A MESSAGE FROM THE CHAIR
HOW WE RANK
THE WOODRUFF SCHOOL
THE YEAR IN REVIEW
ENROLLMENT
DEGREES AWARDED
AWARDS AND HONORS
STUDENT OUTCOMES
FACULTY AND STAFF
PUBLICATIONS AND ON-LINE SERVICES
FINANCIAL REVIEW
THE WOODRUFF ENDOWMENT
THE ADVISORY BOARD
THE CAPITAL CAMPAIGN
DONORS

A BRIEF HISTORY OF TECH (AND THE WOODRUFF SCHOOL)

1885 The Georgia Legislature authorizes $65,000 to found a technical school.
1886 Atlanta is chosen as the location for the school.
1888 The Academic Building (known as the Tech Tower) is completed. The Georgia School of Technology opens for classes on October 8th with the Department of Mechanical Engineering and the Departments of Chemistry, Mathematics, and English. The faculty and staff included five professors and five shop supervisors.
1889 By January, 129 students were registered for the first degree offered, the Bachelor of Science in Mechanical Engineering.
1889 Dr. John Sayler Coon joins Tech as the first head of mechanical engineering.
1890 Tech graduates its first two students.
1907 The Carnegie Library opens (Andrew Carnegie donated $20,000 to build a library).
1911 The Technique, the weekly student newspaper, begins publication.
1912 The Cooperative Education Department is established to coordinate work-study programs.
1912 The first three units of the Coon (ME) building were constructed; the fourth part was completed in 1920.
1922 The first M.S.M.E. was authorized.
1925 Tech awards its first Master of Science degrees.
1946 The doctoral program in mechanical engineering was established.
1948 The Board of Regents authorizes the Georgia School of Technology to be renamed the Georgia Institute of Technology.
1949 The Department of Mechanical Engineering becomes the School of Mechanical Engineering.
1950 Tech awards its first Doctor of Philosophy degrees.
1952 The Georgia Legislature votes to make Tech coeducational; the first two women students enroll in the fall quarter.
1956 Tech's first two women students receive their degrees.
1961 Tech is the first major state university in the Deep South to desegregate without a court order.
1962 The School of Nuclear Engineering is established.
1984 The Graduate Cooperative Program is formed to include graduate students in Tech's work-study program.
1984 The School of Nuclear Engineering merges with the School of Mechanical Engineering.
1985 The School of Mechanical Engineering is named for its benefactor, George W. Woodruff.
1990 Georgia Tech is selected as the site of the Olympic Village.
1991  Tech's first foreign campus, Georgia Tech Lorraine, in Metz, France, is opened.
1994  Construction begins on the Manufacturing Related Disciplines Complex, Phase I.
1995  The Woodruff School moves into the MRDC building.
1996  Tech serves as the site of the Olympic Village.
1997  The Georgia Tech Lorraine program expands to include mechanical engineering.
      Construction begins on the second phase of the Manufacturing Related Disciplines Complex.

HOW WE RANK

In 1997 U.S. News & World Report ranked the College of Engineering 5th in the nation.
In 1997 U.S. News & World Report ranked the Woodruff School 7th in the nation.
In 1997 U.S. News & World Report ranked the Biomedical Engineering Program 10th in the nation.
In 1997 U.S. News & World Report ranked Georgia Tech as one of the top 15 public universities in the nation.

Money magazine's "Best Value Rankings" has Georgia Tech as number two among scientific and technology schools and the 13th best buy nationally.

The National Science Foundation ranks Georgia Tech 6th in industry-sponsored research.

The American Association of Engineering Societies ranks Georgia Tech 1st in the number of doctoral and master's degrees awarded to blacks in engineering.

The American Association of Engineering Societies ranks Georgia Tech 1st in the number of degrees awarded to women in engineering.

The Georgia Tech Cooperative Program is the largest optional program in the country.

Georgia Tech ranks 26th nationally in research expenditures.

Researchers rank Georgia Tech 18 among the top 20 research institutions (universities and research labs) in a Business Week survey of institutions, "working in information technology fields."

The Woodruff School is among the top producers of master's and doctoral degrees in the country.

The Woodruff School is the leading producer of master's degrees to women and minorities in the country.

The Health Physics Program in the Woodruff School is one of the largest in the nation, and produces approximately 15% of all graduate health physicists in the country.

A MESSAGE FROM THE CHAIR

To Colleagues and Friends of the Woodruff School of Mechanical Engineering:
We have now completed our first post-Olympic year. It has been both a busy and satisfying academic year. We continue to make great progress in advancing the quality of our programs. This report presents the record and accomplishments of the Woodruff School of Mechanical Engineering for the period from July 1, 1996 to June 30, 1997.

Through the coordinated effort of faculty, staff, and students, the Woodruff School continues the tradition of excellence for which it has become known. We take pride in the quality of our undergraduates and the state-of-the-art facilities that enhance their studies. We are also proud of the talented graduate students who are attracted to our programs from universities across the country and throughout the world. The considerable contributions made by our faculty to the development of engineering science and technology are also a source of satisfaction. It is a privilege to be associated with an institution that provides significant contributions to the state, the nation, and the international community.

I hope you find this annual report informative and interesting. It presents a picture of the last year's achievements in the Woodruff School, highlighting our activities, the faculty and staff, our degree-granting programs, the students, and the Capital Campaign. This annual report is available to anyone interested in learning more about the Woodruff School's activities: For the first time, you will find the report on our web page: see http://www.me.gatech.edu (view Woodruff School Publications). If you have any questions about our programs or if you require additional copies of this report, please do not hesitate to let me know.

Ward O. Winer
Regents' Professor and Chair
October 1997

The Woodruff School

In 1888 the Georgia School of Technology opened its doors and admitted its first engineering class: 129 mechanical engineering students enrolled in Tech's first degree program. As part of their education these early students worked at trades such as forging, woodworking, and mechanical drawing. The products of these shop exercises were then sold to produce income for the School.

The first Head (starting in 1889) and Professor of Mechanical Engineering was John Saylor Coon, a graduate of Cornell University and a charter member of the American Society of Mechanical Engineers. He held this position until his retirement in 1923. For eight years mechanical engineering was the only degree offered, and Dr. Coon saw to it that classes were challenging -- so challenging that only 28 of the original students earned degrees. "Uncle Si's" high standards set a precedent at Tech.

Over the years, the mechanical engineering program expanded and changed. By 1896, the contract system of shops had been abandoned, and workshops were entirely instructional. Departments in electrical, civil, and textile engineering were added, and increasing emphasis was given to higher mathematics, theoretical science, and original research. The first M.S.M.E. was authorized in 1922, and a doctoral program was added in 1946. In 1949, the Department of Mechanical Engineering officially became the School of Mechanical Engineering with its own director and administrative staff.

Today, the Woodruff School of Mechanical Engineering is the oldest and second largest of the eight divisions in the College of Engineering at Georgia Tech. Its name honors a distinguished Atlanta business and civic leader, the late George W. Woodruff (class of 1917). The programs in mechanical engineering, nuclear and radiological engineering, health physics, and bioengineering house 1257
undergraduate students and 445 graduate students. Research and teaching in the Woodruff School is directed by a distinguished faculty of 60 academic faculty and 18 full-time research engineers/scientists. Many of the 367 graduate students in mechanical engineering and 78 graduate students in the nuclear engineering and health physics programs are employed as research assistants and are an integral part of this technical community. In 1996-97, Woodruff School research teams conducted work on more than 218 grants and contracts from government and industry.

Degree Programs

From 1889 when mechanical engineering was the only degree-granting program at Tech, the number and type of degrees awarded has continued to grow. Today, the Woodruff School offers two undergraduate degrees, and nine graduate degrees:

<table>
<thead>
<tr>
<th>Undergraduate Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Mechanical Engineering (B.M.E.)</td>
</tr>
<tr>
<td>Bachelor of Nuclear and Radiological Engineering (B.N.R.E.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graduate Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>Master of Science in Mechanical Engineering (M.S.M.E.)</td>
</tr>
<tr>
<td>Master of Science (M.S.)</td>
</tr>
<tr>
<td>Doctor of Philosophy (Ph.D.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nuclear Engineering/Health Physics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Science in Nuclear Engineering (M.S.N.E.)</td>
</tr>
<tr>
<td>Master of Science in Health Physics (M.S.H.P.)</td>
</tr>
<tr>
<td>Master of Science (M.S.)</td>
</tr>
<tr>
<td>Doctor of Philosophy (Ph.D.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bioengineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Science in Bioengineering (M.S.B.E.)</td>
</tr>
<tr>
<td>Doctor of Philosophy (Ph.D.)</td>
</tr>
</tbody>
</table>

The Students

The student community in the Woodruff School reflects a rich diversity of person and place. A profile of the freshman class entering the Woodruff School in September 1997 and a profile of the Woodruff School graduate class for summer/fall 1997 admission looks like this:

<table>
<thead>
<tr>
<th>Freshmen Class Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average SAT Score</strong></td>
</tr>
<tr>
<td><strong>High School Average</strong></td>
</tr>
<tr>
<td><strong>Total Number of Freshmen</strong></td>
</tr>
<tr>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>Nuclear Engineering</td>
</tr>
<tr>
<td><strong>Percent of Males in Freshmen Class</strong></td>
</tr>
<tr>
<td><strong>Percent of Females</strong></td>
</tr>
<tr>
<td><strong>Percent of Georgia Residents</strong></td>
</tr>
<tr>
<td><strong>Percent of Freshmen Who Live Out of State</strong></td>
</tr>
</tbody>
</table>
## Incoming Graduate Class Profile

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Students</td>
<td>145</td>
</tr>
<tr>
<td>(137 ME &amp; BE) (8 NE/HP)</td>
<td></td>
</tr>
<tr>
<td>Average Grade Point Average (GPA)</td>
<td>3.56</td>
</tr>
<tr>
<td>Average Score on Graduate Record Exam (GRE)</td>
<td>1899 (out of 2400)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Geographical Breakdown by Sector and Percent (by undergraduate school)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>East/Northeast</td>
<td>19</td>
</tr>
<tr>
<td>South/Southeast</td>
<td>37</td>
</tr>
<tr>
<td>Midwest</td>
<td>10</td>
</tr>
<tr>
<td>West/Southwest</td>
<td>9</td>
</tr>
<tr>
<td>Foreign</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class Makeup</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>119</td>
</tr>
<tr>
<td>Females</td>
<td>26</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number With Work Experience Before Attending Graduate School</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number Entering Graduate School Straight From Undergraduate School</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>114</td>
</tr>
</tbody>
</table>
Student Body Makeup

The School tries to reflect the Institute's concern for a diverse student body. In fall quarter 1996, the graduate and undergraduate student body looked like this:

<table>
<thead>
<tr>
<th>Category</th>
<th>Undergraduates</th>
<th>Graduates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent</td>
<td>Number</td>
</tr>
<tr>
<td>Females</td>
<td>16</td>
<td>167</td>
</tr>
<tr>
<td>Males</td>
<td>84</td>
<td>847</td>
</tr>
<tr>
<td>Minorities</td>
<td>13</td>
<td>150</td>
</tr>
<tr>
<td>International</td>
<td>2</td>
<td>21</td>
</tr>
</tbody>
</table>

Note: Minority (ethnic origin) includes: Blacks, Hispanics, American Indian, and Multiracial.

The Woodruff School continues to be a leading producer of graduate degrees to women. In 1996-97, seven women earned Ph.D. degrees (5 in ME and 2 in NE/HP) while ten earned MS degrees (7 in ME and 3 in either NE or HP). Since the 1990-91 academic year, 26 women have earned Ph.D. degrees from the Woodruff School. In 1996-97, the Woodruff School awarded three Ph.D. degrees to minorities (2 in ME and 1 in NE/HP) and seven MS degrees to minorities (5 in ME and 2 in NE/HP).

Woodruff School students are alike in the impressive abilities and the seriousness of purpose they bring to their work -- traits that have made Georgia Tech graduates among the most sought after in the nation. See Student Outcomes to get an idea of the broad and exciting job market available for those with degrees from the Woodruff School.
Faculty

The professors in the School are high-caliber teachers and researchers, as demonstrated by the recognition they consistently receive for both activities. The Woodruff School has seven distinguished faculty members who hold endowed chairs, whose dynamism in teaching and research allows them to guide junior faculty members, mentor graduate students, and contribute their expertise to new areas of scientific and engineering knowledge. They are:

**Said Abdel-Khalik**
- Southern Nuclear Distinguished Professor

**William Z. Black**
- Georgia Power Distinguished Professor

**Steven Danyluk**
- Morris M. Bryan, Jr. Chair in Mechanical Engineering for Advanced Manufacturing Systems

**Jerry H. Ginsberg**
- George W. Woodruff Chair in Mechanical Systems

**Robert M. Nerem**
- Parker H. Petit Distinguished Chair for Engineering in Medicine

**Peter H. Rogers**
- Rae and Frank Neely Professor in Mechanical Engineering

**Weston M. Stacey, Jr.**
- Callaway Professorship in Nuclear Engineering

In addition, the Woodruff School faculty includes: two members of the National Academy of Engineering, two NAE members who hold joint or adjunct appointments, and 27 fellows of professional groups such as the American Society of Mechanical Engineering (ASME), the Acoustical Society of America (ASA), and the American Nuclear Society (ANS). Twelve Woodruff School faculty members have received National Science Foundation (NSF) Career Awards (previously known as the Presidential Young Investigator Award or the Young Investigator Award). The faculty publishes extensively in scientific and technical journals, and several have written widely used textbooks. Six members of the faculty are Woodruff Faculty Fellows, a program funded from the endowment of the Woodruff School. See *The Faculty* for a brief description of the faculty members of the Woodruff School.

Teaching and Research

While the emphasis on research in the Woodruff School has grown steadily, this capability has allowed our faculty members to gain specialized skills and perspectives that enable them to bring fresh ideas and methods into the classroom. Our faculty is committed to bringing new approaches to current technological challenges and are involved in a variety of investigations.

Funding for such projects comes from numerous governmental and private sources, including the National Science Foundation, the Office of Naval Research, the Department of Energy, the National Institute of Health, General Motors Corporation, Ford Motor Company, IBM Corporation, Digital Equipment Corporation, Georgia Power Company, and NASA.

