process.
3) Will continue the process of scholarship throughout their lives. While for some this development means attending professional or graduate school, others will continue learning through career development or other professional activities.
4) Will contribute to society by following ethical standards and engaging in public and professional service activities.
5) Will be able to succeed through their understanding and appreciation of the impact of engineering practice on society, the economy, and the environment.

Expected Student Outcomes: The published outcomes for the program are as follows.

1) All graduating ECEN students will have successfully completed a well-balanced curriculum that covers a broad range of topics in electrical and computer engineering. This curriculum will specifically provide:
    a. A sound mathematical and scientific foundation.
    b. A breadth of analysis and design experience including both hardware and software.
    c. Advanced upper division courses that permit a student to explore topics in depth.

2) Students graduated from ECEN will have engaged in projects in electrical and computer engineering that develop the abilities of teamwork, communication, and engineering design, including in-depth design projects.

3) Upon graduation students will have academic preparation for graduate study and an appreciation for and excitement about electrical and computer engineering – the foundations for life long learning.

4) Graduating ECEN students will be aware of the importance of professional responsibility, ethics, and public service in engineering.

5) Students will be aware of contemporary global societal, economic, and environmental issues and appreciate the role of engineering on these issues.

Degree Program: Electrical Engineering - MS

Program Clientele: Full-time students on the Stillwater campus (95%) and non-traditional

students on the Tulsa campus or distance education (5%) (approximate)

Program Objectives: The objectives for the program are defined as follows.

MS Traditional Thesis

1. Develop skills balanced in depth and breadth in electrical engineering topics at a level beyond that established in an undergraduate program
2. Develop depth in a particular area of electrical engineering
3. Develop the skills to solve unique, high level electric engineering problems
4. Develop the skills to communicate electrical engineering concepts and results

MS Professional Path

1. Increase understanding of fundamental electrical engineering concepts
2. Develop breadth over a number of electrical engineering applications at a level beyond that established in an undergraduate program
3. Develop skill needed to solve specific electrical engineering problems

Expected Student Outcomes: The following student outcomes are anticipated.

MS Traditional Thesis

1. Completion of one "core" ECEN course, and graduate level courses in at least electrical engineering areas
2. Completion of the courses in a graduate plan of study formulated by the graduate committee with the student
3. Complete and defend an M.S. thesis project
4. Write and defend an M.S. thesis

MS Professional Path

1. Completion of two of three "core" ECEN courses (5513, 5613, 5713)
2. Completion of graduate level courses in at least four electrical engineering areas
3. Complete an in-depth creative component design project

Degree Program: Electrical Engineering - PhD

Program Clientele: Full-time students on the Stillwater campus (95%) and non-traditional students on the Tulsa campus or distance education (5%) (approximate)

Program Objectives: The objectives for the program are defined as follows.

1. Attain in-depth knowledge of a specific electrical engineering topic
2. Attain the ability to identify an advanced research project and formulate a plan to conduct the project

3. Attain the ability to conduct research that advances the state-of-the-art in a electrical engineering knowldege
4. Attain the ability to communicate state-of-the-art engineering concepts and results

Expected Student Outcomes: The following student outcomes are anticipated.

MS Traditional Thesis

1. Completion of the courses in a plan of study formulated by the Ph.D. committee
2. Completion of the ECEN 6050 Preliminary Reasearch and Proposal
3. Completion and defense of a Ph.D. research project
4. Write and defend a Ph.D. dissertation; submit a paper to a peer reviewed scientific conference or journal

B. Linkage of the Program to Institution's Mission *(Use the mission "Proud of its land grant heritage, Oklahoma State University advances knowledge, enriches lives, and stimulates / enhances economic development through instruction, research, outreach, and creative activities" or the final version of the OSU mission).*

As a land grant institution, Oklahoma State University is charged with a special responsibility to our students, our community and our nation. The School of Electrical and Computer Engineering performs a particularly relevant role in helping serve this mission.

ECEN Mission Statement: *The School of Electrical and Computer Engineering – serving the needs of students, faculty, and those who employ our graduates – provides a comprehensive education in electrical or computer engineering. By providing both a breadth of knowledge and depth with design experience in selected areas, graduates are prepared to continue the lifelong process of education needed by active professionals in today's constantly changing global society.*

ECEN provides a high quality educational experience to our students, addressing the needs of industry in the state and nationally. Through our degree offerings, and accompanying areas of specialization, we produce graduates who are well qualified to enter the workforce or pursue advanced educational opportunities. We are active participants in several specialized interdisciplinary degree programs that have been developed specifically to address areas of need. These include the MS in Telecommunication Management, an innovative program that has had wide acceptance from our partners in the telecommunications industry, the MS in Control Systems Engineering, which is directly relevant to numerous industries in the state and region, and the graduate program in Photonics which leverages our nationally prominent faculty in the area. Our program at OSU-Tulsa continues to grow, serving the needs of the greater Tulsa area.

ECEN also has faculty who are very prolific in research, scholarship and service. Efforts in

both basic and applied research, including collaborative activities with state and national industries, have resulted in more than a doubling of externally funded research expenditures to over $3,200,000[1] annually over the past five years.

[1] This number is based on records of actual expenditures maintained by CEAT. It is approximately $250,000 greater than the value reported by the University on the Five Year Academic Report Card. Since CEAT directly manages all external research expenditures in the College, and since CEAT's values are used to measure performance in the college, we will accept this value as correct.

CRITERION II
Program Curriculum and Structure

A. Program Structure *(Attach copies of the current degree requirements sheet)*

Attached in Appendix C below.

B. Distance Education *(List the courses offered by electronic or other distance delivery methods)*

Distance education has been a very important part of the ECEN program for more than two decades, and is more important for the delivery of our programs now than ever. The following courses have been taught by distance education during the past five years and are offered on a somewhat regular basis. These courses serve both traditional students and working professionals. The ECEN program at OSU-Tulsa depends on distance education to provide a full selection of required courses and electives. It is critical that the University continue to view distance education as an important part of the academic mission of the University. Without this central support the ECEN program at OSU-Tulsa could not be delivered.

CLASS	TITLE
ECEN 3113	Energy Conversion
ECEN 3213	Microcomputer Principles
ECEN 3513	Signal Analysis
ECEN 3613	Electromagnetic Fields
ECEN 3623	Math Found EM and Photonics
ECEN 3723	Systems I
ECEN 3913	Solid State Devices
ECEN 4010	Telecommunications Network Design
ECEN 4153	Power System Analysis Design
ECEN 4213	Computer Based System Design
ECEN 4243	Computer Architecture
ECEN 4273	Software Engineering
ECEN 4283	Computer Networks
ECEN 4303	Digital Electronic Circuit Design
ECEN 4313	Linear Electronic Circuit Design
ECEN 4353	Communication Electronics
ECEN 4503	Random Signals and Noise
ECEN 4533	Data Communications
ECEN 4703	Active Filter Design
ECEN 4763	Into to Digital Signal Process
ECEN 5123	System Reliability Evaluation
ECEN 5153	Direct Energy Conversion

ECEN 5193 Power Econ and Regulation
ECEN 5253 Digital Computer Design
ECEN 5263 VLSI Digital System Design
ECEN 5313 Solid State Electronics I
ECEN 5333 Semiconductor Devices
ECEN 5353 Advanced Power Electronics
ECEN 5463 Nonlinear System Analysis Controls
ECEN 5473 Digital Control Systems
ECEN 5513 Stochastic Systems
ECEN 5533 Modern Communication Theory
ECEN 5553 Telecommunication Systems
ECEN 5623 Antenna Theory
ECEN 5633 Radar Theory
ECEN 5713 Linear Systems
ECEN 5733 Neural Networks
ECEN 5763 Digital Signal Processing
ECEN 5833 Fiber-Optic Communication Systems
ECEN 6253 Adv. Topics in Computer Architecture
ECEN 6263 Advances VLSI Design
ECEN 6423 System Identification
ECEN 6453 Adaptive Controls

C. Articulation Agreement *(Identify the articulation (2+2) agreements the program has with community colleges)*

Tulsa Community College – primarily feeds the ECEN program at OSU-Tulsa

D. Multidisciplinary programs *(Briefly describe how program faculty participate in multidisciplinary programs with other OSU departments or other institutions)*

Program faculty participate in three primary multidisciplinary academic programs. These include the MS in Control Systems Engineering (MSCSE), the PhD in Photonics, and the MS in *Telecommunications* Management (MSTM). Participation is through course offerings, student advisement, membership on advisory committees, and program organization and leadership.

Program	Primary ECEN Faculty
MSCSE	Martin Hagan[2] Gary Yen Rafael Fierro
MSTM	George Scheets J-M Chung
PHOTONICS	Alan Cheville Jerzy Krasinski Weili Zhang Daniel Grischkowsky

[2] MSCSE Program Director since program inception in Fall 1999

CRITERION III
Program Resources

A. New facilities and major equipment *(Describe major changes in facilities and major equipment added in the past 5 years)*

Several instructional laboratories have been created or have had extensive upgrades and renovations during the period. They are listed below along with very short descriptions and an indication of which campus (Stillwater or Tulsa) experienced the upgrade. Several state-of-the-art research laboratories located in the Advanced Technology Research Center on the Stillwater campus are also used for instruction in both undergraduate and advanced classes.

Methods I, II and III (ECEN 2011, ECEN 3021, ECEN 3031) – Full complement of new laboratory equipment and benches to support approximately 16 students per lab section. Required course. (Stillwater and Tulsa)

Digital Logic **Design (ECEN 3233)** – Updated laboratory equipment to support approximately 12 students per lab section. Required course. (Stillwater and Tulsa)

Energy Conversion (ECEN 3113) – Completely new laboratory, including four custom benches and equipment fabricated by program faculty and graduate students to support 8 students per lab section. (Tulsa) The Stillwater Energy Conversion Laboratory is currently being upgraded to be equal to the facility on the Tulsa campus. Required course. (Stillwater)

Electromagnetic Fields (ECEN 3613) – New laboratory equipment to support revised course content. Required course. (Stillwater)

Mathematical Foundations of Electromagnetics and Photonics (ECEN 3623) – New laboratory equipment to support this new course. (Stillwater)

Engineering Optics (ECEN3813) and Optical Electronics (ECEN4813) – New laboratory and new equipment to revitalize courses which had not been taught for several years. Funded through National Science Foundation Grant. (Stillwater)

Senior Design I (ECEN 4013) – An extensive laboratory upgrade, including new automated test and measurement equipment for 10 benches. Required course. (Stillwater and Tulsa)

Senior Design II (ECEN 4023) – Partial laboratory upgrade and partially renovated facility. (Stillwater) New laboratory equipment and facility. Required course. (Tulsa)

Microelectronic Fabrication (ECEN5843) – Oklahoma's only functioning academic cleanroom support laboratory course for graduate and undergraduate students. Funded through National Science Foundation and Private grants. (Stillwater)

Photonics **I (ECEN 6803)** – Full laboratory renovation to support this interdisciplinary course. (Stillwater)

B. Academic and administrative efficiencies *(In the past 5 years, what strategies has the program used to achieve greater academic and administrative efficiencies?)*

The primary strategy to enhance academic and administrative efficiency has been to more carefully coordinate course offerings and course sequencing within the School on the Stillwater campus and between the Stillwater and Tulsa campuses.

In the undergraduate program, extensive use has been made of distance education to provide greatly enhanced flexibility for our Tulsa students while at the same time reducing redundant course offerings. At the same time, as enrollment has increased in Tulsa, required undergraduate courses have been offered with a resident instructor on both the Stillwater and Tulsa campuses to ensure as similar an educational experience as possible for students at both sites. This serves to increase program cost, but is necessary to ensure quality in the student experience on both campuses.

In the graduate program, attention has been given to reducing the number and frequency of elective and required courses to better optimize class enrollments without affecting a student's ability to graduate on time.

The effect of these changes at both the undergraduate and graduate levels has been to reduce the number of FTE required to teach, while freeing up faculty time to significantly enhance their time available for research and scholarly activities. ECEN faculty with significant research or other scholarly activities are being rewarded with partial released time from teaching. As a result, faculty research performance has more than doubled in the past five years to more than $3,200,000. These projects include both basic and applied research, as well as research in the area of enhancing engineering education.

Additional faculty on the Tulsa campus would make this approach more effective and allow research activities to be created and expanded in Tulsa, greatly benefiting the graduate program there. It is critical that additional OSU-Tulsa faculty be funded immediately if this important program is to grow and thrive

C. External funding. If applicable, complete Appendix A External Grants, Contracts, and Gifts Awarded to Program Faculty for the past 5 years. (*Describe the changes in external funding during the past 5 years.)*

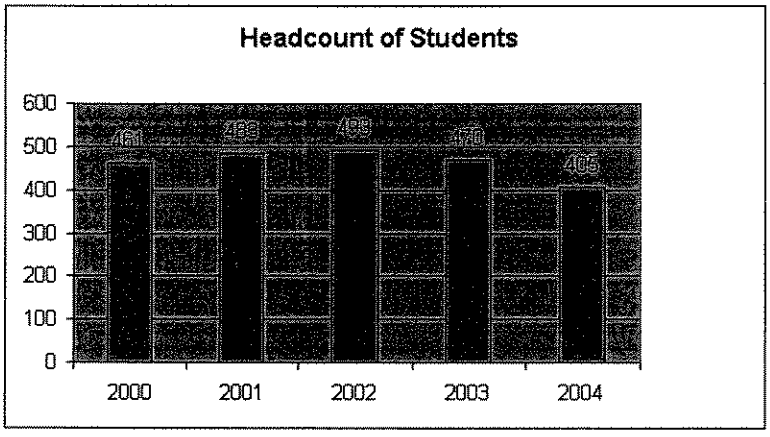
ECEN faculty are highly involved in externally funded research. Their activities are summarized in Appendix A. Research performance, as measured by research expenditures within ECEN, has more than doubled in the past five years to over $3,200,000 per year, which is the highest within the CEAT academic units. A list of externally funded research projects is included in the appendix.

CRITERION IV
Productivity

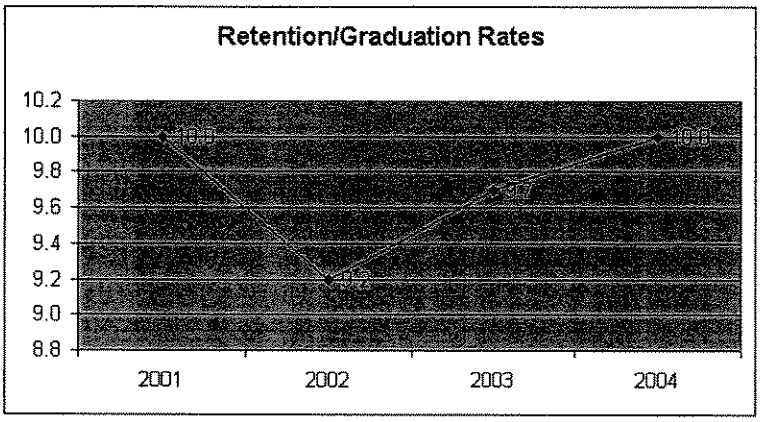
A. Number of majors (headcount), student credit hours, and average time to graduation. Attach a copy of the 5 Year Academic Ledger for the department. *(Briefly summarize changes in the number of majors, student credit hours generated, and average time to graduation during the past 5 years.)*

Five Year Academic Ledger – Attached in Appendix D below.

Over the past five years, BS enrollment has ranged from a current low of 405 to a high in 2002 of 493 students. This seems to represent a normal variation due to national trends, economic factors, and customary cyclic changes. In particular, the recent decline is probably due to the impact of the significant downturn in the telecommunications industry several years ago. This is summarized in the figure below.



The average time to graduation in the BS program is approximately 10 semesters. This counts only students who began their academic careers at OSU and have continued in the program full-time. No accounting for advanced placement credit is made. Note that the figure of 9.2 semesters for 2002 is skewed by a small number of students with significant AP credit who graduated in 6 and 7 semesters. The number of student credit hours (SCH) required for graduation is slightly over 130, resulting in an average course load of 13 SCH per semester per student.



One of ECEN's goals is to reduce the time to graduation by approximately one semester every three years to 9 semesters by 2008 and approaching 8 semesters by 2011.

B. Faculty ratio and class size. Attach a copy of the 5 Year Academic Ledger for the department. *(Briefly summarize changes in the student to faculty ratio and class size during the past 5 years. Provide a brief explanation of the future plans for the program related to student to faculty ratio and class size, the time frame required to accomplish these plans, and the budget implications of the plans.)*

Student to faculty ratio has stayed relatively constant during the past five years as the number of classes and class sections has been adjusted to account for changing enrollment trends. It should be noted that almost all classes in ECEN are at the 3xxx and 4xxx level, and hence faculty ratio and class size trail enrollment trends by approximately two years. The faculty ratio, number of classes, and class size appears in line with expected values. Current plans to add one faculty member each year for the coming years will allow us to account for anticipated increases in enrollment as the current cycle reverses.

As the program in Tulsa continues to grow, it will be necessary for the Stillwater program to become more efficient. As indicated by the mean SCH and time to graduation it is likely that many students enroll, drop, then retake courses reducing the class size and extending time to graduation. We are currently seeking data to support this assertion. ECEN is in the process of providing students increased advising and removing legacy material from the curriculum. This is a time and resource intensive process, although we have had some success funding this effort through external grants (National Science Foundation). We recognize that as the number of non-traditional students increases, there will be more need for flexible academic programs. We are considering changes to the curriculum which allow this flexibility.

Since learning is intimately linked to class size, ECEN's goal is to maintain or reduce the student:faculty ratio. To increase efficiency ECEN willl reduce the number and frequency of large required classes and distribute students more evenly among elective courses, dropping mean course load to approximately 1.5 courses per semester by 2011. We anticipate increasing training and support of TA's to free up additional faculty time for research.

C. 5 year average number of degrees conferred and majors. Refer to the OSRHE productivity spreadsheet. (*Compare the number of graduates and majors to the minimum productivity standards established by the Oklahoma State Regents for Higher Education)*

Degree	Number of Degrees Conferred		Majors (Headcount) – Fall Semester	
	OSRHE standard	5 yr average	OSRHE standard	5 yr average
Certificate	NA	NA	NA	NA
Baccalaureate	5	68.4	12.5	462.4
Masters	3	50.4	6.0	161.8
Doctoral	2	4.4	4.5	35.2

If the department has more than one degree program in a degree level (e.g, BS and BA), please list the number of degrees and headcount enrollment for each program separately.

If the five year average for any degree program does not meet State Regents' minimum productivity requirements for graduates and/or headcount enrollment provide a brief explanation of the future plans for the program that will enable it to meet the productivity requirements, the time frame required to accomplish these plans, and the budget implications for continuation of the program.

All programs easily meet OSHRE requirements.

