MESSAGE FROM THE WOODRUFF SCHOOL CHAIR

Dear Friends:

We are pleased to bring you another annual report of the Nuclear and Radiological Engineering and Medical Physics Programs of the George W. Woodruff School. This report covers the academic year ending in June 2005.

This was another very successful year for the Nuclear and Radiological Engineering and Medical Physics Programs. We have again experienced significant increases in enrollment at both the undergraduate and graduate levels. In the undergraduate program, nuclear engineering enrollment is rapidly growing as a result of the quality of our programs and the increased interest in the country in nuclear power as a possible solution to meeting the country’s energy needs as well as helping with environmental issues. The medical physics graduate program has grown considerably in its second year, with a strong increase in the distance learning program. The program’s involvement with Emory University has been expanded and solidified, and we have managed to obtain participation of additional medical institutions to help provide the clinical rotations required in the program.

Given the fact that the NRE/MP programs are directly involved in three of the more important social issues of our time - energy, the environment, and health care - I fully expect the programs to continue to grow rapidly in size and stature. We owe thanks to Farzad Rahnema, the Chair of the programs, for the excellent job he has done in program development.

I hope you find this report informative and that you will help us advance the programs even further. If you have any comments or wish to discuss the programs, please contact Farzad Rahnema or me.

Ward O. Winer, Ph.D.
Eugene C. Gwaltney, Jr. Chair of the Woodruff School

October 2005
Atlanta, Georgia

LETTER FROM THE CHAIR OF THE NRE AND MP PROGRAMS

Dear Colleagues and Friends:

Welcome to the fourth edition of the annual report for the Nuclear and Radiological Engineering and Medical Physics (NRE/MP) Programs. The NRE/MP programs enjoy a healthy enrollment of 146 undergraduate and 73 graduate students. These correspond to enrollment increases of 62 percent and 70 percent, respectively, since fall 2002, soon after the reorganization of the program.

Two factors contributing to the enrollment trend are the increased student recruiting effort by the faculty and the undergraduate scholarship program funded by our industry sponsors and the Department of Energy matching grant. Additionally, the sponsored funds have helped us attract high quality students into the program.

Fall 2005 is the start of the second year of the Georgia Tech and Emory University cooperative on-campus and distance learning graduate program in medical physics. In addition to the M.S.M.P. degree, students may now pursue a Ph.D. degree as an option under the nuclear engineering program. I am also pleased to announce that the Memorial Health University Medical Center at Savannah, Georgia has agreed to be affiliated with the medical physics program and will take on three students for the clinical rotation each summer, beginning in 2006. This has helped us increase the on-campus M.S.M.P. student enrollment. Dr. Nasser Maleki, Director of Medical Physics, will lead the clinical rotation program at Memorial Health.

One of the major challenges in the coming academic year is to expand the faculty and upgrade the radiation detection laboratory in response to the enrollment increase. One of our sponsors, Areva, is making a sizeable contribution toward the upgrade of the detection laboratory. Finally, the faculty will consider an expansion of the medical physics graduate curriculum and review the undergraduate and graduate NRE curricula in response to the enrollment increase and the resurgence in the nuclear power industry.

I would like to welcome Drs. ZongJian (Z.J.) Cao of the Medical College of Georgia, Eric Elder of Emory University, and Dr. Nasser Maleki of Memorial Health University Medical Center to the medical physics program. Including Dr. Tim Fox, we now have four faculty members from outside institutions who are affiliated with the medical physics program.

I hope that you find this report interesting and useful. Please address any questions and comments about this report and the programs in nuclear and radiological engineering and medical physics to me at (404) 894-3718 or farzad.rahnema@nre.gatech.edu.

Farzad Rahnema, Ph.D.
Associate Chair of the Woodruff School and Chair of the NRE/MP Programs
EVENTS

THE ANNUAL WOODRUFF DISTINGUISHED LECTURE
Mr. Thomas A. Christopher, President and Chief Executive Officer of Framatome AP, Inc. and CEO and Vice Chairman of AREVA Enterprises, Inc. presented the Woodruff Distinguished Lecture on April 12, 2005. His talk was titled, *The Energy Highway...Where Does Your Road Lead?* He spoke about electricity and the fact that we all take it for granted. He answered these questions: How does the price of coal, natural gas, and oil affect our society? Will we have enough energy sources to maintain our way of life? What role does nuclear energy play? How do all these old and new technologies affect the future and the future of our children? According to Mr. Christopher, there is a strong future in the electric power industry. New power plants are being constructed around the world. These new power plants need people to help design and operate them in a world of increasing electric demand.

Thomas A. Christopher joined Framatome ANP (Advanced Nuclear Power), Inc. as President and Chief Executive Officer in April 2000. In addition, he became CEO and Vice-Chairman of AREVA Enterprises, Inc., the U.S. headquarters of the parent company, in early 2003.

Prior to joining Framatome ANP, Christopher was most recently the Vice President and General Manager of the Siemens Westinghouse Power Corporation’s Energy Services Divisions. Before that, he was General Manager of the Westinghouse Power Generation Business Unit’s Energy Divisions. He joined Westinghouse Nuclear Energy Division in 1973 and served in various management positions. He was General Manager of the Westinghouse Nuclear Service Division from 1982 to 1995.

Christopher holds a Bachelor of Science degree in Mechanical Engineering from the U.S. Naval Academy and a Master of Science degree in Engineering Mechanics (1968) from Georgia Tech. He graduated from the Naval Nuclear Program and was a licensed engineering officer of Operating Nuclear Submarines. In 1980, Christopher earned a Master of Business degree from the University of Pittsburgh.

SEMINARS
Seminars that discuss new developments in nuclear and radiological engineering and medical physics are presented by well-known speakers during the academic year. Speakers come from academia, industry, governmental, and professional organizations, and represent various areas in the disciplines. Graduate students are encouraged to attend these seminars to fulfill the requirements for NRE 8011-2. What follows is a list of speakers from the 2004-2005 academic year.


COOKOUTS
There were two cookouts especially for NRE and MP students, faculty, and staff: one in the spring and one in the fall. These get-togethers are an opportunity for undergraduate and graduate students to meet and get to know the faculty and staff in a relaxed setting. Dr. Ward O. Winer, School Chair, and members of the Woodruff School’s Administrative, Finance, and Academic Offices, who interact with the students, also attended the events.
PROGRAMS

ACCREDITATION
Georgia Tech has institutional accreditation from the Southern Association of Colleges and Schools. The College of Engineering and its schools are accredited by the Accreditation Board for Engineering and Technology (ABET). The Co-op Program is accredited by the Accreditation Council for Cooperative Education.