Faculty members in **mechanical engineering** may concentrate their research in one or more of these areas:

- Acoustics and Dynamics
- Automation and Mechatronics
Faculty members in **nuclear engineering and health physics** may concentrate their research in one or more of these areas:

- **Fission**
- **Fusion**
- **Health Physics**
- **Radiological Engineering**

More details about our research program may be found in a companion publication, *Research in the George W. Woodruff School of Mechanical Engineering*. Many ongoing research projects are highlighted in this publication.

**Facilities**

The Woodruff School is currently housed in a seven-building research/classroom complex. The School completed its move to the Manufacturing Related Disciplines Complex, Phase I (MRDC I) in the fall of 1995, a modern classroom/laboratory/seminar building that it shares with Textile and Fiber Engineering. This building holds machine shops, instructional laboratories, tribology research labs, manufacturing labs, and mechanics of materials research labs. There are computer-aided design laboratories for undergraduate design, mechatronics, internal combustion engines, and thermal and mechanical systems, as well as solidification processing.

The Fuller E. Callaway Manufacturing Research Center (MARC) houses three Woodruff School research groups. The 120,000 square foot facility includes research laboratories, faculty and research offices, shop bays, and an electronics manufacturing laboratory. In 1996 the National Science Foundation awarded Tech $440,000 and Ford Motor Company gave $300,000 to build an anechoic (echo-free) chamber. This chamber is being built in the high-bay area of MARC and will open in December 1997.

Construction will begin soon on the Manufacturing Related Disciplines, Phase II. The four-story, el-shaped building will be about 135,000 square feet at a budget of $27,000,000. This new building will allow the School to consolidate virtually all of its activities into a three-building complex: MRDC I, II, and MARC. MRDC
II will house state-of-the-art research and laboratory facilities in acoustics and dynamics; fluid mechanics; thermal systems; and nuclear and radiological engineering, health physics, and fusion. The building will also have three classrooms, an atrium, laboratory space, a high-bay area, and faculty office space. Roughly two-thirds of MRDC II will be used for Mechanical Engineering and one-third for Materials Science and Engineering. MRDC II should be ready for occupancy by fall 1999.

THE YEAR IN REVIEW

The past academic year (summer 1996 through spring 1997) was an exciting and busy time for the Woodruff School. We recovered from our Olympic experience, and began work on two major challenges: the conversion to a semester calendar and the preparation for an ABET accreditation visit in the fall of 1997. There were many other activities sponsored by the School; some of these projects are highlighted in this review.

The Olympic Legacy

The 1996 Centennial Olympic Games were an exciting time for Georgia Tech. The Woodruff School is proud of its direct involvement with the management, prototyping, and component development of the torch for the Olympic Torch Relay. The six-member team included two Woodruff School faculty members (Sam Shelton served as project manager), two ME graduate students, and one alumnus of the Woodruff School. In addition, two machinists from the School assisted with prototype development. An Olympic torch is on permanent display in the Woodruff School.

Semester Conversion

We are in the final throes of preparing for the Board of Regents' mandated conversion of the academic calendar from quarters to semesters. While this requires a tremendous amount of work on the part of our faculty and staff, it also gives us a good opportunity to improve our programs. Georgia Tech will begin using a semester calendar in the fall of 1999, so we must have all our degree requirements, course syllabi, and scheduling ready by the fall of 1997 for the 1998 catalog. The Woodruff School approached semester conversion much like we did our curriculum revision in the early part of this decade, by taking a zero-based approach; it will be as if we were starting a new program from scratch.

ABET Accreditation

Georgia Tech is one of six universities that are test cases in the implementation of ABET's new Criteria 2000. Criteria 2000 represents a shift from ABET's procedures of accounting for different topics in the degree programs to a performance and outcomes-based criteria. Georgia Tech will be the first major engineering research institution evaluated under these criteria and should help set the standards and procedures for future ABET 2000 accreditation activities.

Computer-Aided Engineering Lab
The Computer-Aided Engineering (CAE) Lab in the Woodruff School is designed to meet the growing demand for CAE education among mechanical engineering students. This high-end instructional lab is designated for undergraduate and graduate class use, and gives the School the capability to offer classes to more than 160 students each year. The Lab is capable of carrying a throughput of approximately 40 students per quarter. This growth is important because employers increasingly screen applicants on their CAE/CAD skills.

Undergraduate students will use the CAE Lab when they take ME 4041 (Interactive Computer Graphics and Computer-Aided Design). The course deals with the principles of interactive computer graphics hardware and software; programming for interactive graphics with application to the solution of thermal and mechanical design problems; and various design projects.

Graduate students will use the lab when they take ME 8103 (Special Topics in Design). This course deals with finite element theory and practice, and was the first course taught in the new lab in winter quarter 1997.

The Lab is equipped with 20 high-end 200 MHz Pentium Pro Gateway 2000 workstations. Two of the workstations will serve as file servers, while 18 stations will be used for lab instruction and training.

The CAE Lab was constructed with grants totaling approximately $150,000 from Texaco, General Motors, and Mr. Nelson Abell, the 1995 Distinguished Alumnus (class of 1944). Fundraising for this project was completed by October 1996, and the CAE Lab was functional in January 1997. Plans to expand the lab are being developed.

The Woodruff Distinguished Alumnus Award

Mr. Eugene (Gene) C. Gwaltney (BME, 1940) was presented the 1997 Woodruff Distinguished Alumnus Award at the Annual ME Spring Banquet. He was given a plaque in recognition of his distinguished career and philanthropy toward Georgia Tech. It is tradition that the distinguished alumnus attend the banquet to interact with and serve as an inspiration for students. This is a special opportunity for the students to hear some stories that the distinguished alumnus might relate, and for the alumnus to hear about the students' plans and achievements.

Mr. Gwaltney was with the Russell Corporation for forty years. He joined the company in 1952; he held various leadership positions in the corporation, and in 1982, he became chairman and chief executive officer. His business expertise helped turn a regional textile producer into a Fortune 400 Company, with an exclusive agreement with Major League Baseball to supply team uniforms and to market game jerseys. Mr. Gwaltney retired from the Russell Corporation in 1993.

In addition to Mr. Gwaltney's foresight in the business world, he believes that young people need to be educated to compete in an increasingly complex world.
Toward that end, he has long been committed to pursuing excellence in education, and his philanthropic vision has benefited Georgia Tech in many ways. He served on the Georgia Tech Advisory Board from 1978 to 1984, and he was elected trustee emeritus of the Georgia Tech Foundation in 1989. In 1994, he was inducted into the College of Engineering's Hall of Fame, and he is the person for whom the Eugene C. Gwaltney Jr. Chair in Manufacturing Systems is named.

About the Award

The Woodruff Distinguished Alumnus Award was inaugurated in 1989 to recognize an outstanding alumnus of the School. Mr. Gwaltney's name, along with other winners of the award, will be on permanent display in the lobby of the MRDC. Previous winners of the award are:

1989  Charles L. Ray (BME, 1950)
1990  Frank M. White (BME, 1954)
1991  Paul A. Duke (BME, 1945)
1992  Frank K. Webb (BME, 1938)
1993  Herbert P. Haley (BME, 1933)
1993  Frank J. Whitley (BSME, 1933)
1994  Jack M. Zeigler (BME, 1948)
1995  Nelson D. Abell (BME, 1944)
1996  Harold W. Gegenheimer (BME, 1933)
1997  Eugene C. Gwaltney (BME, 1940)

The impetus for creating the Distinguished Alumnus Award was the generous endowment given to the School of Mechanical Engineering by George W. Woodruff. In 1985, the centennial year for mechanical engineering at the Institute, the School took the name of this benefactor and became the Woodruff School of Mechanical Engineering. Subsequently, it became apparent that other than this overt identification, the School had never publicly recognized any of its outstanding alumni. To rectify this situation, the Woodruff Distinguished Alumnus Award was inaugurated in 1989.

Lecture Series

The Annual Woodruff Distinguished Lecture

The George W. Woodruff Distinguished Lecture was established by the School in 1990 to recognize an engineer who has made an outstanding contribution to society and to provide a forum for that person to address and interact with the Georgia Tech community. Support for the lecture is made possible by an endowment given to the School by the late George W. Woodruff.

Dr. Charles M. Vest, President and Professor of Mechanical Engineering at the Massachusetts Institute of Technology, delivered the 1997 Woodruff Distinguished Lecture. He spoke about "What We Don't Know: Challenges for the Next Generation," and pointed out some areas where we are still ignorant despite scientific investigation. "By thinking about what we don't know, we can identify avenues of scientific and technological inquiry that have potentially high impact" The areas of ignorance include: information technology, energy and the environment, medicine and biology, the brain and neurosciences, and the physical universe. "Our challenge as a society" said Dr. Vest, "will be to construct a fertile and supportive climate for research of all kinds, so that we can continue to delve into these areas and encounter and frame
Dr. Vest is the fifteenth president of MIT. He earned his BSE in mechanical engineering in 1963 from West Virginia University, and both his MSE and Ph.D. degrees from the University of Michigan in 1964 and 1967, respectively. As a member of the faculty of MIT, his research interests are in the thermal sciences and in the engineering applications of lasers and coherent optics. A transcript of Dr. Vest's lecture may soon be found on the Woodruff School's web page at http://www.me.gatech.edu; click on Woodruff School Publications.

1990  Donald E. Peterson
Chairman and CEO, Ford Motor Company

1991  Samuel C. Florman
Author and Professional Engineer

1992  Chang-Lin Tien
Chancellor and A. Martin Berlin Professor of Mechanical Engineering,
University of California, Berkeley

1993  Sheila E. Widnall
Associate Provost and Abby Rockefeller Mauze Professor of Aeronautics and Astronautics,
Massachusetts Institute of Technology

1994  Roberto C. Goizueta
Chairman and CEO, The Coca-Cola Company

1995  James J. Duderstadt
President, University of Michigan

1996  Norman R. Augustine
Chairman and CEO, Lockheed Martin Company

1997  Charles R. Vest
President and Professor of Mechanical Engineering, Massachusetts Institute of Technology

Mr. Robert A. Lutz, President of the Chrysler Corporation, will be the 1998 Woodruff Distinguished Lecturer on Thursday, April 23, 1998.
Did You Know? (Facts for Fall Quarter 1996)

<table>
<thead>
<tr>
<th>Number of Undergraduate Students (ME&amp;NE)</th>
<th>1257</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Engineering</td>
<td>1049</td>
</tr>
<tr>
<td>Nuclear Engineering</td>
<td>33</td>
</tr>
<tr>
<td>Co-op Students at Work</td>
<td>175</td>
</tr>
<tr>
<td>Number of Freshman</td>
<td>223 (5 NE)</td>
</tr>
<tr>
<td>Number of Sophomores</td>
<td>225 (6 NE)</td>
</tr>
<tr>
<td>Number of Juniors</td>
<td>255 (6 NE)</td>
</tr>
<tr>
<td>Number of Seniors</td>
<td>346 (16 NE)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Graduate Students</th>
<th>445</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Engineering</td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td>187</td>
</tr>
<tr>
<td>Doctoral</td>
<td>171</td>
</tr>
<tr>
<td>Special</td>
<td>9</td>
</tr>
<tr>
<td>Nuclear Engineering and Health Physics</td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td>47</td>
</tr>
<tr>
<td>Doctoral</td>
<td>28</td>
</tr>
<tr>
<td>Special</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL** 1,702
The next chart shows the undergraduate and graduate student enrollment in the various Schools of the College of Engineering for fall quarter 1995 and 1996.

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>Undergraduates</th>
<th></th>
<th>Graduates</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace Engineering</td>
<td>245</td>
<td>239</td>
<td>190</td>
<td>202</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>825</td>
<td>764</td>
<td>117</td>
<td>110</td>
</tr>
<tr>
<td>Civil and Environmental Engineering</td>
<td>703</td>
<td>664</td>
<td>395</td>
<td>399</td>
</tr>
<tr>
<td>Electrical and Computer Engineering</td>
<td>1589</td>
<td>1622</td>
<td>735</td>
<td>714</td>
</tr>
<tr>
<td>Industrial and Systems Engineering</td>
<td>911</td>
<td>981</td>
<td>233</td>
<td>211</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>1136</td>
<td>1257</td>
<td>439</td>
<td>445</td>
</tr>
<tr>
<td>Materials Science and Engineering</td>
<td>70</td>
<td>124</td>
<td>157</td>
<td>164</td>
</tr>
<tr>
<td>Textile and Fiber Engineering</td>
<td>214</td>
<td>112</td>
<td>63</td>
<td>67</td>
</tr>
</tbody>
</table>

Note: Includes co-ops at work. Figures represent all data within the school, i.e., the figures for the School of Mechanical Engineering include data for Nuclear Engineering and Health Physics.
This past academic year, the Woodruff School awarded 248 bachelor's degrees and 119 graduate degrees: 91 master's degrees, and 28 Ph.D. degrees. These graduation numbers place the Woodruff School among the top producers of advanced degrees in mechanical engineering in the country. The chart below provides details on degrees awarded in the Woodruff School this past academic year; the next chart shows the breakdown of the bachelor's, master's, and doctoral degrees awarded in mechanical engineering, nuclear engineering, the Schools of the College of Engineering, and the totals in these categories for the Institute from summer 1995 through spring 1997. The last chart shows the number of degrees awarded by the College of Engineering by Schools for the past academic year: summer 1996 through spring 1997.

Did You Know?