CRITERION V
Quality

A. Program faculty qualifications

Name	Faculty Status (Regular or Adjunct)	Faculty FTE in program	Degrees Earned		Related Work Experience (years)
			Highest Type	Highest in Teaching Area Type	
Allison	Regular	100%	Ph.D.	Ph.D.	44
Bunting	Regular	100%	Ph.D.	Ph.D.	9
Cheville	Regular	100%	Ph.D.	Ph.D.	8
Chung	Regular	100%	Ph.D.	Ph.D.	7
Fan	Regular	100%	Ph.D.	Ph.D.	2
Fierro	Regular	100%	Ph.D.	Ph.D.	2
Gedra	Regular	100%	Ph.D.	Ph.D.	12
Grischkowsk	Regular	100%	Ph.D.	Ph.D.	10
Hagan	Regular	100%	Ph.D.	Ph.D.	12
Hutchens	Regular	100%	Ph.D.	Ph.D.	22
Johnson	Regular	100%	Ph.D.	Ph.D.	25
Krasinski	Regular	100%	Ph.D.	Ph.D.	23
Latino	Regular	100%	Ph.D.	Ph.D.	20
Ramakumar	Regular	100%	Ph.D.	Ph.D.	46
Scheets	Regular	100%	Ph.D.	Ph.D.	15
Teague	Regular	100%	Ph.D.	Ph.D.	19
West	Regular	100%	Ph.D.	Ph.D.	14
Yarlagadda	Regular	100%	Ph.D.	Ph.D.	39
Yen	Regular	100%	Ph.D.	Ph.D.	6
Zhang, Y	Regular	100%	Ph.D.	Ph.D.	3
Zhang, W	Regular	100%	Ph.D.	Ph.D.	11
Acken	Adjunct	25%	Ph.D.	Ph.D.	5
Bell	Adjunct	100%	Ph.D.	Ph.D.	17

B. Evidence of regional / national reputation and ranking

ECEN faculty are highly recognized nationally and internationally. Three current faculty members have been recognized as Fellows in one or more international professional societies, and several faculty have been recognized recently with prestigious awards at the national and local levels. ECEN faculty are highly published and compete nationally and internationally for research funding. The quality of ECEN graduates is well recognized, and our graduates are regularly accepted into nationally respected graduate programs. During the past five years, ECEN students have been recognized with national awards, including two Goldwater Scholars, a Marshal Scholar, a USA Today all-USA Academic Team awardee, several national graduate fellowships, and numerous other awards. ECEN holds accreditation in Elecdtrical Engineering from ABET.

C. Scholarly activity. Complete Appendix B Record of Significant Scholarly, Artistic and/or Creative Work for the past 5 years. (*Describe the changes in scholarly activity during the past 5 years.)*

Attached as Appendix B.

D. Assessment of student achievement of expected learning outcomes for each degree program *(*this information should be available in your annual assessment reports*)*. Select 3-5 key expected learning outcomes for each degree program. Identify the primary method used to assess student achievement of the selected outcomes. *Please indicate the year(s) the assessment was conducted, the number of program graduates that year, and the number of students assessed.*

Degree Program: B.S.

Key Expected Outcome	Method used to assess this outcome	Years this assessment conducted	No. of grads/ number assessed
1. Demonstrate competence across broad range of topics in electrical and computer engineering.	Fundamentals of Engineering certification exam	2001 2002 2003	2/76 24/70 27/72
2. Students gain a depth of experience in a subset of electrical engineering	Area of Specialization enrollment	2004	All
2. Demonstrate skills in teamwork, communication, and engineering design	Portfolio in capstone course	2003 2004	72/72 All
3. Demonstrate that students are satisfied with our program and their choice of an electrical and computer engineering major:	Senior Exit Survey	2002 2003 2004	72/72 72/72 All
4. Students are well prepared for careers in electrical engineering	Alumni Survey	2002 2004	34/70 40/?

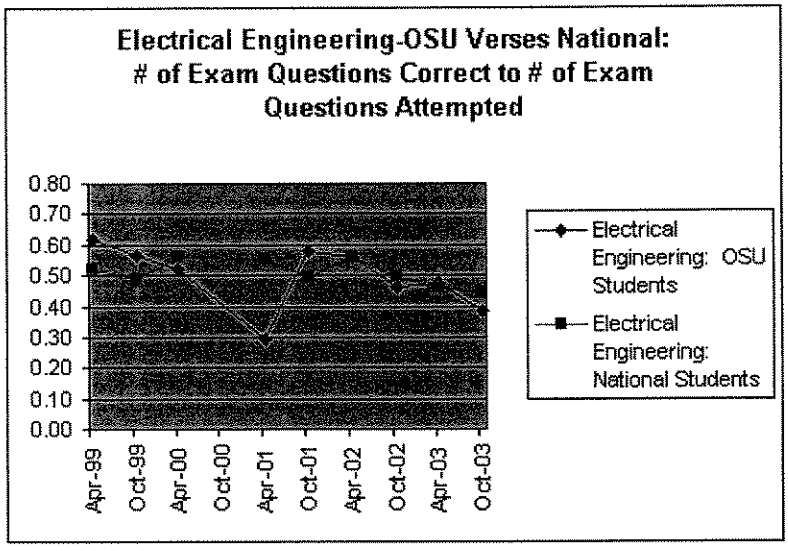
The graduate programs are not currently formally assessed, other than students are required to meet the outcomes and program objectives stated earlier.

E. Overview of results from program outcomes assessment *(*this information should be available in your annual assessment reports*)*. For each key expected outcome, summarize results of assessment and describe how results have been interpreted relative to that outcome. *(To what extent are students achieving each expected outcome? What do assessment results indicate are curricular strengths or areas for improvement / program development?)*

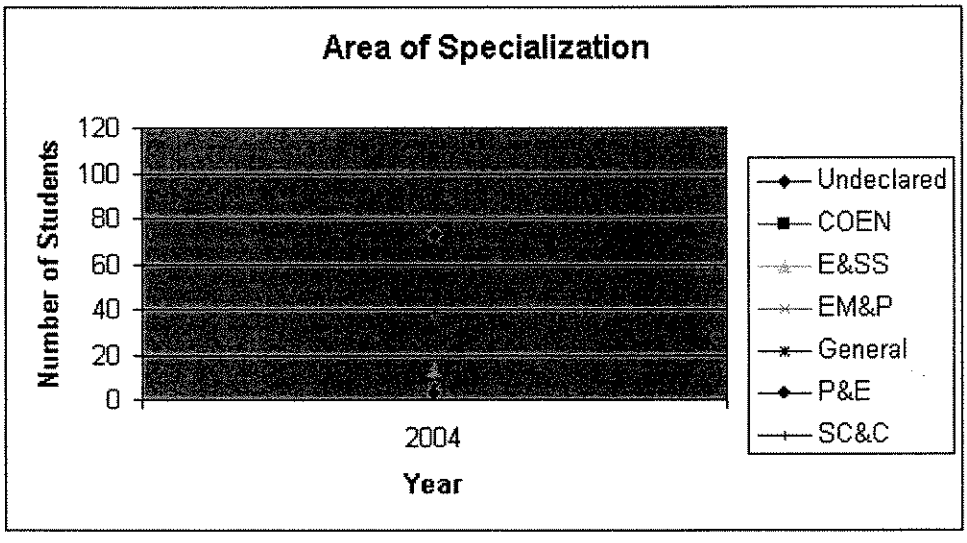
1. Demonstrate competence across broad range of topics in electrical and computer engineering: Data indicates that OSU ECEN students are generally on par with their peers nationwide across a broad range of subjects. The two areas in electrical engineering which we do statistically significanlty worse than the national average (data averaged over five years) is network analysis and computational and numerical methods. The most recent data has shown increases in these areas as new faculty have taken over some of these courses.

   The following graphs illustrate the number of questions correct compared to the number of questions attempted for both OSU students who took the national Fundamentals of

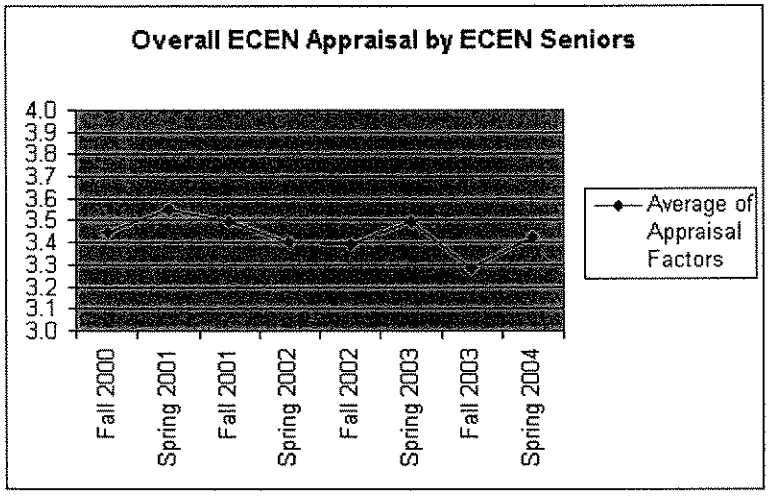
Engineering (FE) Exam as well as the national number of exam questions that were correct and attempted.



2. Students gain a depth of experience in a subset of electrical engineering: To enable ECEN students to experience both a broad range of topics in electrical engineering, as well as gain depth in an area of the discipline in which ECEN students wish to continue their careers, the department established curricular "Areas of Specialization" in the BS program. This change both enables students to get a more coherent degree and allows the department to allocate resources based on enrollment. This change was implemented fully in 2003. The following graph represents the number of ECEN students enrolled in each area of specialization as of 2004.



3. Demonstrate that students are satisfied with our program and their choice of an electrical and computer engineering major: A Senior Exit Survey helps identify the satisfaction of students as they leave the ECEN program (0-4 scale). Eight different categories concerning the ECEN program have been consolidated to come up with an overall appraisal of the ECEN program. Overall the satisfaction with our program has remained constant. ECEN is seeking to increase the overall satisfaction of students by implementing a more focused curriculum, hiring faculty in areas that have poor student:faculty ratios, and redesigning the capstone courses. ECEN also seeks more control over the first two years of the curriculum to enable more consistent experiences for students. The results of the exit survey for eight semesters are shown below.



4. Students are well prepared for careers in electrical engineering: This assessment data is discussed as part of the alumni survey in the following section.

F. Feedback from program alumni / documented achievements of program graduates
(Describe achievements of program graduates obtained from other sources such as department-sponsored alumni surveys, alumni advisory boards, professional societies, etc. Summarize alumni survey results for the degree program, including, if available, information on employment and continued education of program graduates and graduates perceptions of program quality)

The main source of our data on our graduates comes from the university sponsored alumni survey. Responses from the 2002 and 2004 surveys have been analyzed covering alumni from even numbered years from 1996-2002. A statistically significant number of graduates was sampled. The pertinent data from this survey indicates that:

- Over 80% of graduates are employed, and of those who are not, over 75% are seeking employment.
- Over 90% of employed graduates are in a position that is moderately or highly related to their major.

- Nearly 100% of graduates report being adequately or well prepared for their position by the ECEN program.
- Just under 40% of graduates have completed, or are enrolled in, a post-graduate degree program.
- Nearly 100% of graduates report being adequately or well prepared for continuing education by the ECEN program.
- While most graduates are satisfied with the academic advising they received, this area rates consistently below the satisfaction graduates have about other areas of the program.

As shown in the table below there is consistency in the responses of graduates about the strengths and weaknesses of the program as indicated by the responses to open-ended questions. These responses are guiding curriculum reform efforts in ECEN. As ECEN has emphasized teamwork and communication through curriculum reform efforts we have seen a rise in graduates who see this as a strength of the program.

	2002		2004	
Question Category	Responses	% of all responses	Responses	% of all responses
Strengths	34		40	
Fundamentals, mathematics, science	2	5.88%	5	12.50%
Design courses, hands-on experience	7	**20.59%**	7	**17.50%**
Faculty or instructors	6	**17.65%**	2	5.00%
Breadth, range of classes and electives	5	**14.71%**	11	**27.50%**
Specific courses, areas	2	5.88%	3	7.50%
Teamwork, communication	3	8.82%	7	**17.50%**
Misc. responses	9	26.47%	12	30.00%
Weaknesses	36		41	
Lack of design, hands on experience	13	**36.11%**	10	**24.39%**
Faculty or instructors	5	**13.89%**	3	7.32%
Program, teaching, advising	5	**13.89%**	11	**26.83%**
Too much breadth, core curriculum, no depth	6	**16.67%**	4	9.76%
Specific courses, areas	3	8.33%	5	**12.20%**
Soft outcomes incl. teamwork, communication	0	0.00%	3	7.32%
Standards, ethics	2	5.56%	0	0.00%
Miscellaneous	1	2.78%	6	14.63%
How to improve program, esp. design	26		43	
Have more design experiences	9	**34.62%**	10	**23.26%**
Advising, interaction with instructors	5	**19.23%**	3	6.98%
Better equipment	2	7.69%	9	**20.93%**
Organization, communication, teamwork	1	3.85%	7	16.28%

More practical, better organized, more real world	2	7.69%	13	**30.23%**
Miscellaneous			7	16.28%
Topics to be included	5		35	
Software skills			7	**20.00%**
Microprocessors, DLD, DSP			6	**17.14%**
Soft outcomes: teamwork, business, etc.			6	**17.14%**
Semiconductors	1		1	2.86%
RF, microwaves, optics	1		2	5.71%
Circuits, systems, controls			1	2.86%
Design, practical experience			3	8.57%
Miscellaneous			10	28.57%

G. Other Program Evaluations *(Comment on the results of any outside reviews of the program or any institutional reviews within the last 5 years.)*

ECEN recently underwent a very successful external ABET review with resulting full accreditation in 2003. This is the first time our department has fully met the requirements for accreditation in approximately 20 years. We will have another accreditation visit in 2009, and are in the process of streamlining our assessment cycle and trying to overcome faculty resistance to needed changes in the program.

CRITERION VI
Program Demand/Need

A. Occupation Manpower Demand (If applicable)

1. Advisory Committee Membership

   Membership currently consists of three respected Electrical Engineers representing industry and academia. Plans are in place to expand the membership to better represent our constituencies.

2. Advisory Committee Recommendations

   The External Advisory Board has made several observations and recommendations recently.

   a. Students must be skilled in self-assessment to be best able to maximize their own ability to navigate through a career. Students must be aware of the rapidly changing pace of technology and the danger of obsolescence. The EAB suggested modifications to ECEN's objectives. While very insightful, the major changes to the objectives require re-evaluation of at least some portions the ECEN curriculum, and the ECEN outcomes.

   b. ECEN graduates must have a clearly identifiable specialty. Many engineering jobs require more skills in teamwork and communications than they do in design. Consider carefully the tradeoff between required general engineering core courses and specialization in electrical engineering. ECEN should carefully watch the number of hours required for general engineering courses and not let them detract from time spent in ECEN courses.

3. School Response to Recommendations

   These observations and recommendations are under review.

4. Other sources and documents indicating demand

   Demand for Electrical and Computer Engineering graduates and demand for our program is clearly indicated by the success of the program, measured by program enrollment, consistent demand for our graduates, and success and recognition of the faculty.

B. Societal Needs for the Program

The demand for Electrical and Computer Engineering graduates continues to be high, despite the recent downturn in the US economy. The historical need for new graduates grows

typically between 10% and 15% annually. US universities are not able to meet this demand, which is evidenced by the large number of non-citizens who enter the workforce each year in technical positions that would otherwise be occupied by US engineers. This demand is present for both BS and graduate degrees.

C. **Graduate student applications and enrollment changes.** Refer to the spreadsheet that lists the number of graduate student applications, acceptances, enrollments, and graduates for the past 3 years. (*Comment on the number of applications, acceptances, and enrollments, and changes over time. For example, if applications are relatively high but the department accepts few students, why are most students denied admission? If acceptances are relatively high, but enrollments are low, why do admitted students not enroll? Is the rate of graduations consistent with the enrollment number and the expected time to earn the degree? Then provide a brief explanation of the future plans for the program that will enable it to improve numbers of concern, the time frame required to accomplish these plans, and the budget implications for these plans.)*

The majority of students in engineering graduate programs, including ECEN, are international. Our graduate enrollment hit a peak in fall 2002. As a result of new regulations instituted at the federal level since 9/11/2001, both the number of international applications and the number of acceptances have fallen precipitously. If this trend continues, the ability of the program to expand its base of research and scholarship will be threatened. To combat this trend, we have begun an aggressive program of recruiting our own students into the graduate program. These efforts have only been underway for a few semesters, but we are already seeing an increase in the number of US citizens choosing to enter the graduate program. We intend to increase our efforts in this regard. The University will need to be involved as this is a problem that spans many degree programs.

CRITERION VII
Program Duplication

A. Identify other degree programs at OSU with similar titles or functions *(include degree programs in the department if the department has more than one degree program at a degree level (e.g., BS and BA)).*

None.

ECEN at OSU Stillwater and Tulsa campuses meet critical needs in Oklahoma and the nation to generate new engineers capable of meeting the challenges that technological change brings in Electrical Engineering, and in Computers and Information Technology. Program duplication is not an issue while there remains a lack of sufficient numbers of graduates to meet the needs of US industry. The ECEN programs in both Stillwater and Tulsa must be expanded to help meet this need.

B. For similar programs, describe how each degree program fulfills unique student needs *(A program may be unique because of the subject matter treated, the students served, the educational methods employed, the effect of the achievements of the program on other institutions or agencies, etc.)*

N/A

Summary and Recommendations

Note-information for this section may come from a variety of sources and should include information about program strengths and areas for improvement that have been described in the ***program's outcomes assessment reports.***

A. Strengths

ECEN graduates have a breadth of skills, have a high rate of employment, and are the equal of their peers nationally. ECEN faculty are exceptionally productive and very well qualified. The program is healthy and vital.

B. Areas for Improvement

The main concern identified by assessment is the time required for graduation and the rigidity of the ECEN curriculum, particularly in the first two years. Student satisfaction is also a concern, but this issue should resolve itself as the curriculum is streamlined. There is no distinguishing feature of the ECEN program that makes the program clearly stand out from peer programs and that enables us to easily attract top candidates to the undergraduate or

graduate programs. We must do a better job of communicating our strengths to the public. The program at OSU-Tulsa has a critical need for additional faculty to stimulate growth of the program, provide adequate resident faculty for the current student population, and begin development of a vital research program.

C. Recommendations for Action

Eliminate additional legacy material from the curriculum, particularly in the first two years in order to reduce heavy course loads and decrease the number of hours in the curriculum to a value that is more in line with our peers (~128 hours versus the current 133 hours). Streamline the curriculum and allow students more flexibility in customizing their degree plans. Invest in a highly visible change to the undergraduate curriculum and publicize this change to attract top graduates from around the country. Study the potential benefits of earning ABET accreditation for the Computer Engineering Option, and consider establishing the BS in Computer Engineering as a separate degree program. Add faculty for the OSU-Tulsa program as soon as feasible to ensure its growth and vitality.

D. Five-Year Goals for the Program

The faculty have identified four critical goals for the undergraduate program to be implemented by 2009, the date of ECEN's next accreditation visit:

1) The time it takes an ECEN student to graduate will accurately reflect the student's gain in knowledge and expertise.

Assessment data is beginning to show that most students are not able to complete the ECEN program in four years. While a four year program is not a desirable end in and of itself, the number of semesters a competent student takes to graduate should reflect how much the student has learned. ECEN should identify a minimum set of knowledge and expertise a student should have at graduation, and attempt to minimize the time to graduation within these constraints.

2) The ECEN curriculum will emphasize solving open-ended problems. Students will be taught the process of solving such problems, have opportunities to practice this process, and demonstrate success.