FACULTYadopts NEW STRATEGIC PLAN
The Strategic Plan of the Woodruff School supports the plans of the Institute and the College of Engineering. The plan, which was adopted in April, will be reviewed each year by the School Chair and the Faculty Advisory Committee, with input from the entire faculty and staff. The document will guide the Woodruff School into the future.

The goals of the Woodruff School are: to educate those who will pioneer the advancement of knowledge and be the future leaders of industry, academia, and government; to conduct basic and applied research in mechanical engineering, nuclear and radiological engineering, medical physics, and related interdisciplinary areas of bioengineering and paper science and engineering; to provide leadership in addressing emerging areas of technological and societal interest with a global perspective; and to provide service to the profession, to the State of Georgia, to the country, and to the development of engineering.

The objectives of the plan are: to develop the best engineering talent through a world-class educational program; to maintain a world-class and diverse faculty with an appreciation for the global nature of engineering; and support research and entrepreneurship that expands the frontiers of knowledge in engineering and technology and acts as a catalyst for economic development and helps create an enriched, more prosperous, sustainable society. Each objective has action items associated with it. View www.me.gatech.edu (see About the Woodruff School) for a complete copy of the plan.

ACADEMIC COMMON MARKET (ACM)
The ACM provides an exciting opportunity for students from the southeast whose state universities do not offer a BSNRE degree. Students accepted to Georgia Tech in the bachelor’s degree program in nuclear and radiological engineering pay (Georgia) in-state tuition and must maintain ACM status through academic achievement. Students who are legal residents of Alabama, Arkansas, Kentucky, Louisiana, Maryland, Mississippi, Oklahoma, South Carolina, Virginia, and West Virginia are eligible for this program.

INFORMATION
Detailed information about the nuclear and radiological engineering and the medical physics programs may be found online at www.nre.gatech.edu or www.mp.gatech.edu. In addition, copies of all our publications may be obtained online or by requesting a copy from the School. New this year are the Undergraduate Handbook, the Graduate Handbook, the 2005-2006 Graduate Study Brochure, and Research in the George W. Woodruff School of Mechanical Engineering, among others.
THE UNDERGRADUATE PROGRAM
The undergraduate program in nuclear and radiological engineering leads to the B.S.N.R.E. degree. The strength of the undergraduate curriculum is its breadth and balance in many of the fundamental disciplines of nuclear and radiological engineering.

UNDERGRADUATE ADVISEMENT
We introduced an Advisement web site to help undergraduate students more easily reach their academic advisors and to help students through the advisement process. View this site at www.nre.gatech.edu (see Undergraduate Programs). This is an opportunity to meet and contact the undergraduate advisors: Kristi Lewis (students with more than 45 credit hours) and Norma Frank (students with fewer than 45 credit hours). In addition, a faculty mentor/advisor is assigned to each undergraduate student upon entry to the NRE program. This is in addition to the undergraduate academic advisors. The faculty mentor is responsible for course advising, professional development, and assists the students with career planning and research opportunities.

THE UNDERGRADUATE COOPERATIVE PROGRAM
Since 1912, Georgia Tech has offered a five-year cooperative program to those students who wish to combine career-related experience with classroom studies. Students who participate in the program have the opportunity to develop career interests, become more confident in their career choices, and develop human relation skills through their work experiences. Graduates of the program receive the B.S.N.R.E. with a Cooperative Plan designation. In 2004, there were twenty-five nuclear engineering students (about 22% of the undergraduates) enrolled in the program. The job placement rate for program participants after graduation is very high; many take a permanent position with the company in which they did co-op work.

UNDERGRADUATE PROFESSIONAL INTERNSHIP PROGRAM
In fall 2002, the Undergraduate Professional Internship Program was established at Georgia Tech. The first students participated in the program in spring semester 2003. This program is geared toward those students who could not or did not participate in the Cooperative Program, but want some career-related experience before graduation. In the past academic year, five NRE students had internships at national laboratories.

UNDERGRADUATE RESEARCH
Undergraduate research in the Woodruff School is usually performed as a Special Problems course. Students work with a faculty member and can do the work for course credit or pay, part-time or full-time. In the past academic year, one NRE student took NE 4699 for credit.

Opportunities for funding exist from the President's Undergraduate Research Awards (PURA). The Undergraduate Studies Office funds requests by faculty/student teams to support undergraduate student involvement in faculty research. These awards are for student salaries and travel expenses to attend professional meetings. In the past academic year, two NRE students received PURA funding: Jason Breen for a project titled, New and Updated Benchmarks for Emerging Computational Methods and Kevin Riggs for a project titled, 3D Neutron Transport Theory Benchmark Problems. Dr. Farzad Rahnema was the advisor on both projects.

The NRE/MP program encourages and supports undergraduate research by providing up to five qualified students between $800 and $1,000 per student in salaries, travel, and/or equipment. This program is funded by the Department of Energy/Industry Matching Grant Program.

FIVE-YEAR BS/MS PROGRAM
In fall 2001, outstanding freshman and sophomore students in the Woodruff School were invited to apply to the Institute’s first five-year BS/MS degree program. Students can earn two degrees in a five-year period. The degrees can be obtained in various combinations, such as a B.S. and an M.S. in NRE, a B.S. in NRE and an M.S. in MP. Entry into the B.S.N.R.E./M.S.M.P. program is limited due to the clinical rotation requirement in the medical physics program. Graduate course work begins in the senior year. One NRE student (Brian Kern) received the bachelor’s degree and matriculated into the graduate program. Students need a GPA of at least 3.5 to be accepted into the program.

THE GRADUATE PROGRAM
The Woodruff School has a challenging graduate program that encompasses advanced study and research. We offer two master’s degrees: the M.S.N.E. and the M.S.M.P. In addition, the Ph.D. can be obtained in nuclear engineering or medical physics within the nuclear engineering degree program. The last health physics classes were given in spring 2005. The M.S.H.P. degree program is no longer offered. More information about the graduate degrees may be found at www.nre.gatech.edu (view Graduate Programs).