<table>
<thead>
<tr>
<th>Number of Degrees Awarded 1996-1997</th>
<th>367</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Engineering</td>
<td></td>
</tr>
<tr>
<td>B.M.E.</td>
<td>238</td>
</tr>
<tr>
<td>M.S.; M.S.M.E.</td>
<td>72</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>21</td>
</tr>
<tr>
<td>Nuclear Engineering/Health Physics</td>
<td></td>
</tr>
<tr>
<td>B.N.E.</td>
<td>10</td>
</tr>
<tr>
<td>M.S.; M.S.N.E.; M.S.H.P.</td>
<td>19</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>7</td>
</tr>
</tbody>
</table>

Degrees Awarded From 1995 to 1997

<table>
<thead>
<tr>
<th>Bachelor's Degrees</th>
<th>Master's Degrees</th>
<th>Doctoral Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME</td>
<td>301</td>
<td>248</td>
</tr>
<tr>
<td>NE/HP</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>COE</td>
<td>1,413</td>
<td>1,230</td>
</tr>
<tr>
<td>Institute</td>
<td>2,122</td>
<td>1,794</td>
</tr>
</tbody>
</table>

Degrees Awarded for the College of Engineering by School for Summer 1996 - Spring 1997

<table>
<thead>
<tr>
<th>School</th>
<th>Bachelor's Degrees</th>
<th>Master's Degrees</th>
<th>Doctoral Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace Engineering</td>
<td>35</td>
<td>38</td>
<td>16</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>148</td>
<td>114</td>
<td>13</td>
</tr>
<tr>
<td>Civil and Environmental Engineering</td>
<td>176</td>
<td>114</td>
<td>13</td>
</tr>
<tr>
<td>Electrical and Computer Engineering</td>
<td>307</td>
<td>172</td>
<td>54</td>
</tr>
<tr>
<td>Industrial and Systems Engineering</td>
<td>264</td>
<td>91</td>
<td>14</td>
</tr>
<tr>
<td>Materials Science Engineering</td>
<td>17</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>248</td>
<td>91</td>
<td>28</td>
</tr>
<tr>
<td>Textile and Fiber Engineering</td>
<td>25</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>Totals (COE)</td>
<td>1,230</td>
<td>558</td>
<td>151</td>
</tr>
<tr>
<td>Totals for Institute</td>
<td>1,794</td>
<td>895</td>
<td>1,224</td>
</tr>
</tbody>
</table>

Note: Figures represent all data within the School, i.e., the figures for the School of Mechanical Engineering include data for the Nuclear Engineering and Health Physics Programs.
Faculty Awards

Dr. Jonathan Colton was promoted to the rank of full professor.

Dr. Kenneth Cunefare was promoted to the rank of associate professor and granted tenure.

George W. Woodruff Chair and Professor of Mechanical Engineering Jerry Ginsberg was elected Chair of the Technical Committee on Structural Acoustics and Vibrations of the Acoustical Society of America (ASA), and became a member of the Technical Council.

Professor Alan V. Larson received the Georgia Tech Outstanding Service Award.

Associate Professor Steven Liang is a Woodruff Faculty Fellow for the period July 1, 1997 through June 30, 2002.

Assistant Professor Christopher S. Lynch is the recipient of a 1997 NSF Career Award.

Regents' Professor David McDowell received the 1997 Nadai Award from the American Society of Mechanical Engineers (ASME). The award recognizes distinctive contributions to the field of engineering materials.

Professor G. Paul Neitzel was named a member of the NASA Microgravity Research Advisory Subcommittee (MRAS).

Associate Professor Jianmin Qu is a Woodruff Faculty Fellow for the period July 1, 1997 through June 30, 2002.

Assistant Professor David Rosen was selected the Metro Atlanta Engineer of the Year in Education for 1997.

Professor Richard Salant was elected a Fellow of the STLE.

Assistant Professor Suresh Sitaraman received a 1997 Career Award from NSF.

Associate Professor Charles Ume was awarded a patent for "Method and Apparatus for Measuring
Professor **Raymond Vito** was elected a Fellow of the ASME.

Dr. **Chris Wang** was promoted to the rank of associate professor and granted tenure.

Regents' Professor and Chair of the Woodruff School, **Ward O. Winer**, has been named the 1996 winner of the Society of Tribologists and Lubrication Engineer's (STLE) International Award.

Professor **Ajit Yoganathan** won the 1997 ASME H. R. Lissner Award.

David S. Lewis Jr. Chair and Regents' Professor **Ben Zinn** received the Georgia Tech Outstanding Achievement in Research Program Development Award.

Associate Professor **Cheng Zhu** is a Woodruff Faculty Fellow for the period July 1, 1997 through June 30, 2002.

**Student Awards**

**Quixote Atkins** received a GEM Minority Student Fellowship.

**Grant Baynham** received the Robert Cup, which honors a senior student athlete.

**Reid Bailey** won a Predoctoral Fellowship in Integrated Manufacturing from the U.S. Department of Energy.

**Lawrence Butkus** received the ASEE Award and the Luther S. Long III Memorial Award in Engineering Mechanics.

**Brent Capell** won an NSF Graduate Fellowship and the Outstanding Scholastic Achievement Award from the Nuclear Engineering Program.

**Jorge G. Cham** was given the School Chair's Award, which goes to a graduating senior with outstanding scholarship and contributions to the Woodruff School.

**Audra Cockerham**, **Ted Michel**, **James Reeves**, **Alex Vandergrift**, and **Garig Vanderveldt** were members of the senior design team which won the Georgia Engineering Senior Design Award.
Scott Coleman won a CETL/Amoco Foundation Graduate Teaching Assistant Teaching Excellence Award. Scott Cowan received a NASA GSRP Fellowship.

David H. Cowden IV received the George W. Woodruff School of Mechanical Engineering Outstanding Scholar Award.

Stacey Dixon received the ASME Graduate Teaching Fellowship.

Tom Evans was accorded the Sigma Xi Outstanding Ph.D. Dissertation Award.

Jacob Gelbaum won a Georgia Tech Faculty Women's Club Scholarship, which is given to the children of Georgia Tech employees.

Steven M. Gilbert was presented the Pi Tau Sigma Outstanding Senior Award.

Christie Gooch was awarded a GEM Minority Student Fellowship.

Ali Gordon won a GEM Minority Student Fellowship and is a Sloan Fellow.

Richard Gregory received a NASA GSRP Fellowship.

Jennifer Hsieh was presented a Georgia Tech Faculty Women's Club Scholarship, granted to students who are sons and daughters of Georgia Tech employees.

Gail Jefferson won a GEM Minority Student Fellowship.

Caliph Johnson was awarded a GEM Minority Student Fellowship.

Cliff Johnson received an NSF Graduate Fellowship.

Wayne Johnson won an NSF Graduate Fellowship, a NASA GSRP Fellowship, and a Ford Foundation Fellowship.

Janeen Jones won a GEM Minority Student Fellowship.

David Loganbach received the ASME Marjorie Roy Rothermal Scholarship.

Scott Mosher won a Department of Energy Nuclear Engineering Fellowship.
P. J. Newcomb received the Distinguished Paper Award from the ASME Design Theory and Methodology Conference.

Mary Nopolitano won the Best Paper Award at the SEAAPM Annual Meeting.

Carrie Nottingham received an NSF Graduate Fellowship.

Christopher Pascual was awarded an ASHRAE Graduate Student Grant-in-Aid and an ASME Graduate Teaching Fellowship.

Yarom Polsky received an INTEL Fellowship.

Ali Razavi received the High Score on the Ph.D. Qualifying Exam Award.

Jeff Thiele won an NSF graduate Fellowship.

Jason V. Tsai was presented the Richard K. Whitehead Memorial Award for being an outstanding mechanical engineering senior.

Tara M. Varga won the Pi Tau Sigma Outstanding Sophomore Award.

Felipe Verela won a GEM Minority Student Fellowship.

Tina Wang won the Samuel P. Eschenbach Memorial Award in Mechanical Engineering.

Andrew M. Welch won the Atlanta Section, ASME Walter O. Carlson Memorial Award.
Fellowship Holders

During the period from July 1, 1996 to June 30, 1997, Woodruff School students were awarded more than $1.52 million dollars in fellowships for graduate study; in 1995-1996 that amount was $1.36 million. The impressive quality of the graduate student body is demonstrated by the presence of 62 Georgia Tech President’s Fellows and 61 winner of prestigious fellowships from agencies such as the National Science Foundation.

ANS (AMERICAN NUCLEAR SOCIETY) ROBERT DANNELS MEMORIAL
Jeffrey A. Favorite (NE)

ARCS (ACHIEVEMENT REWARDS FOR COLLEGE SCIENTISTS) FOUNDATION ATLANTA CHAPTER SCHOLARS
Stacey Dixon
Staci Edlund
Ashley James
David Wootton

ASME (AMERICAN SOCIETY OF MECHANICAL ENGINEERS) GRADUATE TEACHING FELLOWSHIP Stacey Dixon
Christopher Pascual

DEPARTMENT OF ENERGY, INTEGRATED MANUFACTURING FELLOWSHIP
Matthew Bauer
Stewart Coulter
John Hogan

DEPARTMENT OF ENERGY HEALTH PHYSICS FELLOWSHIP
Scott McKinley

DUKE POWER FELLOWSHIP
Nicolae Gheorghiu
Michael Stinson

FORD FOUNDATION GRADUATE FELLOWSHIP
Gena Poe (HP)
Jerry Volcy
Brian Williams

GEM (GRADUATE EDUCATION FOR MINORITIES) MS FELLOWSHIP
Brent Fennell
Ervin Flores
Phillip Harp
Kimberly Haynes
Sundiata Jangha
Omar Kuhn
Momar Mattocks
Irvin Marrero-Rosa
Kyle Ray
Susan Salcedo
Walter Sutherlin

GEORGIA TECH CIMS (COMPUTER INTEGRATED MANUFACTURING) FELLOWSHIP

Kevin Kamphuis
Andrew McLaughlin
Melissa Sandlin

GEORGIA TECH PRESIDENT’S FELLOWSHIP

Amanda Adams
Laura Atkinson
Matthew Bauer
Steve Benintendi
Valerie Bennett
Harris Bergman
Scott Billington
Vatsal Bulsara
Derrick Coffin
Scott Coleman
Stewart Coulter
Frederick Cowan
Richard Cowan
Nathan Davis
Alexandra DeKok
Lisa Dixon
Stacey Dixon
Ty DuVal
Staci Edlund
Jeffrey Ellis
Eric Eshleman
Jeffrey Favorite (NE)

Matthew Hrinyak
Chien Hsiung
Courtney James
Cliff Johnson
Kemper Lewis
Josiah Lindsay
Thomas Logan
David Longanbach
Benigno Maqueira
Matthew Marston
Robert McGinty
Mark McIntosh
Brad Miller
Matthew Miller
Ryan Morrissey
Greg Mumpower
Christopher
Pascual
Jesse Peplinski
Gena Poe
Orlando Ruiz
Andrew Scholand
Michael Schreiber
Brian Gardner
Samual Graham, Jr.
Richard Hamm
Susan Harp
Comas Haynes
William Healy
Samuel Heffington
Stephen Hill
Andrew Honohan
Sandra Hopko

Tomothy Simpson
Michael Smith
Shane Stone
Matthew Thomspan
Mark Trautman
Thomas Tucker
Donald Upton
Jerry Volcy
Brian Williams
David Wootton
Adele Wright

GLEN FELLOWSHIP
Jean Davis
Mark Gillespie
Mario Gomes
Kenneth Hamall
John Hogan
Ai-Ping Hu
Patrick Koch
Griffith Russell
Dror Seliktar
Charlotte Song
Jeffrey Thiele
Patrick Wilkerson

GWALTNEY MANUFACTURING TRAINEESHIP
Patrick Koch

INPO (INSTITUTE FOR NUCLEAR POWER OPERATIONS) FELLOWSHIP
Adam Nielson
(HP) Zella Sasnett (HP)
Kenneth Veinot (HP)

INTEL GRADUATE FELLOWSHIP
Joseph Levert

KVAERNER FELLOWSHIP
Yee-Wang Low
Kjartan Pedersen
NASA GRADUATE FELLOWSHIP

Steve Benintendi
Pat Blanchet
Noelle Currey
Andrew Honohan
Thomas Lacy
Josiah Lindsay

NATIONAL DEFENSE SCIENCE &
ENGINEERING GRADUATE FELLOWSHIP

Richard Cowan

NIH TRAINEESHIP

Scott Chesla
Nathan Davis
Dror Seliktar
Tom Williams

NSF GRADUATE FELLOWSHIP

Laura Atkinson
Alexandra DeKok
Stacey Dixon
Ty DuVal
Jeffrey Favorite (NE)
Comas Haynes
William Healy
Stephen Hill
Sandra Hopko
Stephanie Kladakis
Matthew Marston
Angela Minichiello
Jennifer Morrissette
Timothy Simpson
Adele Wright
Claudia Zettner

NSF/GEE GRADUATE FELLOWSHIP

Staci Edlund
Samuel Graham, Jr.
Benigno Maqueira
Calvin Martin
NSF TRIBOLOGY TRAINEESHIP
Susan Harp
Leonard Lay
Bradley Miller

REGENTS’ OPPORTUNITY SCHOLARSHIP
Valerie Bennett
Eugenia Duncan
Edward Fye

SAE (SOCIETY OF AUTOMOTIVE ENGINEERS) DOCTORAL FELLOWSHIP
Miodrag Oljaca

SLOAN FOUNDATION DOCTORAL FELLOWSHIP
Wayne Johnson
Gena Poe
Orlando Ruiz

US AIR FORCE DOCTORAL TRAINEESHIP
Lawrence Butkus

US AIR FORCE PALACE KNIGHT FELLOWSHIP
Ryan Morrissey

US ARMY DOCTORAL TRAINEESHIP
Albert Tanner

WHITAKER FELLOWSHIP
Amanda Adams
Harris Bergman
Nathan Davis
Christopher Hunter
Bridget Hurley
Bryan Marshall
Dror Seliktar
David Wootton
Adele Wright

WOODRUFF FELLOWSHIP
Mark Gillespie
John Hogan
Ai-Ping Hu
WOODRUFF TEACHING INTERNS
Jesse Lim
Eleodor Nichita
Klaus Obergfell

YOPP FELLOWSHIP
Claudia Zettner
Did You Know?