Results from the alumni survey clearly indicate the ability to learn and practice engineering design is the most valuable aspect of our program and one that should be improved and expanded. ECEN should look at how to effectively integrate open-ended design problems throughout the curriculum. Students should be explicitly taught approaches to solve open ended problems. Such problems should be designed so that students are able to succeed, building their confidence and morale.

3) Since task overload results in decreased learning, student credit hours for courses should accurately reflect the time and effort required by an average student.

All courses called for in the ECEN flowchart in a given semester should be able to be completed by a competent student. Courses with workloads that are much more or less than the semester credit hours given for that class make it difficult for students to create course plans and for faculty to advise students. Students who drop courses because of task overload result in increased teaching load for faculty and may be more likely to withdraw from engineering.

4) Ensure that all ECEN students are advised on their academic plan, long-tem career goals, and opportunities for graduate education in both the pre-professional and professional school programs.

One of the outcomes of the ECEN program is to prepare students both for careers and graduate school. To ensure students are well prepared and to ensure their academic schedule meets their needs, ECEN will oversee coordination of pre-professional student advising with CEAT Student Advising. Upon entering professional school all students should have the opportunity to meet with faculty to discuss their academic and career goals. ECEN should also sponsor other student advising events to discuss Areas of Specialization and the advantages afforded by pursuing a graduate degree.

Appendix A

External Grants, Contracts, and Gifts Awarded to Program Faculty

(Arranged in Ascending Order by Fiscal Year, as Reported by CEAT)

FY2000 Electrical & Computer Engineering Award Funding Received

July 1, 1999 - June 30, 2000

Account Number	Routing Number	Title	Routing Type	Amount	End Date	Sponsor	Project Leader	Dept.	Routing Date
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	($8,450)	FN	OSU Foundation	Hagan, M.T.	ECEN	7/9/1999
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$6,000	FN	Cummins Engine Company, Inc.	Hagan, M.T.	ECEN	7/30/1999
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$5,000	FN	HBD, Inc.	Hagan, M.T.	ECEN	7/30/1999
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$5,000	FN	HBD, Inc.	Hagan, M.T.	ECEN	7/30/1999
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$6,000	FN	Cummins Engine Company, Inc.	Hagan, M.T.	ECEN	8/20/1999
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$12,000	FN	Cummins Engine Company, Inc.	Hagan, M.T.	ECEN	5/4/2000
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$6,000	6/30/2000	Cummins Engine Company, Inc.	Hagan, M.T.	ECEN	6/16/2000
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	($6,000)	FN	Various	Hagan, M.T.	ECEN	6/16/2000

AA-1-55757	EN-99-RS-150	THz Time-Domain Spectroscopy, THz Coherent Transients and THz Impulse Ranging Cost Share	F	$44,170	5/31/2001	FY 2000 Oklahoma State Regents for Higher Education Cost Share Program Guarantee	Grischkowsky, D.R.	ECEN	6/20/2000
AA-1-55775	EN-00-RS-108	MRI: Acquisition of Instrumentation for Ultrafast Terahertz Optoelectronic Fabrication and Characterization Cost Share	N	$89,250	8/31/2001	FY 2000 Oklahoma State Regents for Higher Education Cost Share Program Guarantee	Cheville, R.A. Grischkowsky, D.R.	ECEN	6/20/2000
AA-5-35955	EN-95-RS-054	Advanced Circuit and Semiconductors Technology	F	($3,574)	6/28/1998	Space and Naval Warfare Systems Command (SPAWAR)	Hutchens, C.G.	ECEN	11/18/1999
AA-5-37946	EN-96-RS-014	Neural Network Implementation of Non-Linear Controllers	F	$8,450	FN	OSU Foundation	Hagan, M.T.	ECEN	7/9/1999
AA-5-37946	EN-96-RS-014	Neural Network Implementation of Non-Linear Controllers	F	$6,000	FN	OSU Foundation	Hagan, M.T.	ECEN	6/16/2000
AA-5-43787	EN-99-RS-143	Multi-Resolution Segmentation via Fusion of Mesonet Data and Remotely Sensed Imagery	F	$42,924	11/14/2000	University of Oklahoma	Acton, S.T.	ECEN	4/1/2000
AA-5-43787	EN-99-RS-143	Multi-Resolution Segmentation via Fusion of Mesonet Data and Remotely Sensed Imagery	F	($42,924)	11/14/2000	University of Oklahoma	Acton, S.T.	ECEN	4/26/2000
AA-5-43797	EN-99-RS-151	Multi-Resolution Segmentation via Fusion of Mesonet Data and Remotely Sensed Imagery	F	$73,872	11/14/2000	University of Oklahoma	Acton, S.T.	ECEN	4/26/2000

AA-5-47798	EN-98-RS-028	Neural Networks for Pattern Classification and Model Inversion	F/T	$15,713	5/31/2000	Haliburton Energy Services	Hagan, M.T.	ECEN	12/7/1999
AA-5-49768	EN-98-RS-024	THz Time-Domain Spectroscopy, THz Coherent Transients and THz Impulse Ranging	F	$1,873	5/31/2000	National Science Foundation	Grischkowsky, D.R.	ECEN	5/2/2000
AA-5-49768	EN-98-RS-024	THz Time-Domain Spectroscopy, THz Coherent Transients and THz Impulse Ranging	F/T	$160,000	5/31/2001	National Science Foundation	Grischkowsky, D.R.	ECEN	5/5/2000
AA-5-52529	EN-00-RS-023	Real Time Infrared Demonstration Set (RTIR) -- Phase 3	F/T	$7,500	9/30/2000	Titan Corporation	Hutchens, C.G.	ECEN	11/9/1999
AA-5-52529	EN-00-RS-023	Real Time Infrared Demonstration Set (RTIR) --Phase 3	F/T	$28,520	9/30/2000	Titan Corporation	Hutchens, C.G.	ECEN	3/16/2000
AA-5-54009	EN-99-RS-083	Investigation of Enabling Technologies for Secure Multimedia on Your Desktop	F	$50,000	10/4/2000	Maryland Procurement Office	Teague, K.A.	ECEN	10/12/1999
AA-5-54349	EN-99-RS-117	A Partnership Between Williams in Tulsa and Oklahoma State University- Tulsa	F/T	$16,052	4/30/2001	Williams Network	Bell, S.S.	ECEN (OSU-Tulsa)	5/8/2000
AA-5-54479	EN-00-RS-020	Multi-Purpose Power Sensor (MPPS)	F/T	$5,025	9/30/2000	Titan Corporation	Hutchens, C.G.	ECEN	11/8/1999
AA-5-54479	EN-00-RS-020	Multi-Purpose Power Sensor (MPPS)	F	$47,809	9/30/2000	Titan Corporation	Hutchens, C.G.	ECEN	6/22/2000
AA-5-54649	EN-99-RS-050	Dynamic Sensor Calibration with Neural Networks	N	$25,717	6/30/2000	Haliburton Energy Services	Hagan, M.T.	ECEN	7/6/1999
AA-5-54649	EN-99-RS-050	Dynamic Sensor Calibration with Neural Networks	F/T	$25,000	6/30/2001	Haliburton Energy Services	Hagan, M.T.	ECEN	1/7/2000

AA-5-54729	EN-00-RS-075	THz Time-Domain Spectroscopy, THz Coherent Transients and THz Impulse Ranging REU Supplement	F	$10,000	5/31/2001	National Science Foundation	Grischkowsky, D.R.	ECEN	6/6/2000
AA-5-55610	EN-99-RS-087	Improved Performance Tests for Optical Communications	N	$49,453	7/31/2000	Oklahoma Center for the Advancement of Science and Technology	Shepard, S.R. Scheets, G.M. Grischkowsky, D.R.	ECEN	9/28/1999
AA-5-55690	EN-99-RS-009	Visual and Auditory Data	N	$9,000	7/31/2000	Various (Measurement and Control Engineering Center)	Yen, G.G.	ECEN	9/27/1999
AA-5-55690	EN-99-RS-122	Visual and Auditory Data	F	$11,000	7/31/2000	Various (Measurement and Control Engineering Center)	Yen, G.G.	ECEN	10/11/1999
AA-5-58080	EN-00-RS-017	Backbone Cost Analysis	N	$17,452	12/15/1999	Williams Network	Scheets, G.M.	ECEN	9/13/1999
AA-5-58200	EN-99-RS-045	Nanoshell-based Infrared and Terahertz Adaptive Materials and Devices	N	$41,621	2/11/2000	Rice University for US Army Research Office	Cheville, R.A. Grischkowsky, D.R.	ECEN	9/16/1999
AA-5-58200	EN-99-RS-045	Nanoshell-based Infrared and Terahertz Adaptive Materials and Devices	F/T	$122,801	2/11/2001	Rice University for US Army Research Office	Cheville, R.A. Grischkowsky, D.R.	ECEN	3/2/2000
AA-5-58270	EN-99-RS-071	MRI: Acquisition of Instrumentation for Ultrafast Terahertz Optoelectronic Fabrication and Characterization	N	$193,525	8/31/2000	National Science Foundation	Cheville, R.A. Grischkowsky, D.R.	ECEN	10/14/1999

AA-5-58330	EN-00-RS-025	MRI: Acquisition of Instrumentation for Ultrafast Terahertz Optoelectronic Fabrication and Characterization Cost Share	N	$49,963	8/31/2000	OSU Foundation for Noble Foundation	Cheville, R.A. Grischkowsky, D.R.	ECEN	9/10/1999
AA-5-58330	EN-00-RS-025	MRI: Acquisition of Instrumentation for Ultrafast Terahertz Optoelectronic Fabrication and Characterization Cost Share	F	($9,000)	8/31/2000	OSU Foundation for Noble Foundation	Cheville, R.A. Grischkowsky, D.R.	ECEN	9/30/1999
AA-5-58560	EN-00-RS-016	Advanced DSP Research through Oklahoma State University	N	$20,000	12/15/1999	Raytheon Systems Company	Teague, K.A. Scheets, G.M.	ECEN	10/19/1999
AA-5-59210	EN-00-RS-004	Ship-Wake Scattering Calculations	N	$98,140	9/30/2002	Office of Naval Research	West, J.C.	ECEN	11/18/1999
AA-5-59370	EN-00-RS-024	Advanced Circuit and Semiconductor Technology, Research and Development	N	$95,228	12/5/2001	Space and Naval Warfare Systems Command (SPAWAR)	Hutchens, C.G.	ECEN	1/11/2000
AA-5-59430	EN-00-RS-043	Noise Reduction in Slickline Depth Measurement	N	$33,727	1/15/2001	Haliburton Energy Services	Hagan, M.T.	ECEN	12/6/1999
AA-5-60080	EN-00-RS-033	All-Fiber Faraday Rotator from Nanostructured Thin Films	N	$17,668	2/28/2001	Oklahoma Center for the Advancement of Science and Technology	Krasinski, J.S. Kotov N.	ECEN A&S	4/5/2000
AA-5-60870	EN-99-RS-067	A Partnership Between Williams in Tulsa and Oklahoma State University- Tulsa	R	$16,052	4/30/2001	Oklahoma Center for the Advancement of Science and Technology	Bell, S.S.	ECEN (OSU-Tulsa)	5/8/2000

AA-5-61220	EN-00-RS-019	THz Impulse Scale-Ranging, THz Imaging and Ultra-Sensitive THz Time-Domain Spectroscopy	N	$270,000	6/14/2003	United States Army Research Office	Cheville, R.A. Grischkowsky, D.R.	ECEN	5/18/2000
AA-5-61230	EN-00-RS-086	THz Impulse Scale-Ranging, THz Imaging and Ultra-Sensitive THz Time-Domain Spectroscopy Cost Share	N	$135,000	6/14/2003	Oklahoma State Regents for Higher Education	Cheville, R.A. Grischkowsky, D.R.	ECEN	6/15/2000
AA-5-61390	EN-00-RS-088	Asset Returns Forecasting and Equity Portfolio Management	N	$40,536	5/15/2001	The California Public Employees' Retirement System	Hagan, M.T.	ECEN	5/12/2000
AA-5-61460	EN-00-RS-081	Quartz Resonator Based Pressure Measurement System for Downhole High Temperature Applications	N	$72,000	5/31/2001	Haliburton Energy Services	Hutchens, C.G.	ECEN	6/20/2000
AA-5-61500	EN-00-RS-001	CAREER: Multidimensional THz Imaging and Collaborative Research Oriented Education	N	$200,000	4/30/2004	National Science Foundation	Cheville, R.A.	ECEN	6/5/2000
AH-5-31002	EN-98-RS-702	THz Time-Domain Spectroscopy of Select, Optically-Dense Materials (THz Spectroscopy)	F	($2,603)	6/30/1999	Department of the Air Force	Grischkowsky, D.R.	ECEN	11/4/1999
Third Party In-kind Cost Share	EN-00-RS-011	Improved Performance Tests for Optical Communications	CS	$100,000	7/31/2000	Williams Network	Shepard, S.R. Scheets, G.M. Grischkowsky, D.R.	ECEN	7/29/1999

Third Party In-kind Cost Share	EN-00-RS-011	Improved Performance Tests for Optical Communications	CS	($50,547)	7/31/2000	Williams Network	Shepard, S.R. Scheets, G.M. Grischkowsky, D.R.	ECEN	9/28/1999
Third Party In-kind Cost Share	EN-00-RS-073	All-Fiber Faraday Rotator from Nanostructured Thin Films	CS	$40,000	2/28/2001	Williams Network	Krasinski, J.S. Kotov N.	ECEN A&S	2/15/2000
		TOTAL		**$2,207,943**					

FY2001 Electrical & Computer Engineering External Award Funding Received

July 1, 2000 - June 30, 2001

Account Number	Routing Number	Title	Routing Type	Amount	End Date	Sponsor	Project Leader	Dept.	Routing Date
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$6,000.00	12/31/2000	Cummins Engine Company	Hagan, M.T.	ECEN	11/17/2000
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$10,000.00	FN	AMGEN	Hagan, M.T.	ECEN	5/16/2001
AA-5-37946	EN-96-RS-014	Neural Network Implementation of Non-Linear Controllers	F	$6,000.00	FN	OSU Foundation	Hagan, M.T.	ECEN	11/17/2000
AA-5-37946	EN-96-RS-014	Neural Network Implementation of Non-Linear Controllers	F	$10,000.00	FN	OSU Foundation	Hagan, M.T.	ECEN	5/10/2001
AA-5-54479	EN-00-RS-020	Multi-Purpose Power Sensor (MPPS)	F/T	$10,000.00	1/31/2001	Titan Corporation	Hutchens, C.G.	ECEN	12/12/2000
AA-5-55690	EN-99-RS-009/010/122	Visual and Auditory Data	F	$7,000.00	7/31/2001	Various (Measurement and Control Engineering Center)	Yen, G.G.	ECEN	8/30/2000

AA-5-55690	EN-99-RS-009/010/122	Visual and Auditory Data	F	$21,000.00	FN	Various (Measurement and Control Engineering Center)	Yen, G.G.	ECEN	10/18/2000
AA-5-58200	EN-99-RS-045	Nanoshell-based Infrared and Terahertz Adaptive Materials and Devices	F/T	$121,124.00	2/11/2002	Rice University for US Army Research Office	Cheville, R.A. Grischkowsky, D.R.	ECEN	1/31/2001
AA-5-59210	EN-00-RS-004	Ship-Wake Scattering Calculations	F	$100,118.00	9/30/2002	Office of Naval Research	West, J.C.	ECEN	10/27/2000
AA-5-59370	EN-00-RS-024	Advanced Circuit and Semiconductor Technology, Research, and Development	F/T/A	$30,000.00	9/30/2001	Space and Naval Warfare Systems (SPAWAR)	Hutchens, C.G.	ECEN	3/28/2001
AA-5-62161	EN-00-RS-083	Spatial/Temporal DSP Research and Implementation on an Embedded Multi-Processor System	N	$40,000.00	8/31/2001	Raytheon Company	Teague, K.A. Scheets, G.M.	ECEN	8/28/2000
AA-5-62241	EN-00-RS-079	Sailor's Wireless Communication Badge	N	$30,000.00	11/30/2000	Nomadics, Inc.	Chung, J.M.	ECEN	9/26/2000
AA-5-62571	EN-01-RS-011	Statistical Multiplexing Gains of Variable Rate Voice Coders	N	$52,249.00	8/31/2001	Williams Network	Scheets, G.M.	ECEN	10/2/2000
AA-5-62581	EN-01-RS-018	Backbone Cost/Survivability Analysis	N	$56,789.00	8/31/2001	Williams Network	Scheets, G.M. Chung, J.M.	ECEN	10/2/2000
AA-5-62851	EN-01-RS-027	Investigation of MPLS Network Architecture: Modeling and Performance Enhancement	N	$119,576.00	8/31/2001	Williams Network	Chung, J.M. Scheets, G.M.	ECEN	10/2/2000
AA-5-64031	EN-00-RI-098	Hands-On Undergraduate Laboratory in Photonics Using Case Studies and Other Non-Traditional Methodologies	N	$60,646.00	11/30/2003	National Science Foundation	Cheville, R.A. Bull, K.S.	ECEN COE	12/13/2000

AA-5-64191	EN-01-RS-066	Investigation of Enabling Technologies for Secure Multimedia on Your Desktop	N	$33,660.00	4/30/2001	Maryland Procurement Office	Teague, K.A.	ECEN	2/1/2001
AA-5-65061	EN-00-RS-079	Sailor's Wireless Communication Badge	F/T	$950.00	5/31/2001	Nomadics, Inc.	Chung, J.M.	ECEN	4/9/2001
AA-5-65241	EN-01-RS-029	Innovative Nanotechnology in Wide Gap Photonic & Electronic Materials & Devices	N	$148,975.00	4/30/2004	Office of Naval Research	Krasinski, J.S. Song, J.J. Park, G.H.	ECEN A&S CLPR	5/8/2001
AA-5-65341	EN-01-RS-073	Sailor's Wireless Communication Badge - Phase II	N	$140,250.00	4/30/2003	Nomadics, Inc.	Chung, J.M.	ECEN	6/20/2001
AA-5-65471	EN-01-RS-063	CAREER: Multidimensional THz Imaging and Collaborative Research Oriented Education REU Supplement	N	$12,000.00	4/30/2004	National Science Foundation	Cheville, R.A.	ECEN	5/22/2001

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Account Number	Routing Number	Title	Routing Type	Amount	End Date	Sponsor	Project Leader	Dept.	Routing Date
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	($25,000)	FN	Various Industrial Sponsors	Hagan, M.T.	ECEN	7/1/2001
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$10,000	FN	HBD, Inc.	Hagan, M.T.	ECEN	7/1/2001
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$15,000	FN	AMGEN	Hagan, M.T.	ECEN	7/1/2001
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	($15,000.00)	FN	Various Industrial Sponsors	Hagan, M.T.	ECEN	10/9/2001
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$15,000.00	FN	AMGEN	Hagan, M.T.	ECEN	10/9/2001
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	($5,400.00)	FN	Various Industrial Sponsors	Hagan, M.T.	ECEN	3/5/2002
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$5,400.00	FN	HBD, Inc.	Hagan, M.T.	ECEN	3/5/2002
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	F	$5,000.00	FN	HBD, Inc.	Hagan, M.T.	ECEN	6/10/2002
AA-1-50627	EN-02-RS-107 Internal	Developing a GIS-Based Tool for Automated Feature Information Retrieval from Multisource Geospatial Data: Applications on CRP Mapping at Texas County, OK	N	$25,424.00	6/30/2003	Environmental Institute's Water Research Center	Fan, G.	ECEN	6/3/2002
AA-5-06390	EN-90-RS-027	Engineering Energy Lab II	F	$10,000	FN	OSU Foundation	Ramakumar, R.G.	ECEN	8/24/2001