MEDICAL PHYSICS PROGRAM
A cooperative on-campus and distance learning graduate program in medical physics was created by Georgia Tech and Emory University in fall 2004. Georgia Tech administers the program including admission, registration, granting the degrees, and offering all the MP courses; Emory teaches the radiation therapy physics and part of the diagnostic imaging physics courses and handles the clinical rotation of ten students in its hospitals and clinic for ten weeks full-time each summer.

Currently, the program offers an M.S.M.P. degree and a Ph.D. degree as an option under the nuclear engineering program. Beginning fall 2005, the clinical rotation limit was increased to
thirteen students by adding the Memorial Health University Medical Center at Savannah, Georgia as an on-campus facility. As of fall 2005, there are 41 graduate students in the MP program: 19 on campus and 22 in the distance learning program. At least six of the on-campus students are in the Ph.D. program. Three MSMP students graduated in summer 2005 and accepted a job offer. Three additional students are expected to graduate in fall 2005 for a total of six graduates from the fall 2004 entering class. Information about this popular program may be found at their web site at www.mp.gatech.edu.

STUDENT ORGANIZATIONS

There are a number of organizations for Woodruff School students to join. These organizations offer a unique opportunity to learn about the many facets of nuclear and radiological engineering, provide an opportunity to meet practicing professionals, and provide valuable service to the program. These groups are especially for NRE students.

American Nuclear Society

The student section of the American Nuclear Society (ANS) is the link for prospective nuclear engineers with their chosen profession. The section holds monthly meetings which feature presentations by practicing engineers. Dr. Cassiano de Oliveira is the group’s faculty advisor.

Student Advisory Committee

The Nuclear and Radiological Engineering/Medical Physics Student Advisory Committee acts as a liaison between the NRE administration and students, provides the administration with commentary on the current status of the program, including issues that directly affect the students, and notes items that will improve faculty and student relations. Appointments to the committee are made by the chair of the program, Dr. Farzad Rahnema. The committee is comprised of up to two students from each class, freshman to senior, plus master’s and doctoral students. Active members in the past academic year were: Sarah Brashear, Jason Breen, Frank Hope, Ryan Lorio, Jeff Preston, Justin Pounders, and Lee Tschaepe.

Their activities included a discussion about the NRE curriculum and a presentation to the faculty; assistance with FASET presentations; draft and approval of the committee’s charter; calling potential incoming freshmen to answer their questions about the NRE program; and a discussion of advisement with feedback to the faculty and staff.

ENROLLMENT

The most important asset in the Woodruff School is our students. Interest and enrollment in the nuclear and radiological engineering undergraduate program continues to increase, with undergraduate enrollment increasing sharply in the past two years. In fall 2004, NRE enrollment increased by 21 percent over the previous year to 115 undergraduates. In fall 2005, NRE enrollment increased by 24 percent to 146 undergraduates. The increase can be attributed to a new-found interest in nuclear engineering from entering freshmen. There has also been a significant increase in the number of undecided students choosing NRE and in the number of students transferring into the School from other majors. The continued success of our students in the job market is a major factor in this increase.

<table>
<thead>
<tr>
<th>Bachelor’s Degree</th>
<th>Master’s Degree</th>
<th>Doctoral Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asians</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Blacks</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Hispanics</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Native Americans</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Whites</td>
<td>115</td>
<td>37</td>
</tr>
<tr>
<td>Multiracials</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Internationals</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Totals</td>
<td>146</td>
<td>54</td>
</tr>
</tbody>
</table>

Of the 146 undergraduate students, there are 53 freshmen, 34 sophomores, 25 juniors, and 34 seniors. By gender, there are 121 males and 25 females.

In fall 2005, the NRE/MP Programs had 32 NRE graduate students, and 41 medical physics students for a total of 73 graduate students. Nineteen are Ph.D. students, 15 are MSNE students, and 41 are MSMP students. By gender, there are 46 males and 27 females.

FRESHMAN CLASS PROFILE

There are 47 entering freshmen in fall 2005 in the nuclear and radiological engineering program. There were also five students who transferred into the program.

<table>
<thead>
<tr>
<th>Average SAT (out of 1600)</th>
<th>1371</th>
<th>1345</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgia Tech</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School Grade Point Average</td>
<td>3.72</td>
<td>3.74</td>
</tr>
<tr>
<td>Nuclear Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgia Tech</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Incoming Freshmen</td>
<td>47</td>
<td>2,431</td>
</tr>
<tr>
<td>Nuclear Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgia Tech</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asians</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Blacks</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hispanics</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Multiracials</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Internationals</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Whites</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Residency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgia Residents</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Out-of-State Residents</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Internationals</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

The entering freshmen come from the following places: Alabama (4), California (2), Florida (4), Georgia (9), Illinois (1), Kentucky (4), Louisiana (3), Massachusetts (1), Maryland (1), North Carolina (1), New York (2), Oregon (1), Pennsylvania (1), South Carolina (3), Texas (1), Virginia (5), and West Virginia (1). The international students are from United Arab Emirates (1), South Korea (1), and Ukraine (1).
This year's winners are: Victoria Beavers, Sarah Brashear, Jason Breen, Ashby Bridges, Patrick Brunick, Amanda Bryson, Julia Bunch, Geoffrey Carter, William Casino, Jesse Cheatham, Obert Chen, Alice Cheung, Sherard Chiu, Devin Dannemiller, Eugene Fortune, Zachary Friis, Benjamin Good, Ryan Green, Karen Hauffer, Winston Hamilton, Jason Hutchinson, Jimmy Jiang, Alex Johnson, Adam Jones, Bernard Jones, Brian Kern, Ryan A. Lorio, Alexander Lynn, James Maddox, Ashley Manzoor, David Nesbitt, James Poje, Jordan Rader, Sara Rahmna, Kevin Riggs, Brian Rotolo, Joseph Schulz, Colin Singer, Tyler Sumner, Matthew Terry, James Weathers, and Shruti Vellore.

WOMEN IN ENGINEERING SCHOLARSHIPS

In 2005, a group of talented Woodruff School students received scholarships from the Women in Engineering Program. One was an NRE student: Sarah Brashear received a Boeing Scholarship. According to Dr. Mimi Philobos, Director of the Women in Engineering Program, 452 female undergraduate engineering students qualified for the banquet, with a cutoff GPA of 3.35 (graduating with high honor). Seventy-two scholarships from twenty-five companies were awarded at the banquet with a value of $80,000.