Number of Faculty (Tenure Track) 60
  Mechanical Engineering 53
  Nuclear Engineering and Health Physics 7
  (Faculty with a Ph.D.: 100%)
  (Faculty with Tenure: 75%)
Joint Appointments 6
Endowed/Distinguished Faculty 7
Research Faculty 18
  (With a Ph.D.: 8)
  (With an M.D.: 1)
Academic Professionals 1
Adjunct and Part-Time Faculty 8
Postdoctoral Fellows 18
Visiting Scholars 22
Support Staff 43

Woodruff School Academic Faculty

**Said I. Abdel-Khalik**, Southern Nuclear Distinguished Professor and Professor of Nuclear Engineering
Ph.D., University of Wisconsin, 1973
Heat Transfer, Combustion and Energy Systems;
Nuclear and Radiological Engineering and Health Physics

**Daniel F. Baldwin**, Assistant Professor
Ph.D., Massachusetts Institute of Technology, 1994
Manufacturing; Computer-Aided Engineering and Design

**Yves H. Berthelot**, Professor
Ph.D., University of Texas at Austin, 1985
Acoustics and Dynamics
William Z. Black, Georgia Power Distinguished Professor and Regents’ Professor  
Ph.D., Purdue University, 1968  
Heat Transfer, Combustion and Energy Systems

Wayne J. Book, Professor  
Ph.D., Massachusetts Institute of Technology, 1974  
Automation and Mechatronics; Acoustics and Dynamics

Bert A. Bras, Assistant Professor  
Ph.D., University of Houston, 1992  
Computer-Aided Engineering and Design; Manufacturing

Robert S. Cargill, Assistant Professor  
Ph.D., University of Pennsylvania, 1994  
Bioengineering

Ye-Hwa Chen, Associate Professor  
Ph.D., University of California, Berkeley, 1985  
Automation and Mechatronics; Manufacturing

Jonathan S. Colton, Professor  
Ph.D., Massachusetts Institute of Technology, 1986  
Manufacturing; Tribology

Kenneth A. Cunefare, Associate Professor  
Ph.D., Pennsylvania State University, 1990  
Acoustics and Dynamics; Computer-Aided Engineering and Design

Steven M. Danyluk, Morris M. Bryan, Jr. Chair in Mechanical Engineering for Advanced Manufacturing Systems and Professor of Mechanical Engineering  
Ph.D., Cornell University, 1974  
Manufacturing; Tribology; Mechanics of Materials

Prateen V. Desai, Professor  
Ph.D., Tulane University, 1967  

Aldo A. Ferri, Associate Professor  
Ph.D., Princeton University, 1985  
Acoustics and Dynamics; Automation and Mechatronics

Show Hwa Fong, Assistant Professor  
Ph.D., Northwestern University, 1990  
Nuclear and Radiological Engineering and Health Physics

Robert E. Fulton, Professor  
Ph.D., University of Illinois, 1960  
Computer-Aided Engineering and Design; Automation and Mechatronics

S. Mostafa Ghiaasiaan, Associate Professor  
Ph.D., University of California, Los Angeles, 1983  
Heat Transfer, Combustion and Energy Systems;  
Nuclear and Radiological Engineering and Health Physics

Jerry H. Ginsberg, George W. Woodruff Chair in Mechanical Systems and Professor of Mechanical Engineering
Ari Glezer, Professor
Ph.D., California Institute of Technology, 1981
Fluid Mechanics; Heat Transfer, Combustion and Energy Systems

Itzhak Green, Professor
Sc.D., Technion-Israel Institute of Technology, Haifa, Israel, 1984
Tribology; Acoustics and Dynamics

Robert E. Guldberg, Assistant Professor
Ph.D., University of Michigan, 1995
Bioengineering; Mechanics of Materials

James G. Hartley, Professor
Ph.D., Georgia Institute of Technology, 1977
Heat Transfer, Combustion and Energy Systems

Nolan E. Hertel, Associate Professor
Ph.D., University of Illinois, 1979
Nuclear and Radiological Engineering and Health Physics

Jacek Jarzynski, Professor
Ph.D., Imperial College of Science and Technology, London, 1961
Acoustics and Dynamics; Tribology

Iwona M. Jasiuk, Associate Professor
Ph.D., Northwestern University, 1986
Mechanics of Materials; Bioengineering

Sheldon M. Jeter, Associate Professor
Ph.D., Georgia Institute of Technology, 1979
Heat Transfer, Combustion and Energy Systems

Prasanna V. Kadaba, Associate Professor
Ph.D., Illinois Institute of Technology, 1964
Computer-Aided Engineering and Design; Heat Transfer, Combustion and Energy Systems

David N. Ku, Professor
M.D., Emory University, 1984, Ph.D.,
Georgia Institute of Technology, 1983
Bioengineering; Fluid Mechanics

Thomas R. Kurfess, Associate Professor
Ph.D., Massachusetts Institute of Technology, 1989
Manufacturing; Automation and Mechatronics

W. Jack Lackey, Professor
Ph.D., North Carolina State University, 1970
Mechanics of Materials; Manufacturing

Alan V. Larson, Professor and Associate Chair for Administration
Ph.D., University of Illinois, 1961
Heat Transfer, Combustion and Energy Systems

Kok-Meng Lee, Associate Professor
Ph.D., Massachusetts Institute of Technology, 1985
Automation and Mechatronics

Steven Y. Liang, Associate Professor
Ph.D., University of California, Berkeley, 1987
Manufacturing; Automation and Mechatronics; Computer-Aided Engineering and Design

Harvey Lipkin, Associate Professor
Ph.D., University of Florida, 1985
Automation and Mechatronics; Computer-Aided Engineering and Design

Christopher S. Lynch, Assistant Professor
Ph.D., University of California, Santa Barbara, 1992
Mechanics of Materials

David L. McDowell, Regents' Professor
Ph.D., University of Illinois, 1983
Mechanics of Materials; Computer-Aided Engineering and Design

Shreyes N. Melkote, Assistant Professor
Ph.D., Michigan Technological University, 1993
Manufacturing; Tribology

Farrokh Mistree, Professor
Ph.D., University of California, Berkeley, 1974
Computer-Aided Engineering and Design; Manufacturing

G. Paul Neitzel, Professor
Ph.D., Johns Hopkins University, 1979
Fluid Mechanics; Heat Transfer, Combustion and Energy Systems

Robert M. Nerem, Institute Professor and Parker H. Petit Distinguished Chair for Engineering in Medicine
Ph.D., Ohio State University, 1964
Bioengineering; Fluid Mechanics

Richard W. Neu, Assistant Professor
Ph.D., University of Illinois, 1991
Mechanics of Materials; Tribology

John G. Papastavridis, Associate Professor
Ph.D., Purdue University, 1976
Acoustics and Dynamics; Automation and Mechatronics

Jianmin Qu, Associate Professor
Ph.D., Northwestern University, 1987
Mechanics of Materials; Acoustics and Dynamics

Farzad Rahnema, Associate Professor
Ph.D., University of California, Los Angeles 1981
Nuclear and Radiological Engineering and Health Physics

Peter H. Rogers, Rae and Frank H. Neely Distinguished Professor in Mechanical Engineering
Ph.D., Brown University, 1970
Acoustics and Dynamics; Bioengineering

David W. Rosen, Assistant Professor
Nader Sadegh, Associate Professor
Ph.D., University of California, Berkeley, 1987
Automation and Mechatronics; Acoustics and Dynamics

Richard F. Salant, Professor
Sc.D., Massachusetts Institute of Technology, 1967
Tribology; Fluid Mechanics

Sam V. Shelton, Associate Professor
Ph.D., Georgia Institute of Technology, 1969
Heat Transfer, Combustion and Energy Systems; Fluid Mechanics

Suresh Sitaraman, Assistant Professor
Ph.D., Ohio State University, 1989
Computer-Aided Engineering and Design; Manufacturing; Mechanics of Materials

Marc K. Smith, Associate Professor
Ph.D., Northwestern University, 1982
Fluid Mechanics

Weston M. Stacey, Jr., Fuller E. Callaway Professor and
Regents' Professor of Nuclear Engineering
Ph.D., Massachusetts Institute of Technology, 1966
Fusion; Nuclear and Radiological Engineering and Health Physics

Jeffrey L. Streator, Associate Professor
Ph.D., University of California, Berkeley, 1990
Tribology

Charles Ume, Associate Professor
Ph.D., University of South Carolina, 1985
Manufacturing; Automation and Mechatronics

Raymond P. Vito, Professor and Associate Chair for Undergraduate Studies
Ph.D., Cornell University, 1971
Bioengineering; Computer-Aided Engineering and Design

C.-K. Chris Wang, Associate Professor
Ph.D., Ohio State University, 1989
Nuclear and Radiological Engineering and Health Physics

William J. Wepfer, Professor and Associate Chair for Graduate Studies
Ph.D., University of Wisconsin, 1979
Heat Transfer, Combustion and Energy Systems

Ward O. Winer, Regents' Professor and Chair,
Woodruff School of Mechanical Engineering
Ph.D., Cambridge University, 1964, Ph.D., University of Michigan, 1961
Tribology; Fluid Mechanics

Minami Yoda, Assistant Professor
Ph.D., Stanford University, 1993
Fluid Mechanics; Heat Transfer, Combustion and Energy Systems
Min Zhou, Assistant Professor
Ph.D., Brown University, 1993
Mechanics of Materials

Cheng Zhu, Associate Professor
Ph.D., Columbia University, 1988
Bioengineering

Academic Faculty with Joint Appointments

W. Steven Johnson, Professor of Materials Science and Engineering
Ph.D., Duke University, 1979
Mechanics of Materials

Gunter H. Meyer, Professor of Mathematics
Ph.D., University of Maryland, 1967
Heat Transfer, Combustion and Energy Systems; Tribology

Amyn S. Teja, Regents' Professor of Chemical Engineering
Ph.D., Imperial College, London, 1972
Heat Transfer, Combustion and Energy Systems

Timothy M. Wick, Associate Professor of Chemical Engineering
Ph.D. Rice, University, 1988
Bioengineering; Fluid Mechanics

Ajit P. Yoganathan, Regents' Professor of Chemical Engineering
Ph.D., Rice University, 1978
Bioengineering; Fluid Mechanics

Ben T. Zinn, David S. Lewis Chair of Aerospace Engineering and Regents' Professor
Ph.D., Princeton University, 1965
Acoustics and Dynamics; Heat Transfer, Combustion and Energy Systems

Academic Professionals

James Michael Wileman, Academic Professional (Adjoint au Directeur de Génie Mécanique at Georgia Tech Lorraine, Metz, France)
Ph.D., Georgia Institute of Technology, 1994
Tribology; Acoustics and Dynamics

Adjunct Professors and Part-Time Appointments

Cyrus K. Aidun, Adjunct Professor, Institute of Paper Science and Technology
Ph.D., Clarkson University, 1985
Fluid Mechanics

L. Dennis Ballou, Part-Time Instructor
Stephen L. Dickerson, Professor Emeritus (part-time)
Ph.D., Massachusetts Institute of Technology, 1965
Manufacturing; Automation and Mechatronics

Mario J. Goglia, Regents' Professor Emeritus (part-time)
Ph.D., Purdue University, 1948

William C. Hutton, Adjunct Professor, Emory University
Ph.D., University of Birmingham, England, 1984
Bioengineering

Rodney D. Ice, Adjunct Professor, Neely Nuclear Reactor
Ph.D., Purdue University, 1967
Nuclear and Radiological Engineering and Health Physics

J. Ernest Wilkins, Jr., Adjunct Professor, Clark-Atlanta University
Ph.D., University of Chicago

Ward Whicker, Visiting Professor (part-time)
Ph.D., Colorado State University, 1964
Nuclear and Radiological Engineering and Health Physics

Janet Allen, Senior Research Scientist
Ph.D., University of California, Berkeley, 1973
Computer Aided-Engineering and Design; Heat Transfer, Combustion and Energy Systems

Scott S. Bair, Principal Research Engineer
Ph.D., Georgia Institute of Technology, 1990
Tribology

Van B. Biesel, Research Engineer I
M.S., Georgia Institute of Technology, 1993
Acoustics and Dynamics

John R. Bogle, Research Engineer II
M.S., Georgia Institute of Technology, 1987
Acoustics and Dynamics

Richard S. Cowan, Research Engineer II
M.S., Georgia Institute of Technology, 1992
Tribology

Michael L. Dowling, Research Engineer II
M.S., University of Illinois, 1990
Heat Transfer, Combustion and Energy Systems

Steven R. Hahn, Research Engineer II
M.S., Georgia Institute of Technology, 1988
Acoustics and Dynamics

Lula L. Hilenski, Research Scientist II
Gregg D. Larson, Research Engineer II
Ph.D., Georgia Institute of Technology, 1996
Acoustics and Dynamics

Thomas N. Lewis, Research Engineer II
Ph.D., Georgia Institute of Technology, 1994
Acoustics and Dynamics; Bioengineering

Yu-Hua Li, Research Scientist II
M.D., Peking Union Medical University, Beijing, China. 1991
Bioengineering

Joey G. Lloyd, Research Engineer I
B.S., Georgia Institute of Technology, 1988
Acoustics and Dynamics

James S. Martin, Research Engineer II
M.S., Georgia Institute of Technology, 1994
Acoustics and Dynamics

George S. McCall, II, Research Engineer II
M.S., Georgia Institute of Technology, 1994
Acoustics and Dynamics

Dennis L. Sadowski, Research Engineer II
M.S., University of Illinois, 1986
Fluid Mechanics; Heat Transfer, Combustion and Energy Systems

Guang-Fa Yao, Research Engineer II
Ph.D., Georgia Institute of Technology, 1996
Heat Transfer, Combustion and Energy Systems; Fluid Mechanics

Xuezhen Zhang, Research Scientist II
M.S. Nanjing University, 1963
Acoustics and Dynamics

Ji-Xun Zhou, Principal Research Scientist
Ph.D., Chinese Academy of Sciences, 1967
Acoustics and Dynamics

Woodruff School Staff

Ernestine Bradley, Administrative Assistant II
Donald F. "Butch" Cabe, Manager of Facilities
Anna Chromiak, Medical Research Assistant III
Tilden E. "Gene" Clopton, Director of Special Projects
Phillip R. Coulson, Accountant II
Betty M. Crumbley, Administrative Assistant I
Andrew G. "Drew" Davis, Electronics Technician III
Martin L. Davisson, Systems Analyst III
Royal F. "Pete" Dawkins, Director of Finance
Judith E. Diamond, Senior Administrative Secretary
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Jeffrey A. Donnell, Communications Program Coordinator
Debra L. Finney, Administrative Assistant II
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Phyllis R. Frost, Administrative Supervisor II
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Cosetta W. Gibson, Academic Assistant II
Rona A. Ginsberg, Director of Publications and Public Relations
John W. Graham, Machine Shop Manager
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David W. Stone, Accountant II
Chelcea Harper Warren, Academic Assistant I
June Weddington, Administrative Assistant II
Melinda A. Wilson, Manager of Administrative Services
John Witzel, Electrical Engineer II
The following publications are available from the Woodruff School.

*Bonjour, Georgia Tech: The George W. Woodruff School of Mechanical Engineering Introduces a Graduate Program for Study in France*;
*The 1996 Annual Report Summary (An Overview of the School)*;
*The 1996 Woodruff Distinguished Lecture Transcript (Norm Augustine); "Yes, But Will It Work in Theory?" The George W. Woodruff School of Mechanical Engineering's Video-Based Master's Degree Programs (Graduate Programs for Working Professionals in Mechanical Engineering and Health Physics)*;
*The Undergraduate Nuclear and Radiological Engineering Program at Georgia Tech*;
*mega tech* (alumni newsletter, winter 1997, issue 16);
*mega tech* (alumni newsletter, spring-summer 1997, issue 17);

**See The Web: http://www.me.gatech.edu**

The use of the Woodruff School's home page has increased significantly from last year. The number of hits per day from April 1997 to September 1997 has doubled, and nearly quadrupled at some points, than during the same time period in 1996.