AA-5-06390	EN-90-RS-027	Engineering Energy Lab II	F	$12,000.00	FN	OSU Foundation	Ramakumar, R.G.	ECEN	2/15/2002
AA-5-06390	EN-90-RS-027	Engineering Energy Lab II	F	$10,000.00	FN	OSU Foundation	Ramakumar, R.G.	ECEN	6/13/2002
AA-5-37946	EN-96-RS-014	Neural Network Implementation of Non-Linear Controllers	F	$25,000	FN	OSU Foundation	Hagan, M.T.	ECEN	7/1/2001
AA-5-37946	EN-96-RS-014	Neural Network Implementation of Non-Linear Controllers	F	$15,000.00	FN	OSU Foundation	Hagan, M.T.	ECEN	10/9/2001
AA-5-37946	EN-96-RS-014	Neural Network Implementation of Non-Linear Controllers	F	$5,400.00	FN	OSU Foundation	Hagan, M.T.	ECEN	3/5/2002
AA-5-49118	EN-95-RS-054	Advanced Circuit and Semiconductors Technology	F	($12,394.51)	5/17/2000	Space and Naval Warfare Systems Command	Hutchens, C.G.	ECEN	4/17/2002
AA-5-54649	EN-99-RS-050	Dynamic Sensor Calibration with Neural Networks	F/T	$5,000	9/30/2001	Halliburton Energy Services	Hagan, M.T.	ECEN	7/9/2001
AA-5-54649	EN-99-RS-050	Dynamic Sensor Calibration with Neural Networks	F/T	$5,000	12/31/2001	Halliburton Energy Services	Hagan, M.T.	ECEN	9/18/2001
AA-5-55690	EN-99-RS-009	Visual and Auditory Data	F/T	$28,000	7/31/2002	Various (Measurement and Control Engineering Center)	Yen, G.G.	ECEN	8/13/2001
AA-5-58200	EN-99-RS-045	Nanoshell-based Infrared and Terahertz Adaptive Materials and Devices	F/T	$25,056.00	7/11/2002	Rice University for United States Army Research Office	Cheville, R.A. Grischkowsky, D.R.	ECEN	4/11/2002
AA-5-59210	EN-00-RS-004	Ship-Wake Scattering Calculations	F/T	$102,193.00	9/30/2002	Office of Naval Research	West, J.C.	ECEN	11/19/2001
AA-5-61440	EN-02-RS-141	High-Functional Epitaxial Semiconductor Photonic Materials and Devices for UV-mid IR Applications	N	$423,427.33	3/31/2003	Office of Naval Research	Krasinski, J.S.	ECEN	4/18/2002
AA-5-61460	EN-00-RS-081	Quartz Resonator Based Pressure Measurement System for Downhole High Temperature Applications	F	$24,000	12/30/2001	Halliburton Energy Services	Hutchens, C.G.	ECEN	8/8/2001

AA-5-64001	EN-02-RS-142	High-Functional Epitaxial Semiconductor Photonic Materials and Devices for UV-mid IR Applications Cost Share	N	$276,107.46	3/31/2003	Oklahoma State Regents for Higher Education	Krasinski, J.S.	ECEN	4/18/2002
AA-5-65241	EN-01-RS-029	Innovative Nanotechnology in Wide Gap Photonic & Electronic Materials & Devices	F	$165,000	4/30/2004	Office of Naval Research	Krasinski, J.S.	ECEN	8/10/2001
AA-5-65241	EN-01-RS-029	Innovative Nanotechnology in Wide Gap Photonic & Electronic Materials & Devices	F	$108,693.60	4/30/2004	Office of Naval Research	Krasinski, J.S.	ECEN	11/2/2001
AA-5-65311	EN-01-RS-075	Advanced Alternator and Starter Technology	N	$16,000	5/31/2002	Oklahoma Center for the Advancement of Science and Technology	Shepard, S.R.	ECEN	7/9/2001
AA-5-66012	EN-01-RS-125	FNBDT: Investigation of Enabling Technologies for Secure Multimedia	N	$60,000	1/31/2003	Maryland Procurement Office	Teague, K.A.	ECEN	7/18/2001
AA-5-66012	EN-01-RS-125	FNBDT: Investigation of Enabling Technologies for Secure Multimedia on Your Desktop	F	$120,000.00	1/31/2003	Maryland Procurement Office	Teague, K.A.	ECEN	2/15/2002
AA-5-66012	EN-01-RS-125	FNBDT: Investigation of Enabling Technologies for Secure Multimedia on Your Desktop	F	$66,751.00	1/31/2003	Maryland Procurement Office	Teague, K.A.	ECEN	4/22/2002
AA-5-66322	EN-01-RS-065	2001 American Control Conference: June 25-27, Washington, D.C.	N	$25,750	11/30/2001	National Science Foundation	Yen, G.G.	ECEN	8/7/2001
AA-5-66352	EN-02-RS-020	2001 American Control Conference: June 25-27, Washington, D.C.	N	$5,000	11/30/2001	American Automatic Control Council	Yen, G.G.	ECEN	8/7/2001
AA-5-66652	EN-98-RS-037	IGERT: Advanced Graduate Training in Photonics Research	N	$220,767.27	9/30/2002	National Science Foundation	Soderstrand, M.A. Kotov, N.A. Wiener, J.L.	ECEN A&S BUS	4/19/2002

AA-5-66662	EN-98-RS-037	IGERT: Advanced Graduate Training in Photonics Research	N	$762,812.89	9/30/2002	National Science Foundation	Soderstrand, M.A. Kotov, N.A. Wiener, J.L.	ECEN A&S BUS	4/19/2002
AA-5-66812	EN-01-RS-096	Hybrid Wireless and Wired Networking Systems	N	$100,000.00	8/31/2002	Oklahoma Center for the Advancement of Science and Technology	Chung, J.M.	ECEN	10/11/2001
AA-5-67192	EN-02-RS-038	Spatial/Temporal DSP Research and Implementation on an Embedded Multi-Processor System	N	$40,000	8/31/2002	Raytheon Company	Teague, K.A. Scheets, G.M.	ECEN	9/13/2001
AA-5-67262	EN-02-RS-006	Assignment Agreement with the U.S. Navy	N	$355,732.00	9/30/2003	SPAWAR Systems Center	Hutchens, C.G.	ECEN	10/19/2001
AA-5-68012	EN-00-RS-081	Quartz Resonator Based Pressure Measurement System for Downhole High Temperature Applications	F	$22,543.00	12/31/2001	Halliburton Energy Services	Hutchens, C.G.	ECEN	1/9/2002
AA-5-69052	EN-02-RS-081	Delta Sigma Analog to Digital Converter Design	N	$22,342.00	10/31/2002	SPAWAR Systems Center	Hutchens, C.G.	ECEN	1/9/2002
AA-5-69112	EN-02-RS-024	Wireless Audio/Video Headsets	N	$17,500.00	5/31/2002	Nomadics, Inc.	Chung, J.M.	ECEN	3/7/2002
AA-5-69152	EN-01-RS-068	Terahertz Spectroscopy of Complex Matter	N	$149,146.00	12/31/2002	Department of Energy	Cheville, R.A. Grischkowsky, D.R.	ECEN	2/21/2002
AA-5-69362	EN-02-RS-039	Field Penetration Studies - Statistics and Bounding	N	$21,700.00	12/31/2003	Old Dominion University Research Foundation for NASA	Bunting, C.F.	ECEN	3/1/2002
AA-5-69362	EN-02-RS-039	Field Penetration Studies - Statistics and Bounding	F	$10,000.00	12/31/2003	Old Dominion University Research Foundation for NASA	Bunting, C.F.	ECEN	6/3/2002

AA-5-69372	EN-02-RS-095	Planning and Operation of Combined Gas and Electric Systems	N	$80,000.00	12/31/2002	OGE Energy Corporation	Gedra, T.W.	ECEN	2/13/2002
AA-5-69412	EN-02-RS-109	ABB Inc. Totalflow Intern Program	N	$37,275.00	4/30/2003	ABB Inc. Totalflow	Latino, C.D.	ECEN	2/26/2002
AA-5-72262	EN-02-RS-124	24/7 Remote Monitoring of Work Zones and Intelligent Decision Support System for the Safety of Motorists and Highway Construction Workers	N	$16,387.00	9/30/2002	Oklahoma Transportation Center for Oklahoma Department of Transportation	Fierro, R.	ECEN	6/20/2002
AA-5-72562	EN-02-RS-045	ABB Inc. Totalflow Intern Program	N	$48,024.00	4/30/2003	Oklahoma Center for the Advancement of Science and Technology	Latino, C.D.	ECEN	6/4/2002
AA-5-72712	EN-02-RS-033	Unique Applications of THz Time-Domain Spectroscopy and Waveguide THz-TDS	N	$175,000.00	5/31/2003	National Science Foundation	Grischkowsky, D.R.	ECEN	6/19/2002
AA-5-72792	EN-02-RS-120	Telecommunications Virtual Laboratory Development	N	$128,812.73	6/30/2003	United States Department of Education	Chung, J.M. Scheets, G.M. Sharda, R. Weiser, M. Romano, N.	ECEN ECEN BUS BUS BUS	6/5/2002
AA-5-72922	EN-02-RS-151	Research Experiences for Undergraduates (REU)	N	$5,000.00	12/31/2002	Oklahoma EPSCoR for Oklahoma State Regents for Higher Education	Cheville, R.A.	ECEN	6/1/2002
AA-5-73242	EN-02-RS-136	Picosecond and Femtosecond Dynamics of Functionally Active Nano-particles	N	$17,500.00	1/31/2003	Oklahoma EPSCoR for Oklahoma State Regents for Higher Education	Zhang, W.	ECEN	6/21/2002

AH-5-52603	EN-02-RS-709	Adaptable Programmer for Circuit Card Assemblies	N	$34,667.39	8/31/2002	Automated Science Group, Inc.	Baldwin, S.D.	ECEN	6/18/2002
AH-5-82219	EN-02-RS-716	Task 2.1 Demand Forecasting - ECEN	N	$77,806.80	3/31/2003	Sverdrup Technologies	Morris, S.A.	ECEN	5/1/2002
AH-5-82409	EN-02-RS-717	Task 4.0 Problem Parts - ECEN	N	$75,181.64	12/31/2002	Sverdrup Technologies	Latino, C.D.	ECEN	5/1/2002
Third Party In-kind Cost Share	EN-02-RS-080	Advanced Alternator and Starter Technology	CS	$3,325.00	5/31/2002	Unit Parts Company	Bertenshaw, T.G.	ECEN	11/29/2001
Third Party In-kind Cost Share	EN-02-RS-034	Hybrid Wireless and Wired Networking Systems	CS	$38,804.64	8/31/2004	Sciperio, Inc.	Chung, J.M.	ECEN	12/13/2001
Third Party In-kind Cost Share	EN-02-RS-034	Hybrid Wireless and Wired Networking Systems	CS	$42,696.38	8/31/2004	Sciperio, Inc.	Chung, J.M.	ECEN	5/21/2002

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Account Number	Routing Number	Title	Amount	End Date	Sponsor	Project Leader	Dept.	Routing Type	Routing Date
26-6440	EN-98-RS-904	Non-linear Control with Neural Networks and Fuzzy Logic	($15,000.00)	FN	Various Industrial Sponsors	Hagan, M.T.	ECEN	F	9/12/2002
AA-5-06390	EN-90-RS-027	Engineering Energy Lab II	$12,000.00	FN	OSU Foundation	Ramakumar, R.G.	ECEN	F	11/19/2002
AA-5-06390	EN-90-RS-027	Engineering Energy Lab II	$8,000.00	FN	OSU Foundation	Ramakumar, R.G.	ECEN	F	5/21/2003
AA-5-37946	EN-96-RS-014	Neural Network Implementation of Non-Linear Controllers	$15,000.00	FN	OSU Foundation	Hagan, M.T.	ECEN	F	9/12/2002
AA-5-58200	EN-99-RS-045	Nanoshell-based Infrared and Terahertz Adaptive Materials and Devices	$40,032.00	2/11/2003	Rice University for United States Army Research Office	Cheville, R.A. Grischkowsky, D.R.	ECEN	F/T	9/19/2002
AA-5-66012	EN-01-RS-125	FNBDT: Investigation of Enabling Technologies for Secure Multimedia on Your Desktop	$17,991.00	1/31/2003	Maryland Procurement Office	Teague, K.A.	ECEN	F	12/10/2002
AA-5-66652 AA-5-66662	EN-98-RS-037	IGERT: Advanced Graduate Training in Photonics Research	($14,293.92)	9/30/2004	National Science Foundation	Soderstrand, M.A. Mintmire, J.W. Kotov, N.A.	ECEN A&S A&S	F/T/A	11/7/2002
AA-5-68012	EN-00-RS-081	Quartz Resonator Based Pressure Measurement System for Downhole High Temperature Applications	$184,522.00	2/28/2003	Halliburton Energy Services	Hutchens, C.G.	ECEN	F/T	7/31/2002
AA-5-69052	EN-02-RS-081	Delta Sigma Analog to Digital Converter Design	$5,000.00	12/31/2002	SPAWAR Systems Center	Hutchens, C.G.	ECEN	F/T	12/5/2002

AA-5-69152	EN-01-RS-068	Terahertz Spectroscopy of Complex Matter	$149,314.00	12/31/2003	Department of Energy	Cheville, R.A. Grischkowsky, D.R.	ECEN	F/T	1/23/2003
AA-5-69412	EN-02-RS-109	ABB Inc. Totalflow Intern Program	($37,275.00)	8/31/2002	ABB Inc. Totalflow	Latino, C.D.	ECEN	F/T	9/12/2002
AA-5-72562	EN-02-RS-045	ABB Inc. Totalflow Intern Program	($48,024.00)	8/31/2002	Oklahoma Center for the Advancement of Science and Technology	Latino, C.D.	ECEN	F/T	9/12/2002
AA-5-72712	EN-02-RS-033	Unique Applications of THZ Time-Domain Spectroscopy and Waveguide THz-TDS	$175,000.00	5/31/2004	National Science Foundation	Grischkowsky, D.R.	ECEN	F/T	4/1/2003
AA-5-73242	EN-02-RS-136	Picosecond and Femtosecond Dynamics of Functionally Active Nano-particles	$8,500.00	5/31/2003	Oklahoma EPSCoR for Oklahoma State Regents for Higher Education	Zhang, W.	ECEN	F/T	3/5/2003
AA-5-73743	EN-02-RS-143	2002 IEEE International Midwest Symposium on Circuits and Systems Travel Grant; August 4-7, 2002 at Oklahoma State University - Tulsa	$4,200.00	7/31/2003	National Science Foundation	Yarlagadda, R.K. Soderstrand, M.A.	ECEN	N	8/20/2002
AA-5-74243	EN-01-RS-096	Hybrid Wireless and Wired Networking Systems	$100,000.00	8/31/2003	Oklahoma Center for the Advancement of Science and Technology	Chung, J.M.	ECEN	R	8/29/2002
AA-5-74933	EN-03-RS-031	Direct Sequence Spread Spectrum Wireless Modem Module	$65,776.96	6/30/2003	New Product Development Center for the Oklahoma Department of Commerce	Chung, J.M.	ECEN	N	9/19/2002

AA-5-74943	EN-03-RS-031	Direct Sequence Spread Spectrum Wireless Modem Module	$21,925.65	6/30/2003	New Product Development Center for the Oklahoma Water Resources Board	Chung, J.M.	ECEN	N	9/19/2002
AA-5-75103	EN-03-RS-019	THz Interconnect	$50,000.00	12/31/2002	Rennselaer Polytechnic Institute for Semiconductor Research Corporation	Grischkowsky, D.R.	ECEN	N	10/8/2002
AA-5-75103	EN-03-RS-019	THz Interconnect	$44,000.00	12/31/2003	Rensselaer Polytechnic Institute for Semiconductor Research Corporation	Grischkowsky, D.R.	ECEN	F/T	2/6/2003
AA-5-75663	EN-02-RS-159	Relevancy Enhancement Achieved by Laboratories and Lecture Integrated for Engineering Education (REAL LIFE) Adoption of a Relevant Undergraduate Curriculum	$64,657.00	9/30/2003	National Science Foundation	Cheville, R.A. Bunting, C.F. Latino, C.D. Teague, K.A.	ECEN	N	12/3/2002
AA-5-75713	EN-03-RS-038	Numerical Studies of Low Grazing Angle Microwave Scattering from Breaking Water Waves	$108,018.00	10/31/2004	Office of Naval Research	West, J.C.	ECEN	N	12/10/2002
AA-5-76163	EN-03-RS-087	Software Enabled Control for UAV Formation Flight	$20,506.00	8/31/2003	University of Oklahoma for Oklahoma State Regents for Higher Education	Fierro, R.	ECEN	N	4/15/2003

AA-5-76173	EN-03-RS-077	Toward an Integrated Web-GIS Decision Support System for Evaluating USDA's Conservation Reserve Program (CRP)	$7,164.00	8/31/2003	University of Oklahoma for Oklahoma State Regents for Higher Education	Fan, G.	ECEN	N	4/15/2003
AA-5-76313	EN-03-RS-060	Proposal to Investigate the RF and Analog Scaling Limits of Nanometer CMOS	$84,000.00	2/13/2004	Space and Naval Warfare Systems Center San Diego (SSCSD)	Hutchens, C.G.	ECEN	N	2/11/2003
AA-5-76983	EN-02-RS-159	Relevancy Enhancement Achieved by Laboratories and Lecture Integrated for Engineering Education (REAL LIFE) Adoption of a Relevant Undergraduate Curriculum - REU Supplement	$36,000.00	9/30/2004	National Science Foundation	Cheville, R.A.	ECEN	F	4/17/2003
AA-5-77103	EN-01-RS-125	FNBDT: Investigation of Enabling Technologies for Secure Multimedia on Your Desktop	$100,000.00	5/30/2004	Maryland Procurement Office	Teague, K.A.	ECEN	F/T	5/15/2003
AA-5-77333	EN-03-RS-035	Carrier Dynamics of Semiconductor Nanowires by THz Time-Domain Spectroscopy	$37,950.00	6/30/2004	Oklahoma EPSCoR for National Science Foundation	Zhang, W.	ECEN	N	6/18/2003
AA-5-77373	EN-03-EX-159	American Studies Short Program between Kangwon National University of The Republic of Korea and Oklahoma State University	$6,768.00	11/30/2003	Kangwon National University	Chung, J.M.	ECEN	N	6/13/2003