PRESIDENT’S SCHOLARS

The President’s Scholar Program, which began in 1981, identifies students who have excelled in academia and leadership in high school. Financial awards are for four academic years, and students are expected to maintain honors-level academic performance and to be involved in campus or community activities. The program is funded entirely by endowments and annual contributions from Georgia Tech's alumni, industry supporters, and other friends through the Roll Call annual giving program. There are a total of 263 scholars enrolled, and they have an average GPA of 3.6. In fall 2005, fifty-nine new President’s Scholars enrolled at Georgia Tech. Of these, two are NRE students: Caroline Stratton and Nick Wellkamp. In addition, David Harris and Alex Johnson are other NRE students who are President’s Scholars.

NATIONAL SCIENCE FOUNDATION GRADUATE RESEARCH FELLOWSHIPS

Since 1990, Woodruff School graduate students have won 120 National Science Foundation Graduate Research Fellowships and 128 honorable mentions. One MP student, Megan Satterfield, received the award this past academic year.
The Woodruff School offers the following degrees as part of its NRE/MP programs: an undergraduate degree in nuclear and radiological engineering (B.S.N.R.E.) and four graduate degrees: (M.S., M.S.N.E., M.S.M.P. and the Ph.D.).

### DEGREES

#### Degrees Awarded in the College of Engineering (Summer 2004 to Spring 2005)

<table>
<thead>
<tr>
<th>Field</th>
<th>Bachelor’s Degrees</th>
<th>Master’s Degrees</th>
<th>Doctoral Degrees</th>
<th>School Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace Engineering</td>
<td>94</td>
<td>120</td>
<td>15</td>
<td>229</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
<td>45</td>
<td>7</td>
<td>11</td>
<td>63</td>
</tr>
<tr>
<td>Chemical and Biomolecular Engineering</td>
<td>106</td>
<td>22</td>
<td>28</td>
<td>156</td>
</tr>
<tr>
<td>Civil and Environmental Engineering</td>
<td>161</td>
<td>86</td>
<td>26</td>
<td>373</td>
</tr>
<tr>
<td>Electrical and Computer Engineering</td>
<td>385</td>
<td>230</td>
<td>83</td>
<td>698</td>
</tr>
<tr>
<td>Industrial and Systems Engineering</td>
<td>272</td>
<td>176</td>
<td>34</td>
<td>482</td>
</tr>
<tr>
<td>Materials Science and Engineering</td>
<td>15</td>
<td>22</td>
<td>4</td>
<td>41</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>265</td>
<td>164</td>
<td>42</td>
<td>475</td>
</tr>
<tr>
<td>Nuclear and Radiological Engineering and Medical Physics</td>
<td>8</td>
<td>3</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Polymer, Textile and Fiber Engineering</td>
<td>21</td>
<td>4</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>1372</strong></td>
<td><strong>838</strong></td>
<td><strong>250</strong></td>
<td><strong>2460</strong></td>
</tr>
</tbody>
</table>

#### UNDERGRADUATE DEGREES

During the past academic year, eight undergraduate degrees were awarded in nuclear and radiological engineering: one degree each in summer 2004 and fall 2004 and six degrees in spring 2005. Of these graduates, one was female and seven were male. By ethnicity, six undergraduates receiving their bachelor’s degrees were white, one was multiracial, and one was black. The degree recipients are:

**Summer 2004**
- Christine Noelke

**Fall 2004**
- Winston Hamilton

**Spring 2005**
- Eric Burgett
- Samuel Fowler
- David Kelley
- Brian Kern
- David Lassiter
- Jeffrey Preston

#### GRADUATE DEGREES

In the past academic year, two students received the M.S.N.E., one M.S.H.P., and two received the Ph.D. in NE. By gender, four males and one female received graduate degrees. Of these, four were white and one was an international student.

**SUMMER 2004**
- **Chad Dillon**, M.S.N.E., Advisor: Said Abdel-Khalik, Title: Two-Phase Flow Within Narrow Annuli, Previous school: Georgia Tech
- **Scott Mosher**, Ph.D NE, Advisor: Farzad Rahnema, Title: A Variational Transport Theory Method for Two-Dimensional Reactor Core Calculations, Previous school: Georgia Tech.

**FALL 2004**

**SPRING 2005**

#### CAREERS

The job market has strengthened for graduates of the Woodruff School during the past academic year. The average reported starting salary in spring 2005 for those with a B.S.N.R.E. degree was $51,000, the same as last year. For master’s students in nuclear engineering the median salary was $64,000, with a low of $55,300 and a high of $66,000, and over 81 percent of survey respondents report having jobs at graduation. Three students completed their degrees in medical physics and started jobs. Their average starting salary was $72,000. There is no reported salary information for those receiving doctoral degrees in NE. These numbers reflect only those students who reported salary information to Career Services or to the Woodruff School, which is a very small percentage of our graduates.
mechanical and nuclear engineering. Current experimental research projects include investigation of the root-cause mechanism for axial offset anomaly in pressurized water reactors, single and two-phase flow and heat transfer in microchannels with emphasis on accelerator targets and resistive magnet systems, first wall protection schemes for inertial fusion reactors, EHD enhancement of convection and boiling heat transfer for micro-gravity applications, and fuel cells' performance enhancement. Current numerical research efforts include multiphase modeling of transient nonequilibrium two-phase flow, Rayleigh-Taylor instability of bounded layers with surface injection, thermal analysis of dry cask spent nuclear fuel storage systems, and density wave instabilities in boiling water reactors.

**Distinctions**
- American Nuclear Society
  - Fusion Energy Division Chair, 2005
  - Fellow, 1995
- Georgia Institute of Technology
  - Outstanding Service Award, 2003
  - Outstanding Doctoral Thesis Advisor Award, 1998
  - Outstanding Faculty Leadership for the Development of Graduate Research Assistants Award, 1994
- Jack M. Zeigler Woodruff School Outstanding Educator Award, 2000
- American Society for Engineering Education (Nuclear Engineering Division) Glenn Murphy Award, 1999
- American Society of Mechanical Engineers Fellow, 1999

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**NOLAN E. HERTEL, Professor**
Ph.D., University of Illinois, 1979

**Descriptors:** Radiation shielding, neutron spectrometry and dosimetry, radiological assessment, reactor decommissioning, radiation detection, and high-energy particle transport

**Research (Radiological Engineering)**
Dr. Hertel's research interests include neutron benchmark experiments and the integral testing of neutron data, radiation dosimetry and shielding, air-scattered radiation, high-energy particle transport, and radiological assessment. Dr. Hertel has several ongoing research projects in neutron dosimetry, instrument response, high-energy particle transport, space radiation shielding, and neutron therapy facility design. One of his research activities addresses the redesign of a fast neutron cancer radiotherapy target at Fermilab to extend its applicability to include boron capture therapy enhancement of the fast-neutron tumor dose. Dr. Hertel has an ongoing project with the University of Kentucky in the testing of new space radiation shielding materials. He is also performing modeling studies to assess the use of common hospital radiation detection systems as whole body counters for use in emergencies, such as the explosion of a radiological dispersion device.