Over 57,700 hits were recorded on the World Wide Web page from July 1, 1996 to June 30, 1997. These were from over 15,900 (unique) computers on over 8,400 different subnets. Only about 1,400 of these machines were at Georgia Tech.

This trend is expected to continue as more information is made available via the Woodruff home page. We have made a number of revisions to the School's web page; go to our home page at: http://www.me.gatech.edu and look for our publications by clicking on Woodruff School Publications; view the list of lectures and seminars under Seminars; open the Calendar of Events to find out what's happening in the School; see Academic Programs for information about all the graduate and undergraduate degrees offered by the School; view Theses and Dissertations for an archival record of the abstracts of Ph.D. Proposals and M.S. and Ph.D. Thesis Presentations; open ME Program at GT Lorraine (France) for information on this study-abroad program; and click on Photo Gallery for a pictorial display of recent School events. Other areas will be opened or updated soon. Also check out http://www.me.gatech.edu/ne_re_hp for information on the nuclear and radiological engineering and health physics programs.
For fiscal year 1997 (July 1, 1996 to June 30, 1997), the Woodruff School's finances were reflected in the number of grants and contracts received from external sources, the budget of the School (state support), and the revenue generated from the Woodruff Endowment. These categories break down as given below. Detailed information on any of these categories is available from the School's Director of Finance, Pete Dawkins, at (404) 894-7400.

**Grants and Contracts**

Total new funds received on external/internal grants and contracts active during FY 97 (includes endowment revenue) $19,423,485
Endowment and externally funded grant and contract expenditures \(a\) $12,957,934
Internally funded grant expenditures \(b\) $724,786
Total grant, contract, and endowment expenditures $13,682,720

**Number of Grants, Contracts, and Proposals**

Total number of active (external/internal) grants and contracts (includes endowment accounts) 377
Number of proposals submitted to external agencies 164
Number of externally funded grants, contracts, and endowments receiving new funds 200
Number of internally funded grants receiving new funds 18

**School Budget**

State support $8,157,328
Sponsored grant support \(c\) $11,056,360
Total budget $19,213,688

**Endowments**

Total endowment (market value principal) $45,189,418
Endowment-generated revenue available for expenditure $1,754,145

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\(a\) Includes direct costs, fringe benefits, and overhead, where applicable.

\(b\) Includes direct costs and fringe benefits (overhead if applicable).

\(c\) Includes direct costs but not overhead.
The market value of the Mechanical Engineering Woodruff Endowment on July 1, 1996 was $35,660,574. The endowment generated $1,282,215 that was available to the Woodruff School to update and enrich our programs. The expenditures may be categorized as follows: faculty, students, facilities, lectures and seminars, staff, publications, and general projects/supplies. A breakdown of the use of these funds includes:

**Faculty**

- Funds from the Woodruff Trust are used to endow the George W. Woodruff Chair in Mechanical Systems. This chair is held by Dr. Jerry H. Ginsberg, Professor of Mechanical Engineering and the recipient of the 1994 Distinguished Professor Award - the Institute's highest faculty award.
- Funds developmental leaves for faculty;
- Funds the Woodruff Faculty Fellows Program, which encourages young professors to build their careers at Georgia Tech by providing seed money ($10,000) for research projects and other discretionary activities; the award is given for a five-year period. In the past academic year, the faculty fellows were: Yves Berthelot, Jonathan Colton, Aldo Ferri, Itzhak Green, Kok-Meng Lee; new fellows this year (for the period July 1, 1997 through June 30, 2002) are: Steven Liang, Jianmin Qu, and Cheng Zhu;
- Provides funds for the yearly Faculty Retreat.

**Students**

- During the course of the academic year, approximately 85 graduate student quarters were funded for research and teaching assistants in the Woodruff School; they receive an average rate of $3,300 a quarter;
- Awards Woodruff Graduate Fellowships to outstanding Ph.D. students; currently there are ten holders of these fellowships (Mark Gillespie, John Hogan, Ai-Ping Hu, Patrick Koch, Gene Poe, Griffith Russell, Dror Seliktra, Charlotte Song, Jeffrey Thiele, and Patrick Wilkerson).
- Provides funds for the Woodruff Doctoral Teaching Program, which enables graduate students interested in academic careers to team-teach with a senior faculty member; three graduate students (Jesse Lin, Eleodor Nichita, and Klaus Obergfell) participated in this program in the past academic year.
- Provides funds to recruit new graduate students to the Woodruff School;
- Gives money for the ME Spring Banquet, a yearly gathering of students, staff, and faculty to recognize the accomplishments of Woodruff School students.
- Partially funds the GT Motorsports competition;
- Funds for the Résumé Book, a yearly presentation of the résumés of doctoral students at the School who are close to finishing their degree and are seeking employment.
Facilities

- Funds for general provisions for the various research labs;
- Provides funds to improve and furnish School facilities, including the CAE lab, an upgrade to the fluids space, machine tools, electronics lab, graduate student offices, general furnishings, materials lab, computer network for MRDC, security systems (ADT card readers), upgrade to the Woodruff School Student Advisory Committee (WSSAC) office, the tribology lab, and the undergraduate computer cluster;
- Funds for a hospitality suite at the ASME National Meeting in Atlanta in November 1996.

Lectures/Seminars

- Funds for the Annual Woodruff Distinguished Lecture;
- Provides for the Woodruff Seminar Series.

Publications

- The following publications were made possible under the endowment: the annual report and the annual report summary, *mea tech* (the newsletter for Woodruff School alumni), brochures on Georgia Tech Lorraine, the media-based master's degree programs, the undergraduate nuclear and radiological engineering program at Georgia Tech brochure, and the student newsletter.

Training

- Funds for both off-site and on-site staff training programs.

Miscellaneous Projects

- Provides funds for the Woodruff School Advisory Board meetings. Gives money to maintain the Pi Tau Sigma (the ME honorary organization) National Office;
- Funds for office equipment improvements;
- Money to purchase computers for offices and laboratories, and for the implementation of the Banner System used for such things as student registration;
- Provides money to furnish faculty and staff offices;
- Funds for the general network server;
- Funds to purchase a van for the School.
THE ADVISORY BOARD

The Woodruff School Advisory Board meets twice annually (in the spring and the fall). Members are invited to join the Board so that its composition reflects the varied scope of mechanical engineering in industry, the health-related professions, and the academic community. The purpose of the Advisory Board is to recommend strategic direction for the School, suggest broad-based curriculum revisions, and consult with the Chair and faculty on issues that are important to the Woodruff School.

Two areas of interest to the Board this year were the School's preparation for an ABET accreditation visit in fall 1997, and the REGEnts' mandated conversion of the Georgia Tech calendar from quarters to semesters. The last two advisory board meetings were convened in November 1996 and in May 1997. A list of the members and a synopsis of both meetings are given below.

The Members of the Board

Mr. Kerry E. Adams ('58)
Executive Vice President
Southern Company Services, Inc.
Birmingham, Alabama

Mr. Cary D. Baldwin ('67)
Manager, Human Resource Placement
United Technologies
West Palm Beach, Florida

Dr. David Bogy
Chairman, Department of Mechanical Engineering
University of California
Berkeley, California

Mr. James R. Borders ('83)
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University of Minnesota  
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Distinguished Professor of Applied Mathematics and
Mathematical Physics
Clark Atlanta University
Atlanta, Georgia

Dr. Larry Ybarrondo ('64)
CEO, Scientech, Inc.
Idaho Falls, Idaho

Synopsis of the November 7-8, 1996 Meeting

Dr. Ward Winer presented an overview of the Woodruff School. Dr. Ray Vito discussed the program of
study for undergraduate students, and how credit hour requirements would be affected by the semester
conversion. Dr. Sheldon Jeter presented an overview of our labs.

Dr. Nolan Hertel discussed the status and content of the BNRE program, and developments in the video
delivery of the health physics master's degree. In the future, shared NE/HP resources among universities
may be necessary to supplement core curriculum among campuses.

The video market is strong according to Dr. William Wepfer, Associate Chair for Graduate Studies. The
master’s program in health physics expanded in the 1980's. Approximately 15% of the nation's master's
degrees in health physics graduate from Georgia Tech, and about 75 have graduated through the Distance
Learning Program.

The MSME video program has about 50 students enrolled in 1996. The video program in Nuclear
Engineering was added in 1993-1995, but is not as successful. We need to maintain quality so that the
student who receives the MSHP or MSME on video receives the same degree as the on-campus student -
which is one of the distinguishing features of our video program.

The job market influences the number of applications for graduate school. From fall 1995 to fall 1996 we
saw a 25% drop in graduate school applications because the job market is so good. Another drop is
expected next year.

Dr. Tom Kurfess discussed the foundation for the curriculum, and the issue of breadth versus depth. We
currently have two tracks - mechanical systems and thermal systems, and electives for the student to use
for specialization. Because a student will take approximately two-thirds as many courses in a semester
system, we must be concerned with course and concept integration. The Board supported breadth of
subject coverage in the bachelor's degree, and no more specialization than the two-branch approach in the current program.

Our writing program, according to Dr. Jeffrey Donnell, is different from those of other schools. Communication is linked to the engineering projects in instructional labs and design courses. The Board agreed it would be very useful if we could model a similar program around professionalism and ethics.

Ms. Connie Parish, Director for Development, outlined the Campaign for Georgia Tech. The campaign goal for the University is $400 million. The Woodruff School has a $30 million goal. By the end of October, we raised almost $3.8 million. That includes a little over $2 million in new money. Our objective is to have a campaign kickoff in the spring of 1997. To do that, we need to have one-third of our goal, which is $10 million.

Synopsis of the May 2, 1997 Meeting

Dr. Ward Winer informed the Board about the new CAE Lab and the new acoustics facility. He updated the Board on ME's participation in Georgia Tech Lorraine. This program will include three or four faculty, a master's program, simultaneous classes with a video conferencing center, and funds from the French government. The site plans for MRDC II were outlined. It was also announced that Jack Zeigler has donated $100,000 to furnish the MRDC lobbies.

Dr. Tom Kurfess presented the background on the proposed ME semester curriculum: the utilization of humanities and social sciences, engineering economy, the electrical engineering lecture/lab, the mechanics of materials course sequence control/modeling/vibrations, design sequences, mechanical/thermal labs combined, electives, writing, and an ME tools course.

Future items: the refinement of core courses and electives, work involving service courses from other Georgia Tech schools, and the integration of a writing program. By June, the bulk of the core curriculum should be completed. The inclusion of the micro/macroeconomics courses has been approved by the faculty.

B. Millikan stressed the importance of co-op program, and the need to accommodate it in the new curriculum. C. Ray asked, "how do you get more breadth by cutting back hours?" Dr. Winer stated that there has been a shift from depth to breadth by eliminating the two branches (thermal and mechanical) in the required program. Dr. Vito added that this curriculum is more demanding, and that causes him concern. W. Johnson asked, "Who comes up with this criteria?" (general education and the 120-hour limit). Dr. Winer answered the Board of Regents' requires them. L. Ybarondo: "The student's curriculum should include a soft-side, which includes communication skills. Students lack interpersonal skills, and are not able to communicate in group situations. Perhaps a psychologist could conduct some classes in these areas." Dr. Winer stated, "there is a major move to include soft-skills, and it has not been effective to send students off to take courses in these areas. The Woodruff School has a full-time English instructor to provide this training within ME courses. We also have a plan to include ethics and teamwork skills in a similar manner."
Dr. William Wepfer presented a graduate student recruiting summary. He explained that a strong job market results in a large number of students seeking employment, rather than attending graduate school. He listed schools that Georgia Tech lost prospective graduate students to: MIT, Stanford, Michigan, UC-Berkeley, Penn State, Purdue, Texas, Cornell, and UC-San Diego.

Dr. Larson stated that there is an increased number of female Ph.D. students graduating from Georgia Tech ME.

Connie Parish presented the Capital Campaign update. Georgia Tech has received a total of $200,255,427 or 50.1% of the campaign goal of $400 million. ME has received $9,538,681 or 31.8% of its $30 million goal.

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**THE CAPITAL CAMPAIGN**

It is my special privilege to serve Georgia Tech at this historic moment and to be the first alumnus as its president. The years remaining in the twentieth century provide me, my fellow alumni, and other friends of the Institute with the opportunity to build the foundation for unprecedented success in the twenty-first century.

G. Wayne Clough, President, from his letter to launch the $400 Campaign for Georgia Tech in the spring of 1996.

**ME Tops Ten Million**

The Woodruff School of Mechanical Engineering has topped over ten million dollars toward its $30 million Campaign goal. This amazing progress has been attained during the first two years of The Campaign for Georgia Tech: The Threshold of a New Era. Leading our success are the 165 donors who have participated in the Campaign. Corporate contributors have been generous, making up twenty-five percent of the $10 million total.

Opportunities abound to create a "new era" for the Woodruff School. Adding endowed chairs to attract and retain eminent faculty is the top priority. Making a permanent mark on the School through a naming opportunity, provides visible recognition for posterity. Scholarships, fellowships, and instructional
laboratories round out the top five on the list. The School's Campaign Council is being led by Parker H. "Pete" Petit. Other Council members include: Paul Duke, honorary chair, G.B. Espy, Robert Hill, Bob Millikan, Charles Ray, Oliver Sale, and Larry Ybarrondo. The faculty representatives are Gene Colwell and Sam Shelton.

Has anyone talked with you about the Campaign? For a full briefing on our goals and progress, please call Connie Parish at (404) 894-6007.

The Donor Commemorative Exhibit

An exhibit to commemorate Woodruff School donors is on permanent display in the third floor lobby of MRDC I. The contemporary structure, featuring etched glass and fiber optics lighting, recognizes contributors who have made gifts to Mechanical Engineering of at least $100,000 during both the Centennial Campaign and the current Campaign.

DONORS

This list includes donors who have designated gifts to the Woodruff School since the Capital Campaign began on July 1, 1995 through August 31, 1997.

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THE 1996-1997 ANNUAL REPORT

This report is published once a year in the fall by the George W. Woodruff School of Mechanical Engineering.