AA-7-72313	Internal Cost Share	FNBDT: Investigation of Enabling Technologies for Secure Multimedia on Your Desktop Cost Share	$10,000.00	5/30/2004	CEAT FY03 Homeland Security Funds	Teague, K.A.	ECEN	F	6/10/2003
AH-5-82219	EN-02-RS-716	Task 2.1 Demand Forecasting - ECEN	$22,150.96	3/31/2003	Sverdrup Technologies	Morris, S.A.	ECEN	F	10/22/2002
AH-5-83219	EN-03-RS-731	Demand Forecasting - Task 2.1	$161,139.07	2/28/2004	Sverdrup Technologies	Morris, S.A.	ECEN	N	4/2/2003
AH-5-83219	EN-03-RS-731	Demand Forecasting - Task 2.1	($17,891.22)	2/28/2004	Sverdrup Technologies	Morris, S.	ECEN	F	6/12/2003
AH-5-83419	EN-03-RS-730	Aging Weapon System Support - Task 4.1	$69,838.57	2/28/2004	Sverdrup Technologies	Latino, C.D.	ECEN	N	4/2/2003
N/A - Third Party CS	EN-02-RS-034	Hybrid Wireless and Wired Networking Systems	$17,084.81	8/31/2004	Sciperio, Inc.	Chung, J.M.	ECEN	CS	7/22/2002
N/A - Third Party CS	EN-02-RS-034	Hybrid Wireless and Wired Networking Systems	$16,197.87	8/31/2004	Sciperio, Inc.	Chung, J.M.	ECEN	CS	9/20/2002
N/A - Third Party CS	EN-02-RS-034	Hybrid Wireless and Wired Networking Systems	$52,733.67	8/31/2004	Sciperio, Inc.	Chung, J.M.	ECEN	CS	4/17/2003
N/A - Third Party CS	EN-02-RS-034	Hybrid Wireless and Wired Networking Systems	$19,501.34	8/31/2004	Sciperio, Inc.	Chung, J.M.	ECEN	CS	5/15/2003
N/A - Third Party CS	EN-02-RS-080	Advanced Alternator and Starter Technology	$11,550.00	5/31/2002	Unit Parts Company	Bertenshaw, T.G.	ECEN	CS	7/22/2002
		TOTAL	**$1,614,036.76**						

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Account Number	Routing Number	Sponsor	Account Title	Account Principal Investigator(s)	Account Dept	Routing Amount	Account End Date	Routing Type	Routing Date
AA-5-06390	EN-90-RS-027	OSU Foundation	Engineering Energy Lab II	Ramakumar, R.G.	ECEN	$15,000.00	FN	F	8/18/2003
AA-5-06390	EN-90-RS-027	OSU Foundation	Engineering Energy Lab II	Ramakumar, R.G.	ECEN	$15,000.00	FN	F	3/5/2004
AA-5-58200	EN-99-RS-045	Rice University for United States Army Research Office	Nanoshell-based Infrared and Terahertz Adaptive Materials and Devices	Cheville, R.A., Grischkowsky, D.R.	ECEN	$64,251.00	2/11/2004	F/T	7/15/2003
AA-5-66662	EN-98-RS-037	National Science Foundation	IGERT: Advanced Graduate Training in Photonics Research	Soderstrand, M.A.	ECEN	$122,500.00	9/30/2004	F	8/20/2003
AA-5-69152	EN-01-RS-068	Department of Energy	Terahertz Spectroscopy of Complex Matter	Cheville, R.A., Grischkowsky, D.R.	ECEN	$149,577.00	12/31/2004	F/T	2/5/2004
AA-5-69362	EN-02-RS-039	Old Dominion University Research Foundation for NASA	Field Penetration Studies - Statistics and Bounding	Bunting, C.F.	ECEN	$10,000.00	12/31/2003	F	8/4/2003
AA-5-69362	EN-02-RS-039	Old Dominion University Research Foundation for NASA	Field Penetration Studies - Statistics and Bounding	Bunting, C.F.	ECEN	$18,300.00	12/31/2004	F	2/12/2004
AA-5-72712	EN-02-RS-033	National Science Foundation	Unique Applications of THz Time-Domain Spectroscopy and Waveguide THz-TDS	Grischkowsky, D.R.	ECEN	$175,000.00	5/31/2005	F/T	3/19/2004
AA-5-75103	EN-03-RS-019	Rensselaer Polytechnic Institute for Semiconductor Research Corporation	THz Interconnect	Grischkowsky, D.R.	ECEN	$50,000.00	12/31/2004	F/T	2/12/2004
AA-5-75713	EN-03-RS-038	Office of Naval Research	Numerical Studies of Low Grazing Angle Microwave Scattering from Breaking Water Waves	West, J.C.	ECEN	$108,803.00	10/31/2004	F	12/1/2003
AA-5-76313	EN-03-RS-060	Space and Naval Warfare Systems Center San Diego (SSCSD)	Proposal to Investigate the RF and Analog Scaling Limits of Nanometer CMOS	Hutchens, C.G.	ECEN	$37,695.00	2/13/2004	F	9/3/2003

AA-5-76983	EN-02-RS-159	National Science Foundation	Relevancy Enhancement Achieved by Laboratories and Lecture Integrated for Engineering Education (REAL LIFE) Adoption of a Relevant Undergraduate Curriculum - REU Supplement	Cheville, R.A.	ECEN	$36,000.00	9/30/2004	F	5/7/2004
AA-5-77103	EN-01-RS-125	Maryland Procurement Office	FNBDT: Investigation of Enabling Technologies for Secure Multimedia on Your Desktop	Teague, K.A.	ECEN	$99,998.00	5/30/2004	F	3/2/2004
AA-5-77333	EN-03-RS-035	Oklahoma EPSCoR for National Science Foundation	Carrier Dynamics of Semiconductor Nanowires by THz Time-Domain Spectroscopy	Zhang, W.	ECEN	($725.00)	6/30/2004	F	7/25/2003
AA-5-77563	EN-03-RS-096	Oklahoma Center for the Advancement of Science and Technology	Advanced Retinal Imaging for Non-Invasive Disease Study	Fan, G.	ECEN	$29,899.00	6/30/2004	N	7/21/2003
AA-5-77573	EN-03-RS-096	Oklahoma Center for the Advancement of Science and Technology	Advanced Retinal Imaging for Non-Invasive Disease Study	Yen, G.G.	ECEN	$15,101.00	6/30/2004	N	7/21/2003
AA-5-77673	EN-03-RS-108	Shadowband Systems, Inc. for US Air Force	IA Technologies for Mobile Users	Chung, J.M.	ECEN	$27,527.00	2/19/2004	N	9/3/2003
AA-5-77733	EN-03-RS-022	University of Oklahoma for United States Army	Adaptation and Learning at All Levels in Intelligent Robot Teams for Reconnaissance, Surveillance, and Battlefield Assessment	Fierro, R.	ECEN	$179,996.00	6/30/2006	N	7/17/2003
AA-5-78294	EN-03-RS-014	National Science Foundation	Vitalizing Electromagnetic Concepts to Enhance Relevancy: VECTOR	Bunting, C.F., West, J.C., Cheville, R.A.	ECEN	$84,798.00	7/31/2006	N	9/3/2003
AA-5-78314	EN-03-RS-051	National Science Foundation	Hierarchical Hybrid Control of Multi-Vehicle Systems	Fierro, R.	ECEN	$80,000.00	8/31/2005	N	8/18/2003
AA-5-78944	EN-01-RS-096	Oklahoma Center for the Advancement of Science and Technology	Hybrid Wireless and Wired Networking Systems	Chung, J.M.	ECEN	$100,000.00	8/31/2004	F	9/3/2003
AA-5-78994	EN-04-RS-036	Nomadics, Inc. for US Army Space and Missile Defense Command	USASMDC Terahertz Time Domain Spectroscopy: A Novel Approach for Finding Cracks in Composite Materials	Cheville, R.A.	ECEN	$21,000.00	1/20/2004	N	9/11/2003

AA-5-80244	EN-04-RS-018	Halliburton Energy Services	A 8Kx8 MRAM and LTC 1625 Feasibility Study for High Temperature SOI/SOS Implementation	Hutchens, C.G.	ECEN	$297,778.00	3/31/2005	N	11/14/2003
AA-5-80614	EN-04-RS-016	Halliburton Energy Services	A 14-bit Ksps Analog-To-Digital Convertor and Digital Cell Library for High Temperature Applications	Hutchens, C.G.	ECEN	$321,667.00	1/31/2005	N	11/14/2003
AA-5-80964	EN-04-RS-028	Halliburton Energy Services	Feasibility Study of the RFID MMM Systems	Chung, J.M. Bunting, C.F. Hutchens, C.G.	ECEN	$283,265.00	12/7/2004	N	1/21/2004
AA-5-80994	EN-04-RS-028	Halliburton Energy Services	Feasibility Study of the RFID MMM Systems	Chung, J.M. Bunting, C.F. Hutchens, C.G.	ECEN	$563.00	12/7/2004	N	1/21/2004
AA-5-81574	EN-03-RS-186	Shadowband Systems, Inc. for National Science Foundation	Network Anomaly Detection Using a Self-Similar Traffic Model	Chung, J.M.	ECEN	$22,658.00	6/30/2004	N	2/20/2004
AA-5-81594	EN-04-RS-132	LaLucha, LLC	Advanced Broadband Digital Cable-TV Set-Top System and Networking Rsearch	Chung, J.M.	ECEN	$15,000.00	5/31/2005	F/T	6/21/2004
AA-5-81594	EN-04-RS-132	LaLucha, LLC	Advanced Broadband Digital Cable-TV Set-Top System and Networking Rsearch	Chung, J.M.	ECEN	$15,000.00	1/31/2005	N	4/7/2004
AA-5-81714	EN-04-RS-107	Oklahoma EPSCoR for Oklahoma State Regents for Higher Education	Charge Transport Dynamics of Dye-Sensitized TiO2 Nanorods	Zhang, W.	ECEN	$12,802.00	5/31/2004	N	3/4/2004
AA-5-81714	EN-04-RS-107	Oklahoma EPSCoR for Oklahoma State Regents for Higher Education	Charge Transport Dynamics of Dye-Sensitized TiO2 Nanorods	Zhang, W.	ECEN	$28,942.00	5/31/2005	F/T	5/25/2004
AA-5-81934	EN-04-RS-144	OSU Foundation for the Center of Excellence in Information Technology and Telecommunications, OSU Tulsa	COEITT Domain Leader	Chung, J.M.	ECEN	$15,000.00	3/9/2005	N	4/13/2004
AA-5-82044	EN-04-RS-011	National Science Foundation	CAREER: Coordination of Dynamic Networks - A Hybrid System Approach	Fierro, R.	ECEN	$400,000.00	3/31/2009	N	4/8/2004
AA-5-82464	EN-04-RS-178	Oklahoma EPSCoR for Oklahoma State Regents for Higher Education	Oklahoma EPSCoR Research Day 2004 Internship	Teague, K.A.	ECEN	$6,658.00	8/31/2004	N	5/10/2004

AA-5-82474	EN-04-RS-082	Space and Naval Warfare Systems Center San Diego (SSCSD)	Investigate the RF and Analog Scaling Limits of DSM CMOS and Support of FLEX base RF-Analog	Hutchens, C.G.	ECEN	$144,063.00	5/16/2005	N	5/10/2004
AA-5-82554	EN-04-RS-003	National Science Foundation	CAREER: Advanced Statistical Modeling Approaches for Structured Video Representation and Research Oriented Multidisciplinary Education	Fan, G.	ECEN	$439,895.00	5/31/2009	N	5/27/2004
AA-5-82584	EN-04-EX-146	Kangwon National University	Kangwon National University American Studies Short Program Summer 2004	Chung, J.M.	ECEN	$7,168.00	11/1/2004	N	5/26/2004
AH-5-52820	EN-04-RS-701	Tec-Masters, Inc.	Beyond Falcon Star (F-16 Life Extension)	Yen, G.G.	ECEN	$62,728.00	9/30/2004	N	12/15/2003
AH-5-53103	EN-03-RS-738	Automated Sciences Group, Inc.	Part Failure Knowledge Capture and Reuse in Maintenance Forecasting	Yen, G.G.	ECEN	($1.87)	7/31/2004	N	6/22/2004
AH-5-53103	EN-03-RS-738	Automated Sciences Group, Inc.	Part Failure Knowledge Capture and Reuse in Maintenance Forecasting	Yen, G.G.	ECEN	$42,793.00	9/10/2003	N	7/16/2003
N/A - Inkind Donation - Third Party Cost Share	EN-02-RS-034	Sciperio, Inc.	Hybrid Wireless and Wired Networking Systems	Chung, J.M.	ECEN	$38,026.52	8/31/2004	IK-F	9/17/2003
N/A - Inkind Donation - Third Party Cost Share	EN-02-RS-034	Sciperio, Inc.	Hybrid Wireless and Wired Networking Systems	Chung, J.M.	ECEN	$44,052.99	8/31/2004	IK-F	6/24/2004
N/A - Inkind Donation - Third Party Cost Share	EN-02-RS-034	Sciperio, Inc.	Hybrid Wireless and Wired Networking Systems	Chung, J.M.	ECEN	$76,597.43	8/31/2004	IK-F	4/20/2004

Appendix B
Record of Significant Scholarly, Artistic and/or Creative Work

Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005
Shielding Effectiveness of Metallic Enclosures At Oblique And Arbitrary Polarizations	Bunting	2005
Statistical Investigation of Frequency-Stirred Reverberation Chambers	Bunting	2004
Field Penetration in a Rectangular Box using Numerical Techniques: An Effort to Obtain Statistical Shielding Effectiveness	Bunting	2004
Shielding Effectiveness of a Two-Dimensional Reverberation Chamber using Finite Element Techniques	Bunting	2003
Statistical Characterization and the Simulation of a Reverberation Chamber using Finite Element Techniques	Bunting	2003
Applications of Optically Generated THz Pulses to Time Domain Ranging and Scattering	Cheville	2002
Far-infrared and self-broadened rotational linewidths of high-temperature water vapor	Cheville	1999
Direct Observation of the Gouy Phase Shift in THz Impulse Ranging	Cheville	2000
Experimental Study of the Surface Waves on a Dielectric Cylinder via THz Impulse Radar Ranging	Cheville	2000
Properties of surface waves determined via bistatic terahertz impulse ranging	Cheville	
Characterization of thin polymer films using terahertz time-domain interferometry	Cheville	2001
Optical Tunneling of Single Cycle, THz Bandwidth Pulses	Cheville	2001
THz Time-Domain Spectroscopy on Ammonia	Cheville	2001
Incidence Angle Selection and Spatial Reshaping of THz Pulses in Optical Tunneling	Cheville	2001
Time Resolved synthetic aperture terahertz impulse imaging	Cheville	2001
The Zoom Lens: A Case Study in Geometrical Optics	Cheville	2002
The Freshman Research Scholars Program, Springboard to Undergraduate Research	Cheville	2000

New Directions in THz Ranging, invited talk	Cheville	2000
Variable angle THz impulse ranging on cylinders	Cheville	2000
Variable Angle Impulse Ranging and Image Reconstruction of Dielectric Cylinders	Cheville	2000
Reflective geometry THz imaging	Cheville	2001
Terahertz pulse propagation in optical tunneling: causal vs. superluminal	Cheville	2001
THz Spectroscopy on Ammonia	Cheville	2001
THz interferometer for characterization of thin samples	Cheville	2001
Part per million species detection with THz radiation	Cheville	2001
K vector filtering and spatial pulse reshaping in optical tunneling	Cheville	2001
Confinement of ultrawide bandwidth THz pulses, microresonators, and waveguides	Cheville	2002
THz beam propagation measured through 3D amplitude profile determination	Cheville	2002
Material characterization using THz time domain spectroscopy	Cheville	2002
Long path length beam propagation with non-ideal beams	Cheville	2002
Prime Valued Space Time Convolutional *Zw* Code Achieving Full 2-Level Diversity	Chung	2005
Space Time Codes for Quaternary CPFSK Systems with Large Number of Receiver Antennas	Chung	2005
A Wireless Instructor System for Computer-Supported Collaborative Learning Requiring Immersive Presence (CSCLIP)	Chung	2005
Analysis of Macroscopic Diversity Combining of MIMO Signals in Mobile Communications	Chung	2005
Statistical Admission Control for Real-Time Services under Earliest Deadline First (EDF) Scheduling	Chung	2005
Interarrival Packet Jitter Analysis of Constant Bit Rate Traffic in Wireless Differentiated Services Networks	Chung	2004
Space-Time Convolutional Coding Based on Linear *Zw* Codes	Chung	2004
Asymptotic Loss of Real-Time Traffic in Wireless Mobile Networks with Selective-Repeat ARQ	Chung	2004
Security Solutionists	Chung	2004
Space Time Trellis Codes for 2P4PSK OPSM Systems with Large Number of Receiver Antennas	Chung	2004

Designing Safer Stores	Chung	2004
Foundation for the Study of Computer-Supported Collaborative Learning Requiring Immersive Presence (CSCLIP)	Chung	2004
Analysis of Serially and Hybrid Concatenated Space-Time Codes Applying Iterative Decoding	Chung	2004
Iterative Decoding of Serially Concatenated Space-Time Codes in WCDMA Systems with Short Frames	Chung	2004
16 State Space Time Code for 16PSK Modulation	Chung	2004
Extensions to MPLS Networking for Enhanced Multiplatform Multicasting Services	Chung	2004
Hybrid Concatenated Space-Time Coding Systems	Chung	2003
Analysis of Nonpreemptive Priority Queueing of DiffServ Networks with Bulk Arrivals	Chung	2003
A Statistical Framework for EDF Scheduling	Chung	2003
Queue Length Analysis of Non-Preemptive DiffServ Networks	Chung	2003
Jitter Analysis of Homogeneous Traffic in Differentiated Services Networks	Chung	2003
Analysis of Wireless Multiprotocol Label Switching (WMPLS) Applications and Performance Features	Chung	2002
Theoretical Analysis of the Error Correction Performance of Majority-Logic-Like Vector Symbol Codes	Chung	2001
Efficient Energy Utilization with Time Constraint in Mobile Time Varying Channels	Chung	2000
Enhanced Broadband Wireless Networking Through Macroscopic Diversity Combining Applications of MIMO Technology	Chung	2004
Enhanced OFDM Time and Frequency Synchronization Through Optimal Code Correlation	Chung	2002
Performance Analysis of WMPLS Signaling and Control in Ad Hoc Networks	Chung	2002
Virtual Laboratory Development for Persons with Vision Disabilities	Chung	2002
Interarrival Jitter Analysis of Packet Switched Networks Deploying Differentiated Services	Chung	2002
MPLS Multicasting Through Enhanced LDP and RSVP-TE Control	Chung	2002
Multiple LSP Routing Network Security for MPLS Networking	Chung	2002
Wireless Multiprotocol Label Switching	Chung	2001