**Distinctions**
- American Nuclear Society
  - Scholarship Policy and Coordination Committee Chair, 2003-2005
  - Radiation Protection and Shielding Division Executive Committee, 2004-2007
- Health Physics Society Fellow, 2005
- Georgia Institute of Technology Sam Nunn School of International Affairs, Sam Nunn Security Program Senior Fellow, 2004-2006
- American Society for Engineering Education (Nuclear and Radiological Division) Glenn Murphy Award, 2004
- U.S. Department of Energy Russian Health Studies Program, Scientific Review Group Chairman
- American National Standards Institute Consensus Committee
- Registered Professional Engineer in Georgia
Research (Fission/Medical Physics)

Dr. Rahnema’s current research activities are in computational reactor and medical physics, transport theory, and reactor physics. His current research thrusts are in variational methods in radiation transport, perturbation and variational methods. The main thrust of his work is the development of highly efficient and accurate coarse-mesh radiation transport methods for criticality analysis in reactor cores, spent fuel configurations, and dose estimation in cancer patients. Two approaches are under development: one is based on coupled stochastic and deterministic methodology and the other is purely deterministic using discontinuous variational and nonvariational techniques. The two approaches differ in the techniques used in the expansion of the interface angular flux in terms of the angular and spatial variables. Another area of research is a coupled Monte Carlo and deterministic diffusion theory method for criticality analysis of loosely and tightly coupled lattice systems such as those in reactor and spent fuel configurations, respectively. The main purpose of this investigation has been to develop coarse-mesh methods for estimating homogenized diffusion coefficients that lead to diffusion results with Monte Carlo accuracy. Ongoing collaboration with the Idaho National Laboratory involves the development of a coupled coarse mesh diffusion/transport method in cylindrical and hexagonal geometries and a cell-homogenized cross section generation methodology in three-dimensional lattice configurations typical of the Very High Temperature Gas Cooled Reactor (VHTR).

Distinctions
- American Nuclear Society
  - Fellow, 2003
- Mathematics, and Computation Division, Executive Committee, 2002 - 2005
- Reactor Physics Division Treasurer, 2005 - 2006
- Dannels Scholarship Committee Chair, 2000 - present
- Southeast Universities Nuclear Reactors Institute for Science and Education (SUNRISE), Steering Committee Chair, 2002 - present
- Transport Theory and Statistical Physics Journal, ICTT Conference Special Issue Guest Editor, 1999

C.-K. Chris Wang, Associate Professor
Ph.D., Ohio State University, 1989

Descriptors: Radiation detection and dosimetry, medical and industrial applications of ionizing radiations, and spent nuclear fuel measurements

Research (Medical Physics/Fission)

Dr. Wang’s research includes both experimental and computational studies on the radiation detection and dosimetry problems that involve neutrons, photons, and charged particles. He has had a long-term research interest in the development of various neutron-based cancer treatment modalities including fast neutron therapy and neutron capture therapy. Dr. Wang’s recent collaboration with the Oak Ridge National Lab (ORNL) and the Isotron Inc. has resulted in the successful development of a new generation of high-intensity miniature 252Cf source seeds, making the interstitial 252Cf brachytherapy a practical modality for cancer treatment. His research projects include the biophysical modeling of radiation effects on cells and the in-phantom neutron dose measurement using radiochromic films.

Distinctions
- Sigma Xi (Georgia Tech Chapter) Advisor for Best Doctoral Dissertation (Advisor to Thomas M. Evans), 1997
- Registered Professional Engineer in Kansas

Weston M. Stacey, Jr., Fuller E. Callaway Professor in Nuclear Engineering and Regents’ Professor
Ph.D., Massachusetts Institute of Technology, 1966

Descriptors: Fusion engineering, plasma physics, and reactor physics

Research (Fusion)

Dr. Stacey’s research has two principal thrusts. Experimental Plasma Physics Analysis and Supporting Theory: Dr. Stacey’s group in the Fusion Research Center (FRC) formally collaborated with the DIII-D National Fusion Facility in the planning, data analysis, and interpretation of plasma physics experiments in the DIII-D tokamak, informally collaborated with the German TEXTOR tokamak group in the analysis of a series of experiments, and independently carried out supporting plasma theory and code development. During the past year, this work concentrated on understanding density limits, calculating plasma rotation and transport, and understanding phenomena in the edge plasma which play a major role in plasma confinement. Next-Step Fusion Device Design: Dr. Stacey’s group in the FRC performed plasma physics analysis in support of the national design effort for the FIRE plasma physics experiment and developed the concept of the Fusion Transmutation of Waste Reactor, a subcritical nuclear reactor driven by a fusion neutron source which would transmute the long-lived actinides in spent nuclear fuel.

Distinctions
- American Nuclear Society
  - Wigner Award, 2003
- Glenn T. Seaborg Medal, 2001
- Outstanding Technical Accomplishment Award (Fusion), 1996
- Fellow, 1974
- Georgia Institute of Technology
  - Outstanding Faculty Research Author, 2003
- Sigma Xi (Georgia Tech Chapter) Sustained Research Award, 1998
- Department of Energy Distinguished Associate Award, 1990
- American Physical Society Fellow, 1988
SRINIVAS GARIMELLA, Associate Professor
Ph.D., Ohio State University, 1990
Fellow of the ASME
Research descriptors: Sustainable technologies, phase change in microchannel and compact heat exchangers, and heat and mass transfer in binary mixtures.

S. MOSTAFA GHIAASIAAN, Professor
Ph.D., University of California, Los Angeles, 1983
Research descriptors: Multiphase flow, aerosol and particle transport, microscale heat transfer, and nuclear reactor thermohydraulics.