For more information about programs in the School, please contact:

Ward O. Winer, Chair,
George W. Woodruff School of Mechanical Engineering
Georgia Institute of Technology
Atlanta, Georgia 30332-0405
ACKNOWLEDGMENT

Writer and Editor: Rona Ginsberg

With thanks to: Kaye Fuller for preparing the manuscript; Craig Moonshower for designing the document, Gary Meek for shooting most of the photographs in this report, and Dr. Jerry Ginsberg for providing the cover figure. We also gratefully acknowledge the Woodruff Endowment to the Woodruff School of Mechanical Engineering, which provided the funds to produce this annual report.

Cover figure: The figure is from an Office of Naval Research project on developing a variational principle that describes fluid-structure acoustic interaction.
The 1996 Harold W. Gegenheimer Lecture Series on Innovation featured Mr. Burt Rutan, an aeronautical engineer, designer, and entrepreneur. The lecture was titled, "Innovation: Use It Or Lose It" and was given in the Manufacturing Research Center auditorium at Georgia Tech on December 5, 1996. Mr. Rutan designed the record-breaking Voyager, the first airplane to circle the world nonstop without refueling. His company, Scaled Composites (named for its trademark use of carbon-fiber composites), has developed projects as diverse as a sail for an America's Cup challenge and the gondola for Richard Bransen's attempt to balloon nonstop around the world. Mr. Rutan also developed an all-composite car body for General Motors (producing a car that averages 100 miles per gallon).

The Lecture Series on Innovation was established through an endowment from Mr. Harold W. Gegenheimer (class of 1933) to support student programs that encourage creativity, innovation, and design. Through the lecture series and support of capstone design projects, students are exposed to processes that stimulate creativity and lead to inventions and patents.

The first lecture was given in October 1995 by Dr. Jerry Woodall, Charles William Harrison Distinguished Professor in Microelectronics at Purdue University. His lecture was titled: "Necessity is the Mother of Invention, But Curiosity and Persistence Make It Happen." The 1997 lecture will feature Professor Jim Adams of Stanford University. He will speak on: "Creativity Versus Control: Their Impact on Innovation" on November 6, 1997.

Woodruff Seminar Series

Each quarter, the endowment to the School sponsors the Woodruff Seminars, a series of lectures presented by national and international experts in the various research areas of mechanical and nuclear
engineering. The Woodruff Seminars given during the past academic year were:

**J. Iwan A. Alexander**, University of Alabama, Time-Dependent and Chaotic Flow and Transport Due to Vibrational Thermal Convection and g-Jitter.

**S. George Bankoff**, Northwestern University, Thin Film Aspects of Subcooled Boiling.

**Yakov Ben-Haim**, Technion-Israel Institute of Technology, Robust Reliability of Mechanical Systems and Structures.


**Steven L. Garrett**, Pennsylvania State University, Thermo-Acoustic Refrigeration.

**Francis E. Kennedy, Jr.**, Dartmouth College, Surface Temperatures and Their Influence on the Behavior of Sliding Components.

**Jayanth Kudva**, Northrop Grumman Corporation, Application of Smart Materials and Structures Technologies to Aerospace Vehicles.


**Georgia Tech in France**

It is increasingly important for mechanical engineers to operate in, or at least appreciate the challenges faced by global, competitive industries. To this end, the Georgia Institute of Technology created a satellite campus in Europe, strategically located in the city of Metz in the region of Lorraine in France, known as Georgia Tech Lorraine (GTL). This balanced, two-way exchange of American and European students began operations in October 1990. Georgia Tech's Electrical Engineering School has had a program in Metz for the last four years. Beginning in September 1997, the Woodruff School will offer three courses on site during the next academic year, and begin collaboration with the premier French Mechanical Engineering School, Ecole National Supérieure d'Arts et Métiers (ENSAM).
The mechanical engineering program offered at GTL, which focuses on the M.S. and the Ph.D. degrees, is administered by Georgia Tech, so the degrees awarded are from Tech. The curricula, admission, and degree requirements are the same as for graduate students in mechanical engineering attending classes at the Atlanta campus. Primarily, students at GTL will be enrolled in a master of science program (often with a nonthesis option) in mechanical engineering. Graduate students earn their degree from Georgia Tech while studying in France, whereas French students study at their home school and GTL, and receive their degrees from both institutions. In addition, U.S. students at GTL have the opportunity to pursue dual-degree programs in collaboration with selected European schools.

There were 24 French applicants to the dual-degree program with ENSAM; 18 were accepted and 12 are attending. Also nine American students from the Atlanta campus went to France to study. This is a good start to our program in France.

For detailed information on this study-abroad program, please request our brochure titled, *Bonjour Georgia Tech, The George W. Woodruff School of Mechanical Engineering Introduces a Graduate Program for Study in France*. You can also go to our web site at http://www.me.gatech.edu and click on *Program at GT Lorraine (France)* or send an e-mail to gtl@me.gatech.edu. This is an exciting venture for us, and affords our students an excellent opportunity to obtain international engineering experience.

**NSF Fellowship Wins Continue**

As in the previous years of this decade, the Woodruff School has made a strong showing in the 1997 National Science Foundation (NSF) Graduate Fellowship competition, winning five fellowships, four to graduate students and one to an undergraduate student. The goal of these prestigious and competitive fellowships is to guarantee that the nation's most promising students will be able to pursue their graduate work without distraction. Roughly only ten percent of applicants receive funding from NSF. This year 45 awards were made in mechanical engineering, compared with 45 in 1996, 48 in 1995, and 54 in 1994.

Such winning ways have become typical for the Woodruff School, which has more NSF Graduate Fellowship winners among its graduate students than any other School at the Institute. This strong and consistent record of achievement reflects well upon the ability of the graduate students in the Woodruff School and may be attributed, in part, to the implementation of an endowed writing program in the School.
The Communications Program

The Frank K. Webb Communications Program prepares mechanical engineering students for their professional careers by providing instruction that enhances verbal and written communication skills. A writing specialist gives seminars and individual assistance to graduate students preparing a thesis or dissertation, or to those applying for external support, such as fellowships.

The writing program began in earnest in 1990 under the direction of Dr. Jeffrey Donnell; since that time, the Woodruff School has had 58 NSF fellowship winners. One aspect of this special program is to help teach interested and motivated students how to prepare their application packets for graduate school and how to apply for various graduate fellowships. In essence, the students learn how to package their academic qualifications - to present the "story" of their work early on in their professional careers.

Video-Based Master's Degree Programs

The Woodruff School continues to be a leader in the delivery of its MSME (mechanical engineering) and MSHP (health physics) programs via video. (Tech's video program was started in 1990 and has approximately 450 students.) Admission procedures for the School's video programs are the same as for the on-campus programs. In Fall 1996, 79 HP students were enrolled in video courses. The MSME video program has experienced strong growth since its inception in Fall 1992. In Fall 1996, there were 60 ME students enrolled in video courses. The program in health physics is the largest in the country and produces approximately 15% of the nation's MSHP degrees. The Woodruff School anticipates further growth in its MSME video program as the MSME degree is increasingly perceived as the capstone professional degree in mechanical engineering.

At the end of June 1997, the Woodruff School began a campaign to enroll more students in our video programs. First, we prepared a brochure that highlights the program, and working with the Department of Continuing Education, we did a mass mailing of the brochure. Next, we placed an advertisement (titled: Any Time, Any Place) in Mechanical Engineering, the monthly publication of the American Society of Mechanical Engineers (ASME) with a subscription base of more than 120,000. The final portion of our campaign was to place an advertisement in The Bent, the quarterly publication of Tau Beta Pi, the mechanical engineering honorary fraternity. This publication is mailed to 90,000 members and reaches an excellent target audience for our video-degree programs.

To handle the responses, we established a special e-mail address: video.programs@me.gatech.edu. Fifteen new students have been accepted to the video-degree program for fall term and three for the winter term. This is an increase of more than 75 percent over previous years.

For detailed information on graduate programs for working professionals in mechanical engineering and health physics, please request the brochure titled, The George W. Woodruff School of Mechanical Engineering's Video-Based Master's Degree Programs.
Annual Graduate Student Symposium

The Seventh Annual Graduate Student Symposium, with a theme of transferring innovation, was held at Georgia Tech on March 5 and 6, 1997. The Woodruff School is the lead sponsor of this annual student-run event for doctoral candidates and master’s degree students who have almost completed their degrees. Graduate students had the opportunity to give a five-minute presentation to representatives of industry. Most mechanical engineering students presented in the sessions on Design, Manufacturing and Polymers; Fluids, Heat Transfer and Energy Systems; and Mechanics of Materials. This session was followed by a 45-minute poster session in which presenters could meet with industry representatives on a one-to-one basis to discuss their research. The symposium provides an excellent opportunity to recruit employees.

The Graduate Student Symposium was started in 1991 as a way for engineering graduate students to share the results of their research with science and engineering professionals in industry and academia. This interchange gives Georgia Tech graduate students the opportunity to establish a professional network which is vital in any employment search. Guests have an opportunity to establish contacts with potential recruits as well as learn more about the Georgia Tech community. This year, 92 graduate students from ten schools at Georgia Tech presented their work to representatives of more than two dozen companies. In addition to the presentations and the extended poster session, each industry representative is given a booklet that contains a résumé and an abstract of the work of each presenter; this document is a useful reminder of the quality of the work performed by the graduate students.
Industry and medicine increasingly use radiation, so the need for more college graduates with the type of education provided by a traditional nuclear engineering program has expanded beyond the technology needs of the nuclear power industry. Georgia Tech is meeting this need with a revised undergraduate nuclear engineering program. The new curriculum evolved from a highly-focused emphasis on nuclear power to include radiological engineering fundamentals. By doing this, we provide our graduates with more career choices.

Knowledgeable professionals in the industry reviewed the program; they were enthusiastic about the revised curriculum, the possibilities it creates to meet industry requirements, and the greater job flexibility it will give graduates of the program. The undergraduate program was renamed the BNRE degree to reflect its new focus. The program begins in fall 1997 and is administered by the Woodruff School of Mechanical Engineering.

Typical courses for the BNRE degree are:

*Introduction to Nuclear and Radiological Engineering, Radiation Physics, Radiation Protection Engineering, Reactor Engineering, Radiation Sources, Radiation Applications, Radioactive and Nuclear Materials Management, Nuclear Radiation Detection, Nuclear Reactor Physics, Reactor Physics Laboratory, and Nuclear Engineering Design Applications.*

For more detailed information about the revised undergraduate nuclear and radiological engineering program, view http://www.me.gatech.edu/ne_re_hp, or request the brochure titled, *The Undergraduate Nuclear and Radiological Engineering Program at Georgia Tech.*

**Student Organizations and Activities**

- American Nuclear Society
- American Society of Heating, Refrigerating, and Air Conditioning Engineers
- American Society of Mechanical Engineers
• Foundry Society
• Health Physics Society
• Graduate Student Symposium
• GT Motorsports/Formula SAE
• ME Graduate Students Association
• Pi Tau Sigma, Honorary Mechanical Engineering Fraternity
  (note that the national office of Pi Tau Sigma is located at the Woodruff School)
• Society of Automotive Engineers
• Society of Manufacturing Engineers
• Woodruff School Student Advisory Committee
Graduate Degrees Awarded

This set of information is a compilation of the master's and doctoral degrees granted by the Woodruff School in summer 1996, fall 1996, winter 1997, and spring 1997. You will be able to find the individual's name, the degree and the program in which the degree was granted (for example, MSHP is a master's of science in the health physics program), the student's advisor, the title of the thesis (or a notation that the student took additional course work and selected the non-thesis option), and the previous school (in most cases, this is the place where the student received the undergraduate degree) attended.

In summer quarter 1996, 33 graduate degrees were awarded. In fall quarter 1996, 26 graduate degrees were awarded; in winter quarter 1997, 21 degrees were awarded, and in spring quarter 1997, 39 degrees were awarded.