Analysis of MPLS Traffic Engineering	Chung	2000
Jitter Analysis of Homogeneous Traffic in Wireless Differentiated Services Networks	Chung	2004
Admission Control for Probabilistic Services with Earliest Deadline First Scheduling	Chung	2004
Analysis of Packet Loss for Real-Time Traffic in Wireless Mobile Networks with ARQ Feedback	Chung	2004
Enhanced Robust Wireless Network QoS Control Applying Adaptive Modulation and Macroscopic Diversity Combining Techniques	Chung	2004
An Analytical Framework for EDF Schedulers based on Dominant Time Scale	Chung	2004
Performance Analysis of Macroscopic Diversity Combining of MIMO Signals in Mobile Communications	Chung	2003
Performance Analysis of Wireless Multiprotocol Label Switching (WMPLS) Networks	Chung	2003
Priority Queueing Analysis of Self-Similar Traffic in High-Speed Networks	Chung	2003
Iterative Decoding of Serially Concatenated Space-Time Codes in WCDMA Systems,	Chung	2002
Wireless Internetworking Protocol (WIP)	Chung	2002
Capacity Analysis of Macroscopic Diversity Reception Combining Spread Spectrum Channels in Mobile Communication Environments	Chung	2002
Bluetooth Handover Control for Roaming System Applications	Chung	2002
Impact of Self-Similarity on Performance Evaluation in Differential Service Networks	Chung	2002
Dual Stage Hybrid Restoration Protocol for Optical Networks	Chung	2002
Analysis of Nonpreemptive Priority Queueing of MPLS Networks with Bulk Arrival	Chung	2002
A Novel Analysis of Queue Length in Differentiated Services Networks, with Self-Similar Arrival Processes	Chung	2002
Interoperability Enhancement Recommendations for MPLS and ATM PNNI Networks,	Chung	2002
Analysis of GMPLS Architectures, Topologies, and Algorithms	Chung	2002
Traffic Engineering Based Optimal LSP Computation for MPLS Networks	Chung	2002
Handover Control and Analysis of WMPLS Networks	Chung	2002

Analysis of MPLS & MPLambdaS Next Generation Networking Technologies	Chung	2001
OFDM Frame Synchronization in Slotted ALOHA Mobile Communication Systems	Chung	2001
VoIP over MPLS Networking Requirements	Chung	2001
Mesh Optical QoS and Multi-Layer Restoration	Chung	2001
The Analytical Decoding Performance of Majority-Logic-Like Vector Symbol Codes	Chung	2000
Macrodiversity Combining of Concatenated Majority-Logic-Like Vector Symbol Codes in Mobile Communication Channels	Chung	2000
Invited Paper -Analysis of MPLS Traffic Engineering	Chung	2000
The Analytical Decoding Performance of Majority-Logic-Like Vector Symbol Codes	Chung	2000
Macrodiversity Combining of Concatenated Majority-Logic-Like Vector Symbol Codes in Mobile Communication Channels	Chung	2000
Wireless Multiprotocol Label Switching (WMPLS)	Chung	2002
CR-LDP Extensions for MPLS Multicasting Services	Chung	2002
RSVP Extensions for MPLS Multicasting Services	Chung	2002
Statistical Image Modeling and Processing Using Wavelet-Domain Hidden Markov Models	Fan	2003
A ν-insensitive SVM Approach for Compliance Monitoring of the Conservation Reserve Program	Fan	2005
Automated CRP Mapping using Non-parametric Machine Learning Approaches	Fan	2005
Combined Key-frame Extraction and Object-based Video Segmentation	Fan	2005
Wavelet-based Texture Analysis and Synthesis Using Hidden Markov Models	Fan	2003
A Joint Multi-context and Multiscale Approach to Bayesian Image Segmentation	Fan	2001
Image Denoising Using Local Contextual Hidden Markov Model in the Wavelet Domain	Fan	2001
Improved Hidden Markov Models in the Wavelet-Domain	Fan	2001

Post-processing of Low Bit-rate Wavelet-based Image Coding Using Multiscale Edge Characterization	Fan	2001
Model-Based Edge Reconstruction for Low Bit-rate Wavelet Compressed Images	Fan	2000
Joint Key-frame Extraction and Object-based Video Segmentation	Fan	2005
Pseudo Cepstrum for Assessing Stereo Quality of Retinal Images	Fan	2003
Application of Support Vector Machines for Automatic Compliance Monitoring of the Conservation Reserve Program (CRP) Tracts	Fan	2004
A New Simplified Quantization Rate-Distortion Model for Fast Document Image Segmentation	Fan	2002
A Study of Supervised, Semi-Supervised and Unsupervised Multiscale Bayesian Image Segmentation	Fan	2002
On Context-Based Bayesian Image Segmentation: Joint Multi-context and Multiscale Approach and Wavelet-Domain Hidden Markov Models	Fan	2001
Multiscale Texture Segmentation Using Hybrid Contextual Labeling Tree	Fan	2000
Wavelet-Based Statistical Image Processing Using Hidden Markov Tree Model	Fan	2000
Texture Analysis and Synthesis Using Wavelet-Domain Hidden Markov Models	Fan	2001
Maximum Likelihood Texture Analysis and Classification Using Wavelet-Domain Hidden Markov Models	Fan	2000
Multi-Robot Systems: From Swarms to Intelligent Automata	Fierro	2005
Cooperative Hybrid Control of Robotic Sensors for Perimeter Detection and Tracking	Fierro	2005
Formation Reconfiguration Planning: An MPC Path Space Approach	Fierro	2005
A low-cost modular multi-vehicle experimental testbed for cooperative control	Fierro	2004
Coordination of Dynamic Networks, Workshop on Applications of Advanced Control Theory to Robotics and Automation	Fierro	2004
Coordination of Dynamic Networks, Department of Control and Computing in Automation	Fierro	2004
Control of Dynamic Networks: A Hybrid System Approach	Fierro	2003
Hierarchical Hybrid Control of Multi-Vehicle Systems	Fierro	2002
Mobile Sensor Networks	Fierro	2002

A dual-mode model predictive controller for robot formations	Fierro	2005
Formation Reconfiguration Planning: An MPC Path Space Approach	Fierro	2005
A multi-robot testbed for biologically inspired cooperative control	Fierro	2005
Multi Robot Cooperation," in Autonomous Mobile Robots: Sensing, Control, Decision Making and Applications	Fierro	2005
Coordination of Robot Teams: A Decentralized Approach	Fierro	2005
Optimization-based control of multi-vehicle systems	Fierro	2004
On dynamic reconfiguration of multi-robot formations	Fierro	2003
Control graphs for robot networks	Fierro	2003
A framework and architecture for multi-robot coordination,	Fierro	2002
A vision-based formation control framework	Fierro	2002
Cooperative control of robot formations	Fierro	2002
Hierarchical hybrid modeling of embedded systems	Fierro	2001
A framework and architecture for multirobot coordination	Fierro	2001
On-line Optimization-based Coordination of Multiple Unmanned Vehicles	Fierro	2005
Optimal position strategies for shape changes in robot teams	Fierro	2005
Evaluating intelligence in autonomous ground vehicle teams	Fierro	2004
System intelligence requires distributed learning	Fierro	2004
Designing for system intelligence	Fierro	2004
A dual-mode model predictive controller for robot formations	Fierro	2003
Sliding mode control for robot formations	Fierro	2003
Hybrid control of reconfigurable robot formations	Fierro	2003
Modeling distributed autonomous robots using CHARON: Formation control case study	Fierro	2003
A modular architecture for formation control	Fierro	2002

The OSU multi-vehicle coordination testbed	Fierro	2002
On controlling aircraft formations	Fierro	2001
Hierarchical hybrid modeling of embedded systems	Fierro	2001
Cooperative localization and control for multi-robot manipulation	Fierro	2001
Optimally Locating FACTs Devices in Power Systems Using Second-Order OPF Sensitivities	Gedra	2004
Expected-Security-Cost Optimal Power Flow with Small-Signal Stability Constraints	Gedra	2004
Introduction to Natural Gas and Electricity Optimal Power Flow (GEOPF	Gedra	2004
Unified Power Engineering Laboratory for Electromechanical Energy Conversion, Power Electronics, and Power Systems	Gedra	2004
Solving Natural Gas Loadflow Problems Using Electric Loadflow Techhniques	Gedra	2003
UPFC Ideal Transformer Model." Proceedings of the North American Power Symposium	Gedra	2003
Natural Gas and Electricity Optimal Power Flow	Gedra	2003
Eigenvalue & Eigenvector Sensitivities Applied to Power System Steady-state Operating Point	Gedra	2002
Estimation of UPFC Value Using Sensitivity Analysis	Gedra	2002
Unified Energy Conversion, Power Systems and Power Electronics Lab	Gedra	2002
Introduction of Power Electronics to Electric Machines Lab	Gedra	2002
Application of Virtual Instrumentation in a Power Engineering Laboratory	Gedra	2002
Estimation of UPFC Value using First- and Second-Order OPF Sensitivities	Gedra	2001
Incorporating Eigenvalue Sensitivities into Optimal Power Flow	Gedra	2000
Optimal Power Flow with Expected Security Costs	Gedra	1999
On Transmission Congestion and Pricing	Gedra	1999
Experimental Time-Domain Study of THz Signals from Impulse Excitation of a Surface Dipole	Grishckowsky	1999

Experimental Study of the Surface Waves on a Dielectric Cylinder via THz Impulse Radar Ranging	Grishckowsky	2000
Electro-Optic Detection of THz Radiation	Grishckowsky	1999
Measurements of the THz Absorption and Dispersion of ZnTe and their Relevance to the Electro-Optic Detection of THz Radiation	Grishckowsky	1999
Propagation of Ultra-Wideband, Short Pulses of THz Radiation through Sub-mm Diameter Circular Waveguides	Grishckowsky	1999
The Pure Rotational Spectrum of Solvated HCl: Solute-Bath Interaction Strength and Dynamics	Grishckowsky	1999
Direct Observation of the Gouy Phase Shift in THz impulse Ranging," Appl. Phys. Lett	Grishckowsky	2000
THz Waveguides	Grishckowsky	2000
Single-mode Waveguide Propagation and Reshaping of Sub-ps Terahertz Pulses in Sapphire Fibers	Grishckowsky	2000
Properties of surface waves determined via bistatic terahertz impulse ranging	Grishckowsky	2001
Plastic Ribbon THz Waveguides	Grishckowsky	2000
Electrical Characterization of Conducting Polypyrrole by THz Time-Domain Spectroscopy	Grishckowsky	2000
Optoelectronic Characterization of Transmission Lines and Waveguides by THz Time-Domain Spectroscopy	Grishckowsky	2000
Optical Tunneling of Single Cycle, THz Bandwidth Pulses	Grishckowsky	2001
A Quasi-Optic Dielectric THz Cavity- Coupled through Optical Tunneling	Grishckowsky	2001
THz Time-Domain Spectroscopy on Ammonia	Grishckowsky	2001
Undistorted guided wave propagation of subpsec THz pulses	Grishckowsky	2001
Quasi-Optic THz Imaging	Grishckowsky	2001
Incidence Angle Selection and Spatial Reshaping of THz Pulses in Optical Tunneling	Grishckowsky	2001
Electrical and optical characterization of conducting poly-3-methylthiophene film by THz time-domain spectroscopy	Grishckowsky	2002
Whispering gallery mode terahertz pulses	Grishckowsky	2001
Synthetic Phased-Array THz Imaging	Grishckowsky	2002

Terahertz studies of carrier dynamics and dielectric response of n-type, freestanding epitaxial GaN	Grishckowsky	2003
A dielectric, cylindrical, whispering-gallery mode, terahertz cavity, coupled via a dielectric slab waveguide	Grishckowsky	2003
A THz TEM-mode two dimensional interconnect layer incorporating quasi-optics	Grishckowsky	2003
Quasi-optic synthetic phased-array THz imaging	Grishckowsky	2004
THz Time-Domain Spectroscopy (THz-TDS) Characterization of the Far-Infrared Absorption and Index of Refraction of High-Resistivity, Float-Zone Silicon	Grishckowsky	2004
Parallel plate THz transmitter	Grishckowsky	2004
THz time-domain spectroscopy of sub-monolayer water adsorbed in hydrophilic silica aerogel	Grishckowsky	2004
Terahertz transmission properties of thin, subwavelength metallic hole arrays	Grishckowsky	2004
Waveguide THz time-domain spectroscopy of nm water layers," Optics Letters	Grishckowsky	2004
Planar THz Quasioptics	Grishckowsky	2004
Observation of a New Type of THz Resonance of Surface Plasmons Propagating on Metal-Film Hole Arrays	Grishckowsky	2004
Terahertz Time-Domain Spectroscopy Study of Silica Aerogels and Adsorbed Molecular Vapors	Grishckowsky	2004
Direct Optoelectronic Generation and Detection of Subps Electrical Pulses on Sub-mm Coaxial Transmission Line	Grishckowsky	2004
Adiabatic compression of parallel-plate metal waveguides for sensitivity enhancement of waveguide THz time-domain spectroscopy	Grishckowsky	2004
Lineshape analysis using THz time domain spectroscopy	Grishckowsky	1999
First time measurement of the coupling efficiency of the surface wave on a dielectric cylinder via THz impulse ranging	Grishckowsky	1999
THz time-domain spectroscopy (THz-TDS) with electro-optic detection	Grishckowsky	1999
New Directions in THz Ranging	Grishckowsky	2000
Dielectric Terahertz Waveguides	Grishckowsky	2000

Variable angle terahertz impulse ranging on cylinders	Grischckowsky	2000
Ultrafast Applications of THz Waveguides	Grischckowsky	2000
Terahertz impulse ranging measurement of surface wave radiation on cylinders	Grischckowsky	2000
A Quasi-Optic Dielectric Terahertz Cavity	Grischckowsky	2001
Reflective geometry THz imaging	Grischckowsky	2001
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Quasi-optic coupling to a low-loss, single-mode THz interconnect with no group- velocity dispersion," Conference	Grischckowsky	2001
Observation of Whispering Gallery Mode Terahertz Pulses	Grischckowsky	2002
Synthetic Phased-array THz Imaging	Grischckowsky	2002
Introduction	Grischckowsky	2002
Applications of Optically Generated Terahertz Pulses to Time Domain Ranging and Scattering	Grischckowsky	2002
THz Carrier Dynamics and Dielectric Response of n-type GaN	Grischckowsky	2003
Coherent THz image processing and enhancement	Grischckowsky	2003
Waveguide THz-TDS observation of thin water layers	Grischckowsky	2004
Surface plasmon enhanced THz transmission of subwavelength metallic structures	Grischckowsky	2004
Parallel plate THz transmitter	Grischckowsky	2004
Unique Properties and Applications of THz Photonics	Grischckowsky	1999
Unique Applications enabled by Optoelectronic THz Techniques, THz Time-Domain Spectroscopy (THz-TDS) and THz Impulse Ranging	Grischckowsky	1999
Freshman Research Scholars Program: Springboard to Undergraduate Research	Grischckowsky	2000
New Directions in THz Ranging	Grischckowsky	2000
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Experiments with THz Waveguides: Linear and Nonlinear Applications	Grishckowsky	2000
THz Optoelectronics a Unique Enabler of Research Solutions	Grishckowsky	2000
THz waveguide spectroscopy and applications	Grishckowsky	2000
Fundamental Research and Applications Enabled by THz Photonics	Grishckowsky	2001
Material characterization using THz time-domain spectroscopy	Grishckowsky	2002
Applications of fsec pulses of THz electromagnetic radiation	Grishckowsky	2003
Applications of coherent terahertz radiation	Grishckowsky	2003
Waveguide THz Time-Domain Spectroscopy (THz-TDS) Investigations of Molecular Adsorption on Metals and Crystals	Grishckowsky	2003
THz Photonics – History and Promise	Grishckowsky	2003
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Ab initio potential-energy surfaces for complex, multi-channel systems using modified novelty sampling and feedforward neural networks	Hagan	
Analysis of the Error Surface of Simple Recurrent Neural Networks	Hagan	2004
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Analysis of Recurrent Network Training and Suggestions for Improvements	Hagan	2001
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Training Recurrent Networks for Filtering and Control	Hagan	2000
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Recursive Orhogonal Least Squares Learning with Automatic Weight Selection for Gaussian Neural Networks	Hagan	1999
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Optimal Use of Regularization and Cross-Validation in Neural Network Modeling	Hagan	1999
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A novel frequency measurement technique for quartz microbalance systems and other resonator based instruments	Hutchens	2002
Characterizing metastability and jitter in CMOS latch / flip-flop used as a digital mixer	Hutchens	2002
SOI Implementation of novel triagular layout structures for microwave power transistor applications	Hutchens	2002
A low-cost programmable device characterization system for undergraduate electronics laboratory instruction	Hutchens	2001
Implementation of 1.5V Low Power Two-Path Decimation Filters For Communications D-S Converters	Hutchens	2002
Power/Bit Optimization of D-S ADCs Using Multi-Bit Quantizers	Hutchens	2002
Efficient Use of Two-Path Filter in the Low Power Decimation Filter Design	Hutchens	2002
Implementation of a Multi-bit DS A/DC Without a Correction RAM	Hutchens	2001
Low Power Decimation Filter Design for Delta-Sigma Converters	Hutchens	1999
Determination of the Wigner function from photon statistics,	Krasinski	1999
Direct measurement of the Wigner function by photon counting	Krasinski	1999
Ultra-short light wavepackets	Krasinski	1999
A poor man's FROG	Krasinski	2000
Stimulated emission in MOCVD-grown GaN films on the temperature range of 300K to 700K	Krasinski	2000
Ultrafast Carrier dynamics in a highly excited GaN epilayer	Krasinski	2001
Optical properties and lasing in (InAl)GaN based structures	Krasinski	2001

Generation and diagnostics of femtosecond light pulses	Krasinski	2001
Polarization dependence of the excitonic optical Stark effect in GaN	Krasinski	2002
The excitonic optical Stark effect in GaN	Krasinski	2002
Polarization dependence of the excitonic optical Stark effect in GaN	Krasinski	2002
Cross Kerr and Raman effects between two orthogonally polarized femtosecond soliton pulses in single mode fiber, SPIE Conference Optical Pulse and Beam Propagation San Jose, CA	Krasinski	1999
Comparative studies of HVPE and MOCVD grown nitride structures for UV lasing applications	Krasinski	2001
Femtosecond pump probe spectroscopy of highly excited GaN epilayer	Krasinski	2002
The excitonic optical Stark effect in GaN	Krasinski	2001
Femtosecond pump-probe spectroscopy of a highly excited GaN epilayer	Krasinski	2001
Propagation of ultrashort laser pulses through transparent dielectrics in nonlinear regime	Krasinski	2003
Awesome Design Challenge Committee Member	Latino	1999
Awesome Design Challenge Committee Member	Latino	2000
Awesome Design Challenge Committee Member	Latino	2001
Awesome Design Challenge Committee Member	Latino	2002
Design of a fully functional tester for smart munitions guided system computer	Latino	2005
Awesome Design Tulsa	Latino	2003
OSU-Tulsa Engineering Challenge	Latino	2005
Real Life Innovative Teaching Techniques	Latino	2005
Directed Bucky Cole in Development/Construction of a Magnetic Field Guided Robot	Latino	2005
PhD Thesis-A Voltage Space Approach to Developing a Soft-Switched Inverter Topology with Low Device Voltage Stress	Ramakumar	1999
PhD Thesis-An Approach to the Quantification of the Benefits of Distributed Generation	Ramakumar	2003