SHELDON JETER, Associate Professor
Ph.D., Georgia Institute of Technology, 1979
Research descriptors: Thermodynamics, energy systems, and heat transfer

ZONGJIAN CAO, Professor, Department of Radiology, Medical College of Georgia
Ph.D., Indiana University, 1994
Descriptors: Medical physics and medical imaging including single photon emission computed tomography (SPECT) and positron emission tomography (PET), medical image reconstruction theory, medical image quality and quantitation, and internal dosimetry
Research (Medical Physics)
Dr. Cao's current research centers on deriving accurate and efficient image reconstruction algorithms for SPECT and PET. Also he is interested in developing innovative emission imaging devices to significantly improve image quality. One of his novel ideas has been submitted to NIH for funding and received wide attention. In addition, Dr. Cao worked in the field of internal dosimetry and PET radiation dose to radiation workers.
Distinctions
• Diplomate, American Board of Radiology, 1995
• Society of Nuclear Medicine Member
• American Association of Physicists in Medicine Member
• Institute of Electric and Electronic Engineers Senior Member

ERIC ELDER, Assistant Professor of Radiation Oncology and Associate Director of Medical Physics, Department of Radiation Oncology, Emory University School of Medicine
Ph.D., Georgia Institute of Technology, 1997
Descriptors: Medical physics, image guided radiation therapy, adaptive radiation therapy, experimental medical physics, and radiation dosimetry
Research (Medical Physics)
Dr. Elder's research centers on techniques for adaptive radiation therapy, adjustments to patients radiation treatment caused by changes in patient position, anatomy, or motion or due to tumor response. Methods of visualization of these changes include 3D and 4D computed tomography and linear accelerator mounted cone beam computed tomography, radiography, and respiratory gated fluoroscopy and radiography. After visualization and tumor delineation, treatment planning is performed to adapt treatment properly. Use of electronic portal dosimetry to measure exit doses is also being explored.
Distinctions
• Diplomate, American Society of Therapeutic Radiation Oncology, 1997
• American Association of Physicists in Medicine Member
• American Society of Therapeutic Radiation Oncology Member

TIMOTHY FOX, Assistant Professor of Radiation Oncology and Director of Medical Physics, Department of Radiation Oncology, Emory University School of Medicine
Ph.D., Georgia Institute of Technology 1994
Descriptors: Medical physics, intensity modulated radiation therapy, optimization, biomedical imaging, and image guided radiation therapy
Research (Medical Physics)
Dr. Fox's research centers on techniques for decision making and automation that enable software systems to perform intelligently and exhibit goal-directed behavior in a clinical environment. The solutions to this problem require approaches that cut across many different academic fields. His research draws on areas such as artificial intelligence, constrained optimization methods, computational radiation dosimetry, and visualization methods. Dr. Fox's current research activities are in magnetic resonance (MR) spectroscopy applied to tumor delineation, automated treatment planning, and dose calculation methods.
Distinctions
• Diplomate, American Society of Therapeutic Radiation Oncology, 1997
• American Board of Radiology
  - Item Writer Task Force, Radiation Oncology Physics, 2005
  - Oral Board Examiner, Radiation Oncology Physics, 2005
• American Association of Physicists in Medicine Member
• American Society of Therapeutic Radiation Oncology Member

NASSER MALEKI, Director of Medical Physics, Memorial Health University Medical Center
Ph.D., University of Nebraska, 1981
Descriptors: Medical physics, intensity modulated radiation therapy, image guided radiation therapy, and stereotactic radiosurgery
Research (Medical Physics)
Dr. Nasser Maleki's research interest is in the area of Internal Organ Motion during Radiation Treatment. The field of Image Guided Radiation Therapy (IGRT) is relatively new and organ motion during treatment and on a daily basis is one of the most challenging
problems in treatment optimization. Dr. Maleki is actively exploring the application of implantable passive and active markers, RF transmitter or magnetic, for organ motion detection. He is also active in the development of modern quality management techniques in radiation therapy.

**Distinctions**
- Diplomate, American Board of Radiology, Therapeutic Radiologic Physics, 1988
- American Association of Physicists in Medicine Member
- American Society of Therapeutic Radiation Oncology Member
- American College of Radiology Member

**ADJUNCT NRE FACULTY**

**RICHARD SANCHEZ,** Adjunct Professor  
Research Director, CEA, France  
Ph.D., University of Paris, France, 1979  
Ph.D., University of Washington  

**Research descriptors:** Transport in stochastic media, and direct and inverse methods in reactor physics

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**RESEARCH FACULTY**

**JOHN MANDREKAS,** Senior Research Scientist, Currently on leave at the Office of Fusion Energy Science, U.S. Department of Energy, as a Visiting Program Manager  
Ph.D., University of Illinois, 1987  

**Research descriptors:** Plasma physics, transport theory, fusion reactor design, numerical methods, and computational physics.

**DENNIS SADOWSKI,** Research Engineer II  
M.S., University of Illinois at Chicago, 1986  

**Research descriptors:** Thermal sciences, fluid dynamics, and design and construction of experimental equipment.

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**EMERITUS FACULTY**

**Melvin W. Carter,** started in 1972, retired in 1988  
**Joseph D. Clement,** started in 1965, retired in 1991  
**Monte V. Davis,** started in 1973, retired in 1987  
**Geoffrey G. Eichholz,** started in 1963, retired in 1988  
**Bernd Kahn,** started in 1974, retired in 1996  
**Ratib Karam,** started in 1972, retired in 1997  
**Alfred Schneider,** started in 1975, retired in 1990

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**STAFF**

**SHAUNA BENNETT-BOYD,** Administrative Coordinator  
**LONA SMITH,** Administrative Assistant I

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**DONORS**

This list includes donors who have designated gifts to the Nuclear and Radiological Engineering Program between July 1, 2004 and June 30, 2005.

**CORPORATE CONTRIBUTORS**

Duke Power  
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MGP Instruments  
MWH Americas, Inc.

**FACULTY CONTRIBUTORS**

Nolan E. Hertel  
Farzad Rahnema  
Weston M. Stacey  
Ward O. Winer

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**ALUMNI**

**AWARDS**

**Lawrence T. Dauer** (M.S.H.P. 1996) received the Elda E. Anderson Award from the Health Physics Society for excellence in research or development, discovery or invention, devotion to health physics, and/or significant contributions to the profession of health physics.

**John W. Poston, Sr.** was given the Robley D. Evans commemorative Medal from the Health Physics Society. The recipient of this award demonstrates the extraordinary qualities exemplified by Professor Evans for excellence in scientific achievement, interdisciplinary capabilities, the applicability of science to real-world needs of radiation safety, and insight into simple solutions of difficult problems.