<table>
<thead>
<tr>
<th>Name</th>
<th>Degree/Program</th>
<th>Advisor</th>
<th>Thesis Title</th>
<th>Previous School Attended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bailey-Van Kuren, Michael</td>
<td>Ph.D. ME</td>
<td>Dr. Kok Meng Lee</td>
<td>Automated Cell Supervisory Control for Product Disassembly</td>
<td>University of California, Santa Barbara</td>
</tr>
<tr>
<td>Barth, Eric J.</td>
<td>M.S.M.E.</td>
<td>Dr. Nader Sadegh</td>
<td>Approximating Discrete-Time Optimal Control Using a Neural Network</td>
<td>University of California, Berkeley</td>
</tr>
<tr>
<td>Beal, Craig R.</td>
<td>M.S.NE.</td>
<td>Dr. Farzad Rahmema</td>
<td>Improved Rehomogenization and Discontinuity Factor Correction Procedures for Nodal Methods</td>
<td>United States Naval Academy</td>
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<tr>
<td>Bittle, Steven D.</td>
<td>M.S.M.E.</td>
<td>Dr. Thomas Kurfess</td>
<td>An Active PZT Probe for Precision Measurement on a CMM</td>
<td>Lafayette College</td>
</tr>
<tr>
<td>Burnfield, Daniel L.</td>
<td>M.S.H.P.</td>
<td>Dr. Bernd Kahn</td>
<td>Non-thesis option</td>
<td>Virginia Polytechnic Institute</td>
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<tr>
<td>Chi, Mei-Ling</td>
<td>M.S.M.E.</td>
<td>Dr. Steven Liang</td>
<td>Non-thesis option</td>
<td>State University of New York at Stony Brook</td>
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<tr>
<td>Choi, Jongdae</td>
<td>Ph.D. ME</td>
<td>Dr. George Rentzepis</td>
<td>Axisymmetric Problems of Toroids in the Theory of Elasticity</td>
<td>Worcester Polytechnic Institute</td>
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<td>Daniels, Eugene L.</td>
<td>M.S.M.E.</td>
<td>Dr. William Wepfer</td>
<td>Non-thesis option</td>
<td>Southern University</td>
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<td>Dobb, Christopher P.</td>
<td>M.S.M.E.</td>
<td>Dr. William Wepfer</td>
<td>Non-thesis option</td>
<td>United States Air Force Academy</td>
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<tr>
<td>Ellis, Michael W.</td>
<td>Ph.D. ME</td>
<td>Dr. William Wepfer</td>
<td>An Evaluation of the Effect of Adsorbent Properties on the Performance of an Adsorption Heat Pump</td>
<td>University of Tennessee</td>
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<tr>
<td>Eshleman, Eric D</td>
<td>M.S.M.E.</td>
<td>Dr. Al Ferri</td>
<td>Vibration and Shock Isolation Through Use of Passive, Nonlinear Mounts</td>
<td>University of Cincinnati</td>
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<td>Francke, Eric I</td>
<td>M.S.M.E.</td>
<td>Dr. Robert Nerem</td>
<td>The Effect of Oscillatory Flow on the Intracellular Free Calcium Concentration of Single Bovine Aortic Endothelial Cells</td>
<td>Georgia Institute of Technology</td>
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<td>Garber M.D., Mitchell A.</td>
<td>M.S.M.E.</td>
<td>Dr. David McDowell</td>
<td>Biomechanical Effects of Bone Demineralization During Microgravity Exposure</td>
<td>Emory University</td>
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<td>Gardner, Brian M.</td>
<td>M.S.M.E.</td>
<td>Dr. Jianmin Qu</td>
<td>Visualization of Field Quantities in Complex 3-Dimensional Structures</td>
<td>Virginia Polytechnic Institute</td>
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<tr>
<td>Hefne, Jameel A.</td>
<td>Ph.D. NE</td>
<td>Dr. Ratib Karam</td>
<td>Neutron Spectrum Measurement for Boron Neutron Capture Therapy</td>
<td>King Saud University</td>
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<tr>
<td>Jazbutis, Gintautas B.</td>
<td>Ph.D. ME</td>
<td>Dr. Robert Fulton</td>
<td>A Systematic Approach to Assessing and Extending Graphical Models of Manufacturing</td>
<td>Virginia Polytechnic Institute</td>
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<tr>
<td>Lahr, Jeffrey S.</td>
<td>M.S.H.P.</td>
<td>Dr. Bernd Kahn</td>
<td>Non-thesis option</td>
<td>Georgia Institute of Technology</td>
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<tr>
<td>LeGall, Carole A.</td>
<td>M.S.M.E.</td>
<td>Dr. Jianmin Qu and Dr. David McDowell</td>
<td>Theromechanical Stress Analysis in Flip Chip Packages</td>
<td>Georgia Institute of Technology</td>
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<td>Lewis, Kemper E.</td>
<td>Ph.D. ME</td>
<td>Dr. Farrokh Mistree</td>
<td>An Algorithm for Integrated Subsystem and System Embodiment</td>
<td>Duke University</td>
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<td>Londo, Shawn P.</td>
<td>M.S.M.E.</td>
<td>Dr. Peter Rogers</td>
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<td>Lutostansky, Elizabeth M.</td>
<td>Ph.D. ME</td>
<td>Dr. David Ku</td>
<td>The Role of Convective Mass Transfer in Atherosclerosis</td>
<td>Duke University</td>
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<tr>
<td>Name</td>
<td>Degree</td>
<td>Advisor</td>
<td>Title</td>
<td>Institute</td>
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<td>Magee, David P.</td>
<td>Ph.D. ME</td>
<td>Dr. Wayne Book</td>
<td>Optimal Arbitrary Time-Delay Filtering to Minimize Vibration in Elastic Manipulator Systems</td>
<td>Oklahoma State University</td>
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<tr>
<td>Miller, Bradley A.</td>
<td>M.S.M.E.</td>
<td>Dr. Itzhak Green</td>
<td>Constitutive Laws for Gas Lubricated Triboelements</td>
<td>Auburn University</td>
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<td>Piper, James W.</td>
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<td>Dr. Cheng Zhu</td>
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<tr>
<td>Schreiber, Michael J.</td>
<td>Ph.D. ME</td>
<td>Dr. Stephen Dickerson</td>
<td>Outdoor Tracking Using Computer Vision, Xenon Strobe Illumination and Retro-Reflective Landmarks</td>
<td>Clemson University</td>
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<tr>
<td>Shott, Gregory J.</td>
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<td>University of Washington</td>
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<tr>
<td>Sweezy, Jeremy E.</td>
<td>M.S.M.E.</td>
<td>Dr. Ratib Karam and Dr. Nolan Hertel</td>
<td>A Multisphere Neutron Spectrometer Measurement of the Georgia Tech Research Reactor Bio-Medical Facility</td>
<td>Georgia Institute of Technology</td>
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<td>Troan, James W.</td>
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<td>Dr. Nolan Hertel</td>
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<td>Purdue University</td>
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<tr>
<td>Veinot, Kenneth G.</td>
<td>M.S.H.P.</td>
<td>Dr. Nolan Hertel</td>
<td>Multisphere Neutron Spectra Measurements Near a High Energy Medical Accelerator</td>
<td>North Georgia College</td>
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<tr>
<td>Volcy, Jerry</td>
<td>Ph.D. ME</td>
<td>Dr. Stephen Dickerson</td>
<td>Optimum Illumination for Machine Vision Using Optical Scatter Data</td>
<td>New Jersey Institute of Technology</td>
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<td>Walters III, Alfred G.</td>
<td>M.S.M.E.</td>
<td>Dr. James Hartley</td>
<td>Non-thesis option</td>
<td>Georgia Institute of Technology</td>
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<td>Wu, Xuewei</td>
<td>M.S.M.E.</td>
<td>Dr. Said Abdel-Khalik and Dr. Mostafa Ghaasian</td>
<td>Hydrodynamic Characteristics of Countercurrent Two-Phase Flow Involving Highly Viscous Liquids</td>
<td>Shanghai Institute of Physics</td>
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<tr>
<td>Yeo, Inhwan</td>
<td>Ph.D. HP</td>
<td>Dr. C-K Chris Wang</td>
<td>Methods for Improving X-Ray Film in Phantom Dosimetry for Megavoltage Photo Radiotherapy</td>
<td>Hangyang University</td>
</tr>
</tbody>
</table>

Total of 33 degrees awarded: 22 Master's degrees, 11 Doctoral degrees.

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**FALL 1996 GRADUATE DEGREES**

<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Advisor</th>
<th>Title</th>
<th>Institute</th>
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<tbody>
<tr>
<td>Beattie, Deborah K.</td>
<td>Ph.D. ME</td>
<td>Dr. Raymond Vito</td>
<td>The Mechanics of Heterogeneous Arteries: Implications for Human Atherosclerosis</td>
<td>Georgia Institute of Technology</td>
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<tr>
<td>Currey, Mary N.</td>
<td>Ph.D. ME</td>
<td>Dr. Kenneth Cunefare</td>
<td>On the Behavior of Exterior Acoustic Modes of Structures</td>
<td>University of Tennessee-Chattanooga</td>
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<tr>
<td>Flores, Ervin M.</td>
<td>M.S.M.E.</td>
<td>Dr. Shreyes Melkote</td>
<td>Non-thesis option</td>
<td>University of Puerto</td>
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<td>Fye Jr., Edward M.</td>
<td>M.S.M.E.</td>
<td>Dr. Prasanna Kadaba</td>
<td>Non-thesis option</td>
<td>Georgia Institute of Technology</td>
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<tr>
<td>Gheorghiu, Horia-Nicole M.</td>
<td>Ph.D. NE</td>
<td>Dr. Farzad Rahnama</td>
<td>Generalized Variational Principles for Steady-State Neutron Balance Equations</td>
<td>University of Bucharest</td>
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<tr>
<td>Grimes M.D., Randall Y.</td>
<td>Ph.D. ME</td>
<td>Dr. Ajit Yoganathan</td>
<td>A Theoretical and Experimental Analysis of Mitral Regurgitation and Its Interactions with Pulmonary Venous Flow</td>
<td>Emory University</td>
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<tr>
<td>Grimm, Steven L.</td>
<td>M.S.H.P.</td>
<td>Dr. Bernd Kahn</td>
<td>Non-thesis option</td>
<td>Southern Tech</td>
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<td>Harp, Susan R.</td>
<td>M.S.M.E.</td>
<td>Dr. Richard Salant</td>
<td>A Mathematical Model of a Mechanical Seal Under Transient Operating Conditions</td>
<td>Virginia Polytechnic Institute</td>
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<td>Kamphuis, Kevin L.</td>
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<td>Lambright, Jonathan P.</td>
<td>Ph.D. ME</td>
<td>Dr. Charles Ume</td>
<td>Design of Composite Structures Using Hybrid Knowledge-Based and Case-Based Reasoning</td>
<td>North Carolina A&amp;T State University</td>
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<tr>
<td>Lane III, Dewey H.</td>
<td>M.S.M.E.</td>
<td>Dr. Wayne Book</td>
<td>Identification of Natural Frequency Components of Articulated Flexible Structures</td>
<td>Vanderbilt University</td>
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<td>Lay, Leonard B.</td>
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<td>Dr. Jeffrey Streator</td>
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<td>Marston, Matthew C.</td>
<td>M.S.M.E.</td>
<td>Dr. Farrokh Mistree</td>
<td>Sustainability in Process Modeling of Automated Dye-Bath Reuse</td>
<td>Cornell University</td>
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<td>Mattocks, Momar A.</td>
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<td>Dr. Charles Ume</td>
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<td>University of Michigan</td>
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<td>Parker, John E.</td>
<td>Ph.D. ME</td>
<td>Dr. Kok-Meng Lee</td>
<td>An Analytical and Experimental Investigation of Physically-Accurate Synthetic Images for Machine Vision System Design</td>
<td>Georgia Institute of Technology</td>
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<tr>
<td>Name</td>
<td>Degree</td>
<td>Advisor(s)</td>
<td>Title</td>
<td>Institution</td>
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<td>Ray, Kyle A.</td>
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<td>Rodgers, Joseph J.</td>
<td>M.S.H.P.</td>
<td>Dr. C-K. Chris Wang</td>
<td>Brachytherapy Sources: A Method and its Uncertainties</td>
<td>United States Military Academy</td>
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<td>Salcedo, Susan N.</td>
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<td>Shepard Jr., William S.</td>
<td>Ph.D. ME</td>
<td>Dr. Kenneth Cuneare</td>
<td>The Impact of Attached Feature Scales and Spatial Distributions on the Response of Structural-Acoustic Systems</td>
<td>Georgia Institute of Technology</td>
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<td>Shiroishi, Jason W.</td>
<td>M.S.M.E.</td>
<td>Dr. Thomas Kurfess</td>
<td>Vibration Signal Analysis for Bearing Damage Diagnostics</td>
<td>Georgia Institute of Technology</td>
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<td>Smith, Steven Ray</td>
<td>M.S.M.E.</td>
<td>Dr. William Weper</td>
<td>Non-thesis option</td>
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<td>Stonard, Stewart J.</td>
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<td>Dr. William Weper</td>
<td>Non-thesis option</td>
<td>Rensselaer Polytechnic Institute</td>
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<tr>
<td>Thornhill, Lindsay D.</td>
<td>Ph.D. ME</td>
<td>Dr. Prateen Desai</td>
<td>Boundary Layers in Dense, Low Temperature Plasmas</td>
<td>Georgia Institute of Technology</td>
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<td>Treanor, Kimberly E.</td>
<td>M.S.M.E.</td>
<td>Dr. David Ku</td>
<td>Non-thesis option</td>
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<td>Whiteman, Wayne E.</td>
<td>Ph.D. ME</td>
<td>Dr. Aldo Ferri</td>
<td>Analysis of Systems Subject to Displacement - Dependent Dry Friction Damping</td>
<td>Massachusetts Institute of Technology</td>
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<td>Yusuf, Imran</td>
<td>M.S.M.E.</td>
<td>Dr. David Rosen</td>
<td>Non-thesis option</td>
<td>Georgia Institute of Technology</td>
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</table>

Total of 26 degrees awarded: 17 Master's degrees, 9 Doctoral degrees.

### WINTER 1997 GRADUATE DEGREES

<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Advisor(s)</th>
<th>Title</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Al-Ansary, Hany A.M.</td>
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<td>Dr. Sheldon Jeter</td>
<td>Non-thesis option</td>
<td>King Saud University</td>
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<tr>
<td>DeKok, Alexandra C.</td>
<td>M.S.M.E.</td>
<td>Dr. Prasanna Kabada &amp; Dr. Prateen Desai</td>
<td>The Measurement and Calculation of Nanodosimetric Energy Distributions for Electrons and Photons</td>
<td>Emory University</td>
</tr>
<tr>
<td>Evans, Thomas M.</td>
<td>Ph.D. NE</td>
<td>Dr. C-K. Chris Wang</td>
<td>In-Phantom Measurement of HE for Neutron Protection Dosimetry</td>
<td>Haverford College</td>
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<td>Hashimura, Kazunori</td>
<td>M.S.M.E.</td>
<td>Dr. Harvey Lipkin</td>
<td>Investigation of Service-Machine Time Requirements for Automated Yarn Creeling</td>
<td>Georgia Institute of Technology</td>
</tr>
<tr>
<td>Haynes, Comas L.</td>
<td>M.S.M.E.</td>
<td>Dr. William Weper</td>
<td>A Study of High Pressure Operation of Isothermal Tublar Solid Oxide Fuel Cells and Their Integration With Gas Turbines</td>
<td>Florida A&amp;M University</td>
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<tr>
<td>Jalandoni, Djay M.</td>
<td>Ph.D. NE</td>
<td>Dr. C-K. Chris Wang</td>
<td>Building Load Analysis and Graphical Display as a Design Tool</td>
<td>University of the Philippines</td>
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<td>Jamison, Walter H.</td>
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<td>Dr. Nolan Hertel</td>
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<td>Jerome III, David L.</td>
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<td>Dr. Prasanna Kadaba</td>
<td>Building Load Analysis and Graphical Display as a Design Tool</td>
<td>Georgia Institute of Technology</td>
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<td>Kim, David J.</td>
<td>M.S.M.E.</td>
<td>Dr. Kok-Meng Lee</td>
<td>A Design Methodology of a High-Torque Multi-Degree-Freedom Spherical Motor</td>
<td>Rutgers University</td>
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<td>Kuhn, Omar P.</td>
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<tr>
<td>Lazoglu, Ismail</td>
<td>Ph.D. ME</td>
<td>Dr. Steven Liang</td>
<td>Analysis of Force System in Ball-End Milling</td>
<td>Istanbul Technical University</td>
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<td>Maurya, Alpeshkumar R.</td>
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<td>Dr. Bert Bras</td>
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<td>Mess, Francis M.</td>
<td>M.S.M.E.</td>
<td>Dr. Steven Daryluk</td>
<td>Wear Model for Chemo-Mechanical Polishing of Single Crystal Silicon</td>
<td>Georgia Institute of Technology</td>
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<td>Pan, Lung K.</td>
<td>Ph.D. NE</td>
<td>Dr. C-K. Chris Wang</td>
<td>Development of the Superheated-Liquid-Droplet Technique for Measuring Alpha Decays in Environmental Samples</td>
<td>National Tsing Hua University</td>
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<td>Rutherford, Robert C.</td>
<td>M.S.M.E.</td>
<td>Dr. Kok-Meng Lee</td>
<td>A Design Methodology for Control of a Belt-Driven Robot Using Frequency Response Analysis</td>
<td>University of Alabama</td>
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<td>Sasnett, Zella L.</td>
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<td>Thatcher, H. Andrew</td>
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<td>Van Hiel, Brian D.</td>
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<td>Rapid Tooling Selection Algorithm</td>
<td>Georgia Institute of Technology</td>
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<td>Wright, Adele H.</td>
<td>M.S.M.E.</td>
<td>Dr. Cheng Zhu</td>
<td>Design, Development, and Application of an Automated Precision Scanning Microscope Stage with a Controlled Environment</td>
<td>Carnegie Mellon University</td>
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<tr>
<td>Yim, Sungshik</td>
<td>M.S.M.E.</td>
<td>Dr. Thomas Kurfess</td>
<td>A Kalman Filter and an Adaptive Controller Implementation on a Centerless Grinding Process</td>
<td>University of Tennessee</td>
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</tbody>
</table>
### SPRING 1997 GRADUATE DEGREES