Master's Thesis-Priority Based Approach for Operations of Rural Energy Centers	Ramakumar	2004
Master's Thesis-Probabilistic Approach to Assess the Performance of Integrated Renewable Energy Systems Using Markov Models	Ramakumar	2004
Technical Seminar-Integrated Renewable Energy Systems	Ramakumar	2001
Keynote Address-Renewable Energy Sources for Generation of Electricity	Ramakumar	2001
Book Chapter-The Engineering Handbook, Second Edition	Ramakumar	2005
An Approach to Quantify the Technical Benefits of Distributed Generation	Ramakumar	2004
Editor for IEEE Transactions on Energy Conversion	Ramakumar	2004
Organized and Chaired a Panel Session entitled "Electrification and Development of Remote Areas" at the IEEE/PES 2004 General Meeting	Ramakumar	2004
Chaired a Technical Paper Session entitled "Modeling and Simulation of Distributed Generation" at the IEEE/PES 2004 General Meeting	Ramakumar	2004
Member of the OU Power Advisory Board	Ramakumar	2003
Chaired a Technical Paper Session entitled "Solar Power and Rural Lighting	Ramakumar	2003
Moderated a Technical Session entitled Distributed Generation and Community Wind (Part I)	Ramakumar	2003
Chaired a Poster Session for the IEEE/PES Energy Development and Power Generation Committee at the 2002 Summer Meeting	Ramakumar	2002
Chaired a Technical Paper Session entitled "Fuel Cells Technology" at the IEEE/PES 2002 Summer Meeting	Ramakumar	2002
Chaired a Technical Paper Session entitled "Renewable and Energy Storage Technologies" at the IEEE/PES 2002 Summer Meeting	Ramakumar	2002
Organized and Chaired a Panel Session entitled "Multifaceted Impacts of Renewable Energy Development" at the IEEE/PES 2002 Summer Meeting	Ramakumar	2002
Chaired a Technical Paper Session entitled "Improvements in Advanced Generation Technologies" at the IEEE/PES 2002 Winter Meeting	Ramakumar	2002

Invited to present a technical seminar entitled "Integrated Renewable Energy Systems" at the Indian Institute of Technology-Bombay	Ramakumar	2001
Keynote Address at the Seminar on Renewable Energy Sources for Generation of Electricity, organized by the IEEE (Bombay Section), IEE-UK (Bombay Section) and Institution of Engineers-India (Pune Center)	Ramakumar	2001
Organized and chaired a Technical Paper Session entitled "Technologies for Distributed Generation Utilizing Renewables," at the 2001 IEEE Summer Power Meeting	Ramakumar	2001
Organized and chaired a Special Technical Session on "Fuel Cells" at the 2001 IEEE Summer Power Meeting	Ramakumar	2001
Chaired a Speakers Panel on "Small and Medium Wind and Distributed Generation" at the Oklahoma Wind Power: Emerging Opportunities Conference	Ramakumar	2001
Organized and chaired a Panel Session entitled "Role of Distributed Generation in Reinforcing the Electric Power Infrastructure" at the 2001 IEEE Winter Power Meeting	Ramakumar	2001
Topical Coordinator for the Renewable Energy Sessions for the 36th Intersociety Energy Conversion Engineering Conference	Ramakumar	2001
Organized and chaired a Technical Paper Session entitled "Technologies for Distributed Generation," at the 2000 IEEE Summer Power Meeting	Ramakumar	2000
Organized and chaired a Technical Paper Session entitled "Solar Energy Conversion" at the 35th Intersociety Energy Conversion Engineering Conference	Ramakumar	2000
Organized and chaired a Technical Paper Session entitled "Photovoltaic and Wind Electric Conversion Technologies," at the 2000 IEEE Winter Power Meeting	Ramakumar	2000
Organized and chaired a Panel Session entitled "Renewable Energy and Developing Countries" at the 2000 IEEE Winter Power Meeting	Ramakumar	2000
SAE Aerospace Recognition Award" for contributions to the 34th Intersociety Energy Conversion Engineering Conference	Ramakumar	1999
Chaired a Technical Paper Session entitled "Energy from Waste and Biomass" at the 34th Intersociety Energy Conversion Engineering Conference	Ramakumar	1999

Member of the Technical Program Committee, Coordinator of the Renewable Energy Sources topical area, for the 34th Intersociety Energy Conversion Engineering Conference	Ramakumar	1999
Distinguished Service Award, Energy Development and Power Generation Committee, IEEE Power Engineering Society	Ramakumar	1999
Organized and chaired two technical paper sessions entitled "Emerging Distributed Generation Technologies" and "Distributed Generation Utilizing Renewable Energy Resources" at the 1999 IEEE Summer Power Meeting	Ramakumar	1999
Pathomthat Chiradeja, Ph.D., "An Approach to the Quantification of the Benefits of Distributed Generation."	Ramakumar	2003
Bradley S. McClelland, Ph.D., "A Voltage Space Approach to Developing a Soft-Switched Inverter Topology with Low Device Voltage Stress."	Ramakumar	1999
Presented a technical seminar entitled "Integrated Renewable Energy Systems" at the Indian Institute of Technology-Bombay, Mumbai, India	Ramakumar	2001
An Approach to Quantify the Technical Benefits of Distributed Generation	Ramakumar	2004
Voltage Profile Improvement with Distributed Generation	Ramakumar	2005
Factors Limiting the Penetration of Wind Power	Ramakumar	2004
Power System Blackouts Around the World	Ramakumar	2004
Role of Renewable Energy in the Development And Electrification of Remote Rural Areas," Panel Presentation	Ramakumar	2004
Electrification of Sub-Saharan Africa," Panel Presentation	Ramakumar	2004
An Approach to Study the Reliability of IRES Using Markov Models	Ramakumar	2004
Voltage Profile Improvement with Distributed Wind Turbine Generation	Ramakumar	2003
Study of the Benefits of Distributed Generation	Ramakumar	2002
Energization Versus Electrification Utilizing Renewables," Panel Session Presentation	Ramakumar	2002
Distributed Generation and Renewable Energy Systems	Ramakumar	2002
Technology and Economic Market Integration of DG	Ramakumar	2001

A Probabilistic Approach to the Analysis of Voltage Profile Improvement with Distributed Wind Electric Generation	Ramakumar	2001
Electricity from Renewable Energy: A Timely Option," Keynote Address	Ramakumar	2001
Fuel Cells-An Introduction," Special Technical Session	Ramakumar	2001
Emerging Options for Integrated Renewable Energy Systems," Panel Presentation	Ramakumar	2000
Renewable Technologies and Distribution Systems	Ramakumar	1999
Benefits of Distributed Generation – A Simple Case Study	Ramakumar	1999
Induction Motor Speed Control Using a PWM Inverter	Ramakumar	1999
Changing a Standard Telecommunications Lab to a Same-Time Different-Place Virtual Lab Format: Techniques Utilized and Lessons Learned	Scheets	2005
Formative Evaluation of a CSCLIP Lesson	Scheets	2004
Voice over the Internet: Problems and Solutions associated with Alternative Transport	Scheets	2004
A Foundation for the Study of Computer-Supported Collaborative Learning Requiring Immersive Presence (CSLIP) for Next Generation E-learning	Scheets	2004
Analysis of a 4-Bin Histogram for 2-FSK versus 4-FSK Signal Classification	Scheets	2002
Blind Interference Cancellation via Adaptive Filter Techniques: Audio Separation	Scheets	2002
Computer Supported collaborative Learning Requiring Immediate Presence (CSCLIP): Introduction and Research Opportunities	Scheets	2002
Analyzing End-to-End Delivery Delay in Pure VoIP Networks	Scheets	2002
Technologies and Structures to Support Remote and Virtual Lab Experiences	Scheets	2002
Implementing a Remote and Collaborative 'Hands-On' Learning Environment	Scheets	2002
Virtual Laboratory Development for Persons with Vision Disabilities	Scheets	2002
Development of a Simulation tool for Estimating the Reconfiguration and Restoration Times of a Distributed Intelligence Optical Mesh Network	Scheets	2001
Jitter in Packet Networks: A Simulation Based Study	Scheets	2001
Blind Signal Separation via Adaptive Filter Techniques	Scheets	2001
Mesh Optical QOS and Multi-Layer Restoration	Scheets	2001

Implementing a Remote and Collaborative 'Hands-On' Learning Environment	Scheets	2001
Switched Network Carrying Capacities	Scheets	2000
QoS Over the Internet	Scheets	1999
Managing the Williams Network using TMN	Scheets	1999
A Realistic View of Voice and Video over IP	Scheets	1999
Voice over Alternative Transports: Issues and Options	Scheets	1999
An Overview of Backbone Restoration Techniques	Scheets	1999
Edward J. Daniel, "Modeling Voice-Over-IP Performance Over Dissimilar Networks," Oklahoma State University-PhD Thesis supervised	Teague	2003
Edward J. Daniel, "Design and Implementation of a Voice Over IP Application Using TI MELP at 2,400 bps-Master's Thesis supervised	Teague	2000
Implementation of a Secure Voice over IP Prototype for Heterogeneous Networks	Teague	2004
FNBDT Over Heterogeneous Networks	Teague	2003
Development of a 2,400 bps High Quality Voice Coder	Teague	2000
Packet Loss Concealment in a Secure Voice over IP Environment	Teague	2004
A Real-Time Network Simulation Application for Multimedia over IP	Teague	2004
Performance Evaluation of Secure Voice Over Concatenated Internet and 3G Wireless Packet Networks	Teague	2004
A Multi-Structure Delay Prediction Approach for Real-Time VoIP	Teague	2003
A Network Performance Educational Tool for Modeling, Simulation, and Characterization of Packet Network Behavior	Teague	2005
An Inter-Arrival Delay Jitter Model Using Multi-Structure Network Delay Characteristics for Packet Networks	Teague	2003
A Network Performance Application for Modeling, Simulation, and Characterization of Packet Network Behavior	Teague	2003
An Enhanced MultiBand Excitation Speech Coder at 2,400 bps	Teague	2002
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Performance of Internet and CDMA Cellular Data for Voice over IP	Teague	2002
In Situ Chlorine Detection by Ultraviolet Absorption Spectroscopy	Teague	2002
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Performance of FNBDT and Low Rate Voice (MELP) Over Packet Networks	Teague	2001
Algorithm Compatible Improvements for FS-1016 CELP	Teague	2000
Federal Standard 2.4 kbps MELP Over IP	Teague	2000
Improving the Adaptive Codebook Delay Selection for FS-1016 CELP	Teague	2000
Harmonic Pre-Emphasis for Improving the Performance of FS-1016 CELP	Teague	1999
Enhancing FS-1016 CELP via Selective Harmonic Pre-Emphasis	Teague	1999
Transmission properties of terahertz pulses through ultrathin, subwavelength silicon hole array	W. Zhang	2005
Far-infrared optical and dielectric response of ZnS measured by terahertz time-domain spectroscopy	W. Zhang	2005
Transmission properties of THz radiation through very deep zero-order metallic gratings	W. Zhang	2005
Terahertz transmission properties of thin, subwavelength metallic hole arrays	W. Zhang	2004
THz Time-Domain Spectroscopy (THz-TDS) Characterization of the Far-Infrared Absorption and Dispersion of High-Resistivity, Float-Zone Silicon	W. Zhang	2004
Terahertz studies of carrier dynamics and dielectric response of n-type, freestanding epitaxial GaN	W. Zhang	2003
Group velocity matching in type-III phase-matching geometry in BBO	W. Zhang	2002
A Quasi-Optic Terahertz Cavity - coupled through Optical Tunneling	W. Zhang	2001
A diode-pumped, self-starting, all-solid-state self-mode-locked Cr:LiSGAF laser	W. Zhang	2001
Dynamic process of self-started self-mode-locked Ti:sapphire laser with a semiconductor saturable absorber mirror	W. Zhang	2001
Starting of self-mode-locking solid state laser, Proceedings of SPIE	W. Zhang	2001
Two-photon process takes aim at diagnosis and therapy of cancer, Proceedings of SPIE	W. Zhang	2001

Second- and third-order dispersion in PW prism-sequence with arbitrary apex-angle	W. Zhang	2000
Amplified spontaneous emission and its restraint in a terawatt Ti:sapphire amplifier	W. Zhang	2000
Diode-pumped, all-solid-state Cr:LiSGaF laser, Chinese Journal of Lasers	W. Zhang	2000
Magnitude and dynamics of third-order optical nonlinearity in ZnO microcrystallite thin films	W. Zhang	1999
Suppression of Amplified Spontaneous Emission in a femtosecond chirped-pulse amplifier	W. Zhang	1999
Regular, period doubling, quasi-periodic, and chaotic behavior in a self-mode-locked Ti:sapphire laser	W. Zhang	1999
Growth and laser properties of Nd:$Ca_4YO(BO_3)_3$ crystal	W. Zhang	1999
Femtosecond time-resolved exciton recombination dynamics in ZnO microcrystallite thin films at room-temperature	W. Zhang	1999
Femtosecond degenerate four-wave-mixing in ZnO microcrystallite thin films	W. Zhang	1999
Spatial chirp and angular dispersion of the nonlinear crystal for a femtosecond optical parametric oscillation	W. Zhang	2004
Spatial chirp of the nonlinear crystal for a femtoseocnd BBO optical parametric oscillator, Chinese Journal of Lasers	W. Zhang	2004
Accurate calculation of the ray-tracing method for the dispersion in the femtosecond laser amplifier system	W. Zhang	2004
Time-resolved study of the random lasing in ZnO powder	W. Zhang	2003
An Autocorrelator Based on ZnSSe Two-Phonton Absorption Photodetectors	W. Zhang	2003
Design of G-T interferometro to compensate dispersion of LD-pumped Yb:glass femtosecond lasers	W. Zhang	2003
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Femtosecond Ti:sapphire amplifier using spectrum broadening technique	W. Zhang	2002

Self-starting dynamics of oscillator in femtosecond laser amplifier system	W. Zhang	2001
All-solid-state, tunable Yb:YAG laser	W. Zhang	2001
Self-Q switched, self-mode-locked solid-state lasers	W. Zhang	2001
Theoretical investigation on self-starting of Self-mode-locked solid-state lasers	W. Zhang	2001
Spectrum broadening in femtoseocnd chirped pulse amplification, Proceedings of CCAST (World Laboratory) Workshop	W. Zhang	2001
Experimental study on the self-mode-locking states in a Ti:sapphire laser using an intracavity semiconductor saturable absorber mirror	W. Zhang	2001
Suppression of the amplified spontaneous emission generated during the femtosecond chirped pulse amplification	W. Zhang	2000
High efficient and tunable continuous-wave laser operation of a high doped Yb^{3+}:phosparate glass	W. Zhang	2000
Diode-pumped all-solid-state, self-started, self-mode-locked Cr:LiSGAF laser	W. Zhang	2000
Self-started, self-mode-locked Ti:sapphire laser by using semiconductor saturable absorber	W. Zhang	2000
Study of HpD two-photo-fluorescence of cancer tissue stimulated by femtosecond laser	W. Zhang	2000
Compression of femtosecond pulses by using the introcavity controllable self-phase-modulation	W. Zhang	2000
Real-time autocorrelator by using rotary hollow prism	W. Zhang	2000
Ray-trace calculation on the effect of the structural parameters of optical stretcher on group velocity dispersion	W. Zhang	2000
Biomedical application of femtosecond lasers	W. Zhang	2000
Ray-trace analysis of the effect of grating-pair parallelism in pulse stretcher on group velocity dispersion	W. Zhang	2000
Chaotic behaviors in a self-mode-locked Ti:sapphire ring laser	W. Zhang	2000
Progress of research on Photobiology and Photomedicine in China, Journal of Optoelectronics	W. Zhang	2000
The Survey of all solid-state femtosecond lasers	W. Zhang	1999
Analysis method of Q-P parameter in spatial-temporal matrix in Self-mode-locked lasers	W. Zhang	1999
Self- Q-switched self-mode-locking by using Cr^{4+}:YAG as a saturable absorber	W. Zhang	1999

Study on femtosecond HPD two-photo-fluorescence cancer diagnosis method	W. Zhang	1999
Extraordinary terahertz transmission elliptical subwavelength hole array, submitted to CLEO	W. Zhang	2005
Photoconductivity of vertically aligned crystalline TiO_2 nanorod array	W. Zhang	2004
Surface plasmon enhanced THz transmission of subwavelength metallic structures	W. Zhang	2004
Photoconductivity of vertically aligned crystalline TiO_2 nanorod array	W. Zhang	2004
Size-dependent charge carriers in CdTe nanoparticle thin films	W. Zhang	2004
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Optical dispersions of ZnS-based nanoparticles at Terahertz frequencies	W. Zhang	2003
THz Dielectric Cavity	W. Zhang	2001
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Low-grazing-angle microwave scattering from a three-dimensional spilling breaker crest: A numerical investigation	West	2005
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On the Control of Edge Diffraction in Numerical Rough Surface Scattering Using Resistive Tapering	West	2003
Lessons Learned from Full-Spectral Modeling of Signatures of an Estuary Front	West	2003
Two-scale treatment of LGA scattering from spilling breaker water waves	West	2002
Electromagnetic modeling of multipath scattering from breaking water waves with rough faces	West	2002
LGA Sea-Spike Backscattering from Plunging Breaker Crests	West	2002

Mechanisms of LGA Scattering from a Spilling Breaker Water Wave	West	2001
Integral equation formulation for iterative calculation of scattering from lossy rough surfaces	West	2000
Preconditioned iterative solution of scattering from rough surfaces	West	2000
Microwave scattering from 3-D breaking water wave crests	West	2004
Polarization ratios in microwave scattering from spilling breaker water waves at moderate incidence	West	2004
Small-slope approximation modeling of scattering from a spilling breaker wave crest	West	2003
Extended GO modeling of microwave backscattering from measured breaking wave crests	West	2003
Two-scale analysis of LGA scattering from a 3-D spilling breaker crest	West	2003
Diffractive analysis of analysis of backscatter from wave-crest-like objects	West	2002
Radar investigations of breaking water waves at low grazing angles with simultaneous high-speed optical imagery	West	2002
Resistive treatment of edges in MLFMA LGA scattering from finite conductivity 2-D surfaces	West	2002
Comparison of measured LGA microwave backscatter from breaking wave crests with numerical calculations	West	2002
Radar investigations of breaking water waves at low grazing angles with simultaneous high-speed optical imagery	West	2002
LGA scattering from measured breaking water waves: Extension to jetting surfaces	West	2001
Resistive treament of edges in numerical LGA scattering from rough surfaces	West	2001
Multipath scattering from breaking water waves with rough faces	West	2001
LGA Sea-Spike Backscattering from Plunging Breaker Crests	West	2000
Mechanisms of Scattering from Spilling-Breaker Water Waves	West	2000
Dual Frequency Polarimetric Calibrations of the Naval Ultrawideband Synthetic Aperture Radar	West	2000
Electromagnetic scattering from finite conductivity wind-roughened water surfaces	West	1999
Ray analysis of low-grazing scattering from a breaking water wave	West	1999