Poston is an alumnus (Ph.D. NE 1971), was a faculty member at GT, and received a College of Engineering Hall of Fame award. Professor Emeritus Geoffrey Eichholz was last year’s recipient.

**Michael T. Ryan** (Ph.D. NE 1982) was also honored as a Fellow of the Health Physics Society. In addition, he was elected chairman of the Nuclear Regulatory Commission’s Advisory Committee on Nuclear Waste (ACNW). ACNW provides independent technical advice on activities, programs and issues associated with regulating, managing, and disposing of radioactive waste. Dr. Ryan is an independent consultant in radiological science and health physics, and an adjunct faculty member in the College of Health Professions at the Medical University of South Carolina and at the College of Charleston. He has more than 25 years of experience in radioactive waste management and radiation protection.
TESTIMONIALS

Included here is an assortment of program testimonials from some of our Ph.D. graduates of the nuclear and radiological engineering program. They represent a cross section of graduates; they work in academia, industry, and national laboratories. Everyone was asked the same open-ended questions about their experience at Georgia Tech. Typically, the text has been shortened to fit the space available in this report; the complete text will soon be found online.

JEFFREY FAVORITE
MSNE 1994, Ph.D. NE 1998
Member of the Technical Staff, Los Alamos National Laboratory, Los Alamos, New Mexico

The major strengths of the Woodruff School are its faculty and staff. My advisor was one of the pioneers in the field of my research, and the rest of the faculty are also experts in their fields. The management of the Woodruff School was always helpful, supportive, and attentive. I was always encouraged to publish my work and supported to attend meetings. The nuclear engineering graduate program is outstanding. There are high-quality facilities available for both computational and experimental research, and the faculty is especially good.

DAN ILAS
Ph.D. NE 2001
R&D Staff Member, Oak Ridge National Laboratory, Oak Ridge, Tennessee

Besides the academic work, I had lots of enjoyable moments at Georgia Tech. As a graduate student, the credit I received for courses taken previously helped me concentrate my efforts toward research, in which I was involved from the very beginning. Since my work was in computational methods development, I expected to have up-to-date computers and codes. The Woodruff School and the Nuclear Engineering program always lived up to these expectations. I was fortunate to meet a small but very dedicated and professional faculty, each of them very well known in his field. Their personal examples were an important source of inspiration for me. I always found support from them, whenever I needed it, before or after graduation.

MICHAEL SCOTT MCKINLEY
Computational Physicist, Physics and Advanced Technologies Directorate, Lawrence Livermore National Laboratory, California

I completed my undergraduate degree at Georgia Tech. That exposure led me to realize the excellence in education I could expect from the graduate program. After enrolling in graduate school, I was able to work in groups as well as individually. In addition, I could set my pace and study areas that were of interest to me. This kind of educational experience translates very well into good practices while developing a career. I feel very indebted to my advisor for not only helping me with my research and education but also for his guidance and assistance that prepared me for life after school. My experience with computers as part of my graduate work has resulted in being my greatest asset. Not only have I learned numerical techniques, but I also have been exposed to many operating systems, programming languages and applications. This diversity of knowledge makes me more marketable as well as gives me confidence in tackling new assignments and job opportunities.

ELEODOR NICHITA
Ph.D. NE 1997
Assistant Professor, School of Energy Systems and Nuclear Science, University of Ontario, Institute of Technology, Canada

What attracted me to Georgia Tech initially was the promise of a flexible graduate program of study, one designed primarily by the student, with only minimal guidance from the advisor. I wasn't disappointed: While guidance was always available, it was never constraining. The blend of research and teaching experiences I was exposed to during my four years in the Woodruff School were extremely valuable for my future career as a research analyst and, subsequently, professor. The best thing about the nuclear engineering graduate program may be that it is at the same time rigorous and flexible. Professors have expertise in a range of domains and are very approachable.

KEN VENOIT
MSHP 1996, Ph.D. NE 1999
Y-12 National Security Complex
Oak Ridge, Tennessee

I chose to attend graduate school at Georgia Tech because of its excellent reputation in industry, academia, and professionals. The classroom, research, and laboratory work performed during my time at Georgia Tech thoroughly prepared me to solve operational and theoretical problems. The courses are delivered by extremely competent faculty and were well designed to cover the essential topics in detail. The laboratory courses provide a method to introduce students to the instrumentation as well as to compliment the classroom lectures. Most importantly, the variety of research conducted by the faculty instills the necessary qualities required for quality research. During my study I was allowed and encouraged to be involved with fellow students’ research. While the expectations are high, the rewards of the education and the experience are much higher. I would rate the faculty, students, facilities, and the program as excellent.

MICKEY WADE
MSNE 1887, Ph.D. NE 1991
Deputy Director of the Experimental Science Division, Energy Group of General Atomics, Oak Ridge National Laboratory, Tennessee

The ongoing research program administered by the faculty at Georgia Tech is impressive, allowing the graduate student a wide range of choices in choosing a research topic. The quality of Woodruff School's graduate programs, faculty, and facilities are top notch and highly regarded within industry and the national lab system. Another strength in the Georgia Tech graduate program is the diversity of its students. The range of nationalities and cultures represented by the student body provide a unique opportunity for a student to learn about other cultures and global issues directly.
NUCLEAR ENGINEERING ADVISORY BOARD

The Nuclear Engineering Advisory Board of the Woodruff School has representatives from academia and industry. These board members also belong to the Woodruff School Advisory Board. They meet once a year, in the fall, to discuss new ideas for the NRE program and areas of research that are important to industry. The advisory board recommends strategic directions to the Woodruff School, suggests broad-based curriculum revisions, and consults with the Chair and faculty on important issues.

The annual meeting of the Woodruff School’s advisory board was held at Georgia Tech on Friday, November 5, 2004. School Chair Dr. Ward O. Winer presented the State of the Woodruff School in the past academic year, and Dr. Farzad Rahnema presented an overview of the NRE/MP programs. There was a discussion on the undergraduate and graduate curricula; a review of capstone design, and examples of recent research initiatives by the faculty, including the micro-radiation therapy apparatus and the SUNRISE project.