<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Advisor</th>
<th>Title</th>
<th>Institution</th>
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<tbody>
<tr>
<td>Zhou, Wen-Xu</td>
<td>Ph.D. ME</td>
<td>Dr. Robert Fulton</td>
<td>Modularized and Parametric Modeling Methodology for Concurrent Mechanical Design of Electronic Packaging</td>
<td>Beijing Normal University</td>
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<tr>
<td>Bailey, Robert R.</td>
<td>M.S.M.E.</td>
<td>Dr. Janet Allen</td>
<td>Designing Robust Industrial Ecosystems: A Systems Approach</td>
<td>Duke University</td>
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<td>Bauer, Stephen M.</td>
<td>M.S.M.E.</td>
<td>Dr. David Rosen</td>
<td>Integration of Product and Disassembly Process Design in Parametric Synthesis</td>
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<td>Besemer, John D.</td>
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<td>Dr. Cheng Zhu</td>
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<td>Blaylock, Dwayne P.</td>
<td>M.S.N.E.</td>
<td>Dr. Raib Karam</td>
<td>A Calculation of the Actuation Products in the Biological Shield of the Georgia Tech Research Reactor</td>
<td>Georgia Institute of Technology</td>
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<td>Bose, Feler</td>
<td>M.S.M.E.</td>
<td>Dr. Mostafa Ghiaasiaan</td>
<td>Hydrodynamics of Dispersed Liquid Droplets in Agitated Synthetic Fibrous Slurries</td>
<td>Hope College</td>
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<td>Campbell Jr., James S.</td>
<td>M.S.M.E.</td>
<td>Dr. William Black</td>
<td>Design and Construction of an Experimental and Analytical Test Facility for the Thermal Management of Microelectronics</td>
<td>Auburn University</td>
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<td>Day, Kevin K.</td>
<td>M.S.M.E.</td>
<td>Dr. Richard Salant</td>
<td>Thermal Easothydrodynamic Analysis of a Radial Lip Seal</td>
<td>University of Florida</td>
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<tr>
<td>Dejong, Bretton C.</td>
<td>M.S.M.E.</td>
<td>Dr. Sam Shelton</td>
<td>Cogen Aeration in the New Deregulated Energy Environment</td>
<td>Auburn University</td>
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<td>Delaney, James C.</td>
<td>M.S.M.E.</td>
<td>Dr. Said Abdel-Khalik</td>
<td>Suppression of Vapor Explosions During Rapid Quenching of Char Beds in Chemical Recovery Boilers</td>
<td>Georgia Institute of Technology</td>
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<td>Delano, Andrew D.</td>
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<td>Dr. Sam Shelton</td>
<td>Analysis of the Einstein Refrigeration Cycle</td>
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<td>Dixon, Lisa A.</td>
<td>Ph.D. ME</td>
<td>Dr. Jonathan Colton</td>
<td>An Anchoring and Adjustment Strategy for Re-Design</td>
<td>Trinity University</td>
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<tr>
<td>Dossett, Sharon D.</td>
<td>M.S.H.P.</td>
<td>Dr. William Wepfer</td>
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<td>Downx, James D.</td>
<td>M.S.M.E.</td>
<td>Dr. Kok-Meng Lee</td>
<td>An Experimental Investigation on Dynamics Vision Guided Grasping of Moving Objects</td>
<td>Georgia Institute of Technology</td>
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<td>Edie, Gerald N.</td>
<td>M.S.M.E.</td>
<td>Dr. Stephen Dickerson</td>
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<td>Elder, Eric S.</td>
<td>Ph.D. HP</td>
<td>Dr. Patton McGinley and Dr. Nolan Hertel</td>
<td>A Method and Treatment Device for Non-Coplanar Radiotherapy of the Pancreas</td>
<td>Georgia Institute of Technology</td>
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<tr>
<td>Gomes, Mario W.</td>
<td>M.S.M.E.</td>
<td>Dr. Wayne Book</td>
<td>An Examination of Control Algorithms for a Dissipative Haptic Interface</td>
<td>Cornell University</td>
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<td>Gregory II, Richard O.</td>
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<td>Hamall, Kenneth M.</td>
<td>M.S.M.E.</td>
<td>Dr. Steven Danyuk</td>
<td>Non-Contact Measurement of Wear Induced Changes in Surface Potential</td>
<td>Georgia Institute of Technology</td>
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<td>Haynes, Kimberly D.</td>
<td>M.S.M.E.</td>
<td>Dr. Suresh Sitaraman</td>
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<td>Hogan, John E.</td>
<td>Ph.D. ME</td>
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<td>Minimum Axle Width Path Planning for Non-holonomic Mobile in Industrial Environments</td>
<td>Georgia Institute of Technology</td>
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<td>Jacob, David</td>
<td>M.S.M.E.</td>
<td>Dr. Sam Shelton</td>
<td>Absorption Cycle Analysis Using Commercially Available Software</td>
<td>New Jersey Institute of Technology</td>
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<td>Johnson, Kelly L.</td>
<td>M.S.M.E.</td>
<td>Dr. Daniel Baldwin</td>
<td>Low Cost Bumping Technology for Bare Aluminum Metallized Devices: Using a Gallium-Based Alloy</td>
<td>University of Kentucky</td>
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<td>Lieuwan, Timothy C.</td>
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<td>Dr. Ben Zinn</td>
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<td>Liu, Hubert H.</td>
<td>M.S.M.E.</td>
<td>Dr. Sam Shelton</td>
<td>Analysis and Performance Optimization of Commercial Chiller/Cooling Tower Systems</td>
<td>Vanderbilt University</td>
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<tr>
<td>McClurkin, Joel E.</td>
<td>M.S.M.E.</td>
<td>Dr. David Rosen</td>
<td>A Computer Aided Build Style Decision Support Tool for Stereolithography</td>
<td>University of Nebraska</td>
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<td>McKamey, Eric D.</td>
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<td>Dr. Nolan Hertel</td>
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<td>Nalievanko, John C.</td>
<td>M.S.M.E.</td>
<td>Dr. Paul Neitzel</td>
<td>Design of an Apparatus for Investigation of 2-D Liquid Drop Non-Coalescence</td>
<td>Lafayette College</td>
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</table>

Total of 21 degrees awarded: 16 Master's degrees, 5 Doctoral degrees.
<table>
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<tr>
<th>Name</th>
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<th>Advisor</th>
<th>Title</th>
<th>Institution</th>
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<tr>
<td>Napolitano, Mary E.</td>
<td>Ph.D. HP</td>
<td>Dr. Nolan Hertel</td>
<td>Mammographic X-Ray Unit Peak Kilovoltage and Spectral Quality Determination Using Film Desitometry</td>
<td>University of Cincinnati</td>
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<td>Newby, Peter G.</td>
<td>M.S.N.E.</td>
<td>Dr. Ratib Karam</td>
<td>Optimization of the GTRR Epithermal Neutron Filter of BNCT Applications</td>
<td>Georgia Institute of Technology</td>
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<td>Oliff, Derrick K.</td>
<td>M.S.M.E.</td>
<td>Dr. Jianmin Qu</td>
<td>Characterizing the Failure Envelope of a Conductive Adhesive</td>
<td>Georgia Institute of Technology</td>
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<td>Patel, Akshay M.</td>
<td>M.S.M.E.</td>
<td>Dr. Richard Neu</td>
<td>Growth of Small Fatigue Cracks in PH 13-8 Mo Stainless Steel</td>
<td>University of Pennsylvania</td>
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<td>Rubilar, Roberto B.</td>
<td>M.S.H.P.</td>
<td>Dr. Weston Stacey</td>
<td>Non-thesis option</td>
<td>Brigham Young University</td>
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<td>Rutar, Frank J.</td>
<td>M.S.H.P.</td>
<td>Dr. Nolan Hertel</td>
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<td>Sutton, Michele R.</td>
<td>M.S.H.P.</td>
<td>Dr. C-K. Wang</td>
<td>Non-thesis option</td>
<td>St. Vincent College</td>
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<td>Turmel, R. James</td>
<td>M.S.H.P.</td>
<td>Dr. C-K. Wang</td>
<td>Non-thesis option</td>
<td>Georgia State University</td>
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<td>Whitelaw, Robert S.</td>
<td>M.S.M.E.</td>
<td>Dr. Richard Neu</td>
<td>Deformation Behavior and Modeling of Solder Alloys</td>
<td>Auburn University</td>
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<tr>
<td>Wright, Douglas A.</td>
<td>M.S.M.E.</td>
<td>Dr. Cheng Zhu</td>
<td>The Adherence of Tumor Cells to Endothelial Cells and of Neutrophils to IgG Under Flow</td>
<td>Rensselaer Polytechnic Institute</td>
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<tr>
<td>Wright, Jeffrey R.</td>
<td>M.S.M.E.</td>
<td>Dr. Prasanna Kadaba</td>
<td>Recovery of Refrigerant Vapor Leakage Using High Pressure Psychrometrics</td>
<td>Vanderbilt University</td>
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<tr>
<td>Wright, Richard J.</td>
<td>M.S.M.E.</td>
<td>Dr. Steve Johnson</td>
<td>Bolt Bearing Creep Behavior of Highly Loaded Polymer Matric Composites at Elevated Temperatures</td>
<td>Georgia Institute of Technology</td>
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</table>

Total of 39 degrees awarded: 35 Master's degrees, 4 Doctoral degrees.
Alumni Honors

Four mechanical and nuclear engineering alumni were inducted into the College of Engineering Hall of Fame. This designation is the college's most prestigious award and is based on life-long career accomplishments. The alumni inducted were: Joseph A. Anderer (ME '47), John A. Auxier (Ph. D. NE '72), Robert C. Elder (ME' 43), and Melvin S. Felder (ME '43).

Seven mechanical and nuclear engineering alumni were honored with selection into the Academy of Distinguished Engineering Alumni of the College of Engineering. The award is intended for alumni who have sustained and made distinguished contributions to Georgia Tech, the profession, or the society at large. The 1996 group included: Gordon L. Dickens, III (MSNE '76), George H. Inman (ME '58), James A. Lake (Ph.D. NE '72), Jean Albert Mori (ME ’58), Michael T. Ryan (Ph.D. NE ’82), David M. Walker (BME ’60, MS PHYS ’65, Ph.D. ME ’70), and Charles E. Willbanks (MBE ’62, MSME ’65, Ph.D. ME '67).

In addition, five of the School's young alumni were inducted into the Council of Outstanding Young Engineering Alumni. Membership is reserved for those individuals under the age of 40 who have distinguished themselves through professional practice and/or service to Georgia Tech. The 1996 group included Derrick R. Adkins (BME ’93), Alan B. Berry (BAE '83, MSME '93), Penny A. File (BNE '81), Neil C. Hawkins (BSHP '84), and Donald E. Kinser (BME '84).

The Job Market for Undergraduate Students

The job market for mechanical engineering graduates was excellent this year, and we believe that opportunities will continue to be very good for graduates of the Woodruff School. The average starting salary for a Woodruff School graduate with a bachelor's degree in mechanical engineering for the period June 30, 1996 to July 1, 1997 was $40,013. The companies listed below are some of the recruiters of Woodruff School graduates this past academic year.
The Job Market for Graduate Students

The job market for graduates of the Woodruff School with advanced degrees continues to be very good. The average starting salaries for those with a master's degree from the Woodruff School are: $46,300 (mechanical engineering), $40,500 (nuclear engineering), and $48,700 (health physics); while the average starting salaries for those with a doctoral degree are: $55,500 (mechanical engineering) and $53,300 (nuclear engineering). The companies listed below are some of the employers of recent Woodruff School graduates with advanced degrees.
<table>
<thead>
<tr>
<th>Company/Institution</th>
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<tr>
<td>E.I. Dupont de Nemours &amp; Company</td>
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<td>Ever-ready Battery</td>
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<td>Failure Analysis Associates</td>
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<td>Ford Motor Company</td>
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<td>General Atomics</td>
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<td>General Electric Company</td>
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<td>General Motors Corporation</td>
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<td>Georgia Institute of Technology</td>
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<td>Graytech Software Inc.</td>
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<td>Harris Corporation</td>
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<td>Hughes Aircraft Company</td>
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<td>Hyundai Heavy Industries</td>
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<td>Intergraph Corporation</td>
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<td>Lawrence Berkeley Laboratory</td>
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<td>Lockheed Aeronautical Systems</td>
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<td>Los Alamos National Laboratories</td>
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<td>Louisiana State University</td>
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<td>Lucent Technologies</td>
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<td>Max Planck Institute, Germany</td>
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<td>Michelin Tire</td>
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<td>Motorola Inc.</td>
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<td>National Institute of Health</td>
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<td>Naval Research Laboratory</td>
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<td>Scripps Institute of Oceanography</td>
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<td>Siemens Automotive</td>
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<td>Stanford University</td>
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<td>St. Jude Children's Hospital</td>
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<td>Structural Dynamics Research Corp.</td>
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<td>SUNY, Buffalo</td>
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<td>Texas Instruments</td>
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<td>Tulane University</td>
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<td>Union Camp Corporation</td>
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<td>United Technologies</td>
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