On iterative approaches for electromagnetic rough-surface scattering problems	West	1999
Integral equation formulation for iterative calculation of scattering from lossy rough surfaces	West	1999
Analysis of the iterative Kirchhoff approximation for rough surface scattering	West	1999
LGA scattering from breaking water waves—Further results	West	1999
Lessons learned from full-spectral modeling of signatures of an estuary front	West	1999
High frequency FinFET model	Y. Zhang	2005
Monte Carlo Simulation of Noncubic Symmetry Semiconducting Materials and Devices	Y. Zhang	2000
AlGaN/GaN Heterojunction Bipolar Transistor Structures-Design Considerations	Y. Zhang	2000
1.3 um Polarization-Insensitive Optical Amplifier Structure Based on Coupled Quantum Wells	Y. Zhang	1999
Micro-Power FinFET RF Front-End for Embedded Wireless Systems'	Y. Zhang	2004
Reconfigurable Oscillator and Filter	Y. Zhang	2004
2004 Software Defined Radio Technical Conference	Y. Zhang	2004
SOI Ring Voltage-Controlled Oscillator	Y. Zhang	2004
Compact Model for On-Chip Inductors'	Y. Zhang	2004
An Experimental Study for Individualized ECG Compression Using LPC and Adaptive Code Book for Long Time Recording	Y. Zhang	2003
Single Transistor AND Gate	Y. Zhang	2003
A Simple CMOS VCO	Y. Zhang	2002
Simulation of Heterojunction Bipolar Transistor with Domain Decomposition Method	Y. Zhang	2002
Current Gain of an AlGaN/GaN Heterojunction Bipolar Transistor	Y. Zhang	2001
Design of AlGaN/GaN Heterojunction Bipolar Transistor Structures	Y. Zhang	2000
M. Kohler, Ph.D thesis Compensation for Missing Voice Coding Frames in Packet Transmission Systems.	Yarlagadda	2000
C. Fore, Ph.D. thesis, Compression and Reconstruction of Hadamard Naturalness-Preserving Coded Images.	Yarlagadda	1999
Co-Chair, 2002 IEEE International Midwest Symposium on Circuits and Systems	Yarlagadda	2002
The GDOP Metric	Yarlagadda	2000

Compensation for Missing Voice and Image Coding Frames in Packet Switching Networks	Yarlagadda	2000
Naturalness Preserving Transform for Missing Frame Compensation	Yarlagadda	1999
Evolutionary Multiobjective Optimization: Qualitative Analysis and Design Implementation	Yen	2005
Fault tolerant control-book chapter	Yen	2005
Wavelet packet feature extraction for vibration monitoring	Yen	2000
Pattern classification by a neurofuzzy network: application to vibration monitoring	Yen	2000
From membership activities- student activities	Yen	2000
Winner take all expert network for sensor validation-book chapter	Yen	2001
Automated frog-call monitoring system: a machine learning approach	Yen	2001
An effective neural-fuzzy paradigm for machinery condition health monitoring	Yen	2001
Constructing a fuzzy rule-based system using the ILFN network and genetic algorithm	Yen	2001
Hierarchical genetic algorithm for near-optimal feedforward neural network design	Yen	2002
Identification of a deterministic constant-affine state space model with known initial conditions	Yen	2002
Coordination of exploration and exploitation in a dynamic environment	Yen	2002
Acoustic emission data assisted process monitoring	Yen	2002
Reconfigurable control system design for fault diagnosis and accommodation	Yen	2002
Timeline visualization of research fronts	Yen	2003
Automatic facial feature extraction using edge distribution and genetic search	Yen	2003
Combined numerical and linguistic knowledge representations for medical diagnosis	Yen	2003
On-line multiple-model based fault diagnosis and accommodation	Yen	2003
Multiple model approach by orthonormal bases for controller design	Yen	2003
Dynamic multiobjective evolutionary algorithm: adaptive cell-based rank and density estimation	Yen	2003
Dendrogram seriation using simulated annealing	Yen	2003

Rank and density-based genetic algorithm for multi-criterion optimization	Yen	2003
Accuracy, comprehensibility and completeness evaluation of a fuzzy expert system	Yen	2003
Hierarchical rank-density genetic algorithm for radial basis function neural network design	Yen	2003
A SOM projection technique with the growing structure for visualizing high-dimensional data	Yen	2003
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Reinforcement learning algorithms for robotic navigation in dynamic environments	Yen	2004
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ISIC'03 report	Yen	2004
Problem with fitting to the power-law distribution	Yen	2004
Intelligent on-line fault tolerant control for unanticipated catastrophic failures	Yen	2004
A group-based model for bipartite author-paper networks	Yen	2005
Dynamic database approach to fault tolerant control using an adaptive critic design	Yen	2005
A truth space diagram temporal linguistic rule extraction procedure using multiple objective genetic algorithm	Yen	2005
On-line fault accommodation control for catastrophic system failures	Yen	2005
sing evolutionary algorithms for defining the sampling policy of complex n-partite networks	Yen	2005
A generic framework for constrained optimization using genetic algorithms	Yen	2005

Appendix C
Degree Requirement Sheets

OKLAHOMA STATE UNIVERSITY

GENERAL REQUIREMENTS — COLLEGE OF ENGINEERING, ARCHITECTURE AND TECHNOLOGY

For students matriculating:

Academic Year ..... 2004-05 — BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

DEGREE

Total hours ..... 133 — ELECTRICAL ENGINEERING

MAJOR

Minimum overall grade-point average ..... 2.00 — (COMPUTER ENGINEERING)

OPTION

Other GPA requirements, see below.

General Education Requirements 38 Hours

Area	Hrs	To Be Selected From
Underlined courses below are Pre-Engineering courses used simultaneously to meet general education requirements.		
English Composition and Oral Communication	6	ENGL 1113 or 1313, 1213 or 1413, 3323. Total hours for degree is based on substitution of 3323 for 1213 as per Academic Regulation 3.5.
American History and Government	6	HIST 1103 POLS 1113
Analytical and Quantitative Thought (A)	13	MATH 2144, 2153, 2163, 2233
Humanities (H)	3	Any course designated (H) at Oklahoma State University.
Natural Sciences (N)	4	CHEM 1414 or 1515
Social and Behavioral Sciences (S)	6	Courses designated (S) at Oklahoma State University. Consult the college and departmental requirements.
International Dimension (I)	-	Any course designated (I). Students are encouraged to meet the requirement in their selection of (H) or (S) course work.
Scientific Investigation (L)	-	Any course designated (L). Normally met by Natural Science and/or Basic Science requirements.

College/Departmental Requirements Pre-Engineering 26 Hours

Basic Science	8	PHYS 2014, 2114
Engineering	3	ENGR 1111, 1342
Engineering Science	9	ENSC 2113, 2123, 2613
Computer Science	6	CS 1113, and 3 hours from CS 2133, 2351, 2432

Major Requirements 69 Hours

Common Professional School 9 Hours

Mathematics	3	MATH 3013
Basic Science	3	PHYS 3313
Humanities (To complete Gen. Ed. requirements)	3	Courses designated (H) at Oklahoma State University. Consult the college and departmental requirements.

Specific Professional School Requirements 57 Hours

Admitted to the Professional School of Electrical and Computer Engineering. (See Professional School Admission Requirements in catalog.)

ECEN 2011	3713
3021	3723
3031	3913
3113	4013
3213	4023
3233	4213
3313	4243
3513	4303
3613	4503
IEM 3503	

6 hours selected from combinations on the departmentally approved list.

Controlled Electives 3 Hours

From:

ENSC 2143, 2213, or Engineering courses 3000-level or above
Other courses such as math, stat, etc. may be approved by advisor.

Other Requirements: A minimum GPA of 2.00 is required over all courses applied to Major Requirements.

The major engineering design experience is satisfied by ECEN 4013 and 4023.

Students will be held responsible for degree requirements in effect at the time of matriculation (date of first enrollment) and any changes that are made so long as these changes do not result in semester credit hours being added or do not delay graduation.

Karen M. Reid
DEAN

DEPARTMENT HEAD

EN-13

OKLAHOMA STATE UNIVERSITY

GENERAL REQUIREMENTS

COLLEGE OF ENGINEERING, ARCHITECTURE AND TECHNOLOGY

For students matriculating:

Academic Year 2004-05

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

DEGREE

Total hours 133

ELECTRICAL ENGINEERING

MAJOR

Minimum overall grade-point average 2.00

Other GPA requirements, see below.

General Education Requirements 38 Hours

Area	Hrs	To Be Selected From
Underlined courses below are Pre-Engineering requirements used simultaneously to meet general education requirements.		
English Composition and Oral Communication	6	ENGL 1113 or 1313, 1213 or 1413, 3323. Total hours for degree is based on substitution of 3323 for 1213 as per Academic Regulation 3.5.
American History and Government	6	HIST 1103 POLS 1113
Analytical and Quantitative Thought (A)	13	MATH 2144, 2153, 2163, 2233
Humanities (H)	3	Any course designated (H) at Oklahoma State University.
Natural Sciences (N)	4	CHEM 1414 or 1515
Social and Behavioral Sciences (S)	6	Courses designed (S) at Oklahoma State University. Consult the college and departmental requirements.
International Dimension (I)	-	Any course designated (I). Students are encouraged to meet the requirement in their selection of (H) or (S) course work.
Scientific Investigation (L)	-	Any course designated (L). Normally-met by Natural Science and/or Basic Science requirements.

College/Departmental Requirements Pre-Engineering 26 Hours

Basic Science	8	PHYS 2014, 2114
Engineering	3	ENGR 1111, 1342
Engineering Science	9	ENSC 2113, 2123, 2613
Computer Science	6	CS 1113, plus 3 hours from CS 2133, 2351, 2432

Major Requirements 69 Hours

Common Professional School 9 Hours

Mathematics	3	MATH 3013
Basic Science	3	PHYS 3313
Humanities (To complete Gen. Ed. requirements)	3	Course designated (H) at Oklahoma State University. Consult the college and departmental requirements.

Specific Professional School Requirements 54 Hours

Admitted to the Professional School of Electrical and Computer Engineering. (See Professional School Admission Requirements in catalog.)

ECEN 2011	3613
3021	3713
3031	3723
3113	3913
3233	4013
3313	4023
3513	4503
IEM 3503	

Five ECEN or other courses (15 hours) selected from combinations on the departmentally approved list.

Controlled Electives 6 Hours

From:

ENSC 2143, 2213, or Engineering courses 3000-level and above

Other courses, such as math, stat, etc. may be approved by advisor.

Other Requirements: A minimum GPA of 2.00 is required in all courses applied to Major Requirements.

The major engineering design experience is satisfied by ECEN 4013 and 4023.

Students will be held responsible for degree requirements in effect at the time of matriculation (date of first enrollment) and any changes that are made so long as these changes do not result in semester credit hours being added or do not delay graduation.

Karen M. Reid
DEAN

K. O. G. Tyn
DEPARTMENT HEAD

EN-12

Appendix D
Five Year Academic Report Card

FIVE YEAR ACADEMIC REPORT CARD

COLLEGE: ENGR, ARCH & TECH
ELEC & COMP ENGR (C4515)

FALL SEMESTER -->	2000		2001		2002		2003		2004		5-YEAR DIFFERENCE	
STUDENT INFORMATION												
HEADCOUNT OF STUDENTS												
UNDERGRADUATE	461		483		493		470		405		-56	-12.1%
GRADUATE	144		217		268		255		199		55	+38.1%
PROFESSIONAL	0		0		0		0		0		0	.
TOTAL	605		700		761		725		604		-1	-0.1%
MINORITY	270		348		396		360		276		6	+2.2%
NONMINORITY	335		352		365		365		328		-7	-2.0%
ENTRY INFORMATION	SCORE	NUM	SCORE	NUM	SCORE	NUM	SCORE	NUM	SCORE	NUM		
ACT AVERAGE	27.9	76	26.5	103	26.8	86	27.0	86	27.3	60	-0.6	-2.0%
ACT RANGE (25TH-75TH)	26-30		23-30		23-31		23-30		24-31			
TOP 10% OF HS CLASS	41%		27%		38%		35%		33%		-7	PTS
RETENTION/GRADUATION RATES												
FULLTIME SEMESTERS	.		10.0		9.2		9.7		10.0		0.0	+0.0%
SEMESTER CREDIT HOURS (STATE FUNDED ONLY)												
UNDERGRADUATE	2,781		2,801		2,976		3,021		2,497		-284	-10.2%
GRADUATE	1,455		1,997		1,892		1,752		1,186		-269	-18.4%
PROFESSIONAL	0		0		0		0		0		0	.
TOTAL	4,236		4,798		4,868		4,773		3,683		-553	-13.0%
# AND AVG SIZE OF LECTURE CLASSES TAUGHT	NUMBER	AVG	NUMBER	AVG	NUMBER	AVG	NUMBER	AVG	NUMBER	AVG		
UNDERGRADUATE	37	25.6	30	31.7	32	31.4	29	30.6	25	29.4	-12	-32.4%
GRADUATE/PROF	24	15.0	28	18.0	26	17.0	30	15.0	20	15.0	-4	-16.6%
TOTAL	61	21.4	58	25.1	58	24.9	59	22.7	45	23.0	-16	-26.2%
FACULTY INFORMATION												
HEADCOUNT OF FACULTY												
PROF - LECTURER												
TOTAL	24		29		30		29		27		3	+12.5%
MINORITY	5	21%	10	34%	13	43%	14	48%	13	48%	8	+160.0%
TENURED & TENURE TRACK												
TOTAL	18		22		22		22		21		3	+16.6%
TENURED	15	83%	15	68%	15	68%	16	73%	16	76%	1	+6.6%
INSTRUCTIONAL FTE												
PROF - LECTURER	14.96		18.67		17.72		18.15		17.14		2.18	+14.5%
GRAD ASSISTANT	9.87		16.09		9.11		9.33		9.69		-0.18	-1.8%
TOTAL	24.83		34.76		26.83		27.48		26.83		2.00	+8.0%
STUDENT-FACULTY RATIO	20.5		18.9		20.1		19.1		15.5		-5.0	-24.4%
AVG ACADEMIC YEAR SALARY (FULL-TIME, 9 OR 10 MO.)	OSU	% OF BIG 12	OSU	% OF BIG 12	OSU	% OF BIG 12	OSU	% OF BIG 12	OSU	% OF BIG 12		
PROFESSOR	92,334	94%	95,250	94%	95,250	92%	94,623	89%	95,794	.%	3,460	+3.7%
ASSOC PROF	70,290	97%	73,353	97%	73,303	95%	74,098	93%	77,378	.%	7,088	+10.0%
ASST PROF	61,695	94%	64,413	93%	64,413	90%	64,985	88%	68,214	.%	6,519	+10.5%
CLASSES TAUGHT BY TENURED & TENURE TRACK												
% LOWER DIV	100%		100%		100%		100%		100%		0	PTS
% UNDERGRAD	84%		83%		72%		86%		93%		9	PTS

NOTE: NUMBERS FOR FALL 2004 ARE PRELIMINARY. FINAL FIGURES WILL BE AVAILABLE AFTER THE END OF THE SEMESTER.

NOV 4, 2004 PROJ04.SAS(REPTCARD) INST RESEARCH & INFORMATION MGMT

Oklahoma State University
FIVE-YEAR ACADEMIC REPORT CARD
ELEC & COMP ENGR

Fiscal Year	2000	2001	2002	2003	2004	Change Amount	Change Percent
Financial Information							
Faculty Salaries	$1,438,802	$1,369,954	$1,674,217	$1,656,070	$1,457,167	$18,365	1.3%
Other Salaries	$137,820	$173,663	$216,948	$222,760	$220,734	$83,114	60.4%
Fringe Benefits	$310,251	$336,514	$468,102	$470,864	$429,791	$119,540	38.5%
Travel	$30,013	$44,224	$9,699	$7,114	$9,213	($20,800)	-69.3%
Utilities	$0	$0	$0	$0	$0	$0	-
Supplies Other Oper. Exp.	$98,820	$172,016	$157,099	$83,829	$90,485	($8,335)	-8.4%
Property, Furniture Equip.	$83,057	$25,887	$5,201	$17,572	$13,446	($69,611)	-83.8%
Library Books Periodicals	$338	$0	$496	$324	$558	$220	65.0%
Transfers Other Disbur.	$0	$0	$0	$0	$0	$0	-
Total	$2,098,901	$2,122,257	$2,531,761	$2,458,532	$2,221,393	$122,493	5.8%
Cost per SCH	$288.71	$243.04	$262.33	$249.93	$228.82	($59.79)	-20.7%
Cost per SCH in Constantt	$288.71	$236.13	$250.63	$232.86	$205.39	($83.32)	-28.9%
Other Revenue							
Other Student Fees	$0	$1,500	$2,250	$0	$0	$0	-
Gifts and Grants	$9,016	$133,420	$493,134	$101,898	$768,088	$759,072	8419.3%
Fees Related to Educ. Depts.	$5	$0	$0	$0	$0	($5)	-100.0%
Other Income	$158,062	$888,056	$1,063,627	$930,687	$624,030	$465,968	294.8%
Total	$167,083	$1,022,976	$1,559,012	$1,032,585	$1,392,118	$1,225,034	733.2%
External Funding							
Sponsored Expenditures**	$1,233,674	$1,466,602	$1,664,162	$2,517,795	$2,950,966	$1,717,292	139.2%
Fundraising							

**Excludes federal appropriations for College of Agriculture Sciences and Natural Resources.

Appendix E
Additional University Supplied Information

October 24,2004

ELEC & COMPUTER ENGR

Information for the cover page (page 2 in your packet) of Oklahoma State Regents of Higher Education Program Review. Since we have changed systems for both accounting data and student data during the past five years, both old and new major designations (options) are listed under each degree program.
Both old and new academic department numbers are also listed. The current cost center code for your department is given.

The department numbers are:
Old: 12515 New: C4515
The cost center code: 505

Degree program: 071 - Electrical Engineering - BS
The HEGIS code is: 0909, the CIP code is: 141001

Old major designation:
New major designation: EN BS ELENCOMP

Old major designation:
New major designation: EN BS ELENCS

Old major designation:
New major designation: EN BS ELENTCOM

Old major designation: 4141
New major designation: EN BS ELEN

Old major designation: 4142
New major designation: EN BS ELENCOEN

Degree program: 072 - Electrical Engineering - MS
The HEGIS code is: 0909, the CIP code is: 141001

Old major designation:
New major designation: EN MS ELENTCOM

Old major designation: 7482
New major designation: EN MS ELEN

Degree program: 073 - Electrical Engineering - PHD
The HEGIS code is: 0909, the CIP code is: 141001

Old major designation: 7483
New major designation: EN PHD ELEN

DEPARTMENT_NAME=ELEC & COMPUTER ENGR

	FALL				
	FALL 2000	FALL 2001	FALL 2002	FALL 2003	FALL 2004
	N	N	N	N	N
PROGRAM					
Electrical Engineering - BS	461	483	493	470	405
Electrical Engineering - MS	106	168	212	188	135
Electrical Engineering - PHD	29	36	37	37	37

OSHRE PROGRAM REVIEW
CRITERION IV - PROGRAM PRODUCTIVITY
FIVE YEAR HISTORY OF DEGREES AWARDED

COLLEGE=ENGIN, ARCH & TECH, DEPARTMENT=ELEC & COMPUTER ENGR

		YEAR				
		1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
		N	N	N	N	N
PROGRAM	TERM					
Electrical Engineering - BS	SUMMER	14	25	13	11	4
	FALL	16	23	17	24	18
	SPRING	31	28	40	37	41
	All	61	76	70	72	63
Electrical Engineering - MS	TERM					
	SUMMER	15	10	7	10	21
	FALL	13	11	13	23	39
	SPRING	15	13	13	25	24
	All	43	34	33	58	84
Electrical Engineering - PHD	TERM					
	SUMMER			1	4	2
	FALL	1	1	1	3	3
	SPRING	2		2	1	1
	All	3	1	4	8	6