Mr. Jeffrey A. Benjamin
Vice President, Licensing & Regulation
Exelon Corporation
Warrenville, Illinois

Mr. David A. Christian
Senior Vice President and Chief Nuclear Officer
Dominion Energy
Glen Allen, Virginia

Mr. Thomas A. Coleman
Vice President
Framatome-ANP
Lynchburg, Virginia

Dr. James J. Duderstadt
President Emeritus and University Professor of Science and Engineering
The University of Michigan
Ann Arbor, Michigan

Mr. Ken S. Folk
Manager, Core Analysis
Southern Nuclear Operating Company
Birmingham, Alabama

Dr. James A. Lake
(MSNE 1969, Ph.D. NE 1972)
Associate Laboratory Director Nuclear and Energy Systems U.S. DOD
Idaho National Engineering & Environmental Laboratory
Idaho Falls, Idaho

Mr. Louis B. Long
(BSPhys 1966, MSNE 1967)
Vice President, Technical Support
Southern Nuclear Operating Company
Birmingham, Alabama

Mr. James Maddox
National Academy for Nuclear Training Institute of Nuclear Power Operations
Atlanta, Georgia

Mr. William McCollum, Jr.
Senior Vice President, Nuclear Support
Duke Power Company
Charlotte, North Carolina

Mr. Jim E. Morel
Staff Member
Los Alamos National Laboratory
Los Alamos, New Mexico

Dr. Kyle H. Turner
(BSEE 1968, MSNE 1969, Ph.D. NE 1971)
Chief Executive Officer
McCallum-Turner, Inc.
Evergreen, Colorado

Dr. Lawrence J. Ybarondo
(Ph.D. ME 1964)
Jackson Hole, Wyoming

ACKNOWLEDGMENT: This report is written and edited by Rona Ginsberg, Director of Communications for the Woodruff School. Craig Moonshower designed the document. The photographs were taken by Gary Meek and Rona Ginsberg. Additional photos are either from the Georgia Tech or the Woodruff School Archives. Thanks to Said Abdel-Khalik, Shauna Bennett-Boyd, Zongjian Cao, Cassiano de Oliveira, Eric Elder, Melody Foster, Tim Fox, Nolan Hertel, Glenda Johnson, Kristi Lewis, Nasser Maleki, Farzad Rahnema, Bill Stacey, Chris Wang, Melinda Wilson, Ward Winer and Caroline Wood for providing information for this report. We gratefully acknowledge the financial support of the Woodruff Endowment to the George W. Woodruff School of Mechanical Engineering.
A BRIEF HISTORY OF GEORGIA TECH AND NUCLEAR ENGINEERING

1885 The Georgia Legislature passes a bill appropriating $65,000 to found a technical school.

1886 Atlanta is chosen as the location for the Georgia School of Technology.

1912 The Cooperative Education Department is established to coordinate work-study programs.

1912 The School of Nuclear Engineering is established with the M.S.N.E. as its first degree. The first director of the School of Nuclear Engineering is named: Dr. W. B. Harrison, a professor of mechanical engineering.

1915 The Cooperative Education Department is renamed: Dr. W. B. Harrison, a professor of mechanical engineering.

1920 The first master's degree in medical physics (M.S.H.P.) and nuclear engineering (M.S.H.P.) is started. Dr. Weston M. Stacey comes to Tech to set up the Fusion Research Center in the School of Nuclear Engineering. The Center of Radiological Research was formed to coordinate research in health physics.

1927 The master's degree in nuclear engineering is accredited. The first B.S.N.E. degree is awarded to a minority student.

1931 The Georgia Legislature creates the University System of Georgia.

1931 The Georgia Legislature passes a bill appropriating $65,000 to found a technical school.

1935 The Board of Regents approves Tech to change its name to the Georgia Institute of Technology.

1948 The Board of Regents authorizes Tech to change its name to the Georgia Institute of Technology.

1952 The Board of Regents votes to make Tech coeducational. The first two women students enroll for fall quarter.

1957 Frank Neely helps Georgia Tech get one of the first nuclear reactors in the South. The Georgia Legislature grants Tech $2.5 million for a nuclear reactor. The cost for the entire complex was 4.5 million dollars.

1958 The first master's degree in Applied Nuclear Science (an interdisciplinary program in physics, chemistry and math) is granted. This later became the health physics degree.

1962 The School of Nuclear Engineering is established with the M.S.N.E. as its first degree. The first director of the School of Nuclear Engineering is named: Dr. W. B. Harrison, a professor of mechanical engineering.

1964 The heavy-water-cooled nuclear reactor begins operations. The Ph.D. in nuclear engineering is approved. Reactor physics is taught by a faculty member at the Oak Ridge National Laboratory over a phone line and with a stylus printer, making it, perhaps, the first distance-learning course at Georgia Tech.

1965 The first Ph.D. in nuclear engineering is awarded to Walter Waverly Graham. The curriculum option of health physics within the MSNE program is initiated. Captain F. W. (Bill) Chambers, Jr. is hired as the first HP faculty member.

1965 The undergraduate program in Nuclear Engineering is established.

1967 The Center of Radiological Research is formed to coordinate research in health physics. The distance-learning (video) program in health physics (M.S.H.P.) and nuclear engineering (M.S.N.E.) is started. Dr. Weston M. Stacey comes to Tech to set up the Fusion Research Center in the School of Nuclear Engineering. The Center of Radiological Research was formed to coordinate research in health physics.

1972 The first master's degree in nuclear engineering is awarded to a minority student. The Board of Regents approves the conversion of the master's degree in applied nuclear science to be conferred on health physics students in the nuclear engineering department. This will be called the M.S. in Health Physics.

1973 The first master's degree in nuclear engineering is awarded to a female student. The bachelor's degree in nuclear engineer is approved.

1975 The master's degree in nuclear engineering is accredited. The first master's degree in nuclear engineering is awarded to a female student.

1977 The Center of Radiological Research is formed to coordinate research in health physics. The distance-learning (video) program in health physics (M.S.H.P.) and nuclear engineering (M.S.N.E.) is started. Dr. Weston M. Stacey comes to Tech to set up the Fusion Research Center in the School of Nuclear Engineering. The Center of Radiological Research was formed to coordinate research in health physics.

1979 The School of Nuclear Engineering is renamed the School of Nuclear Engineering and Health Physics. Late 1970s Tech has the largest graduate health physics program in the country.

1981 The first Ph.D. in nuclear engineering is awarded to a minority student. The first Ph.D. in nuclear engineering (HP) is awarded to a woman. The School of Nuclear Engineering is merged into the George W. Woodruff School of Mechanical Engineering.

1984 The Ph.D. in nuclear engineering is awarded to a woman. The School of Nuclear Engineering is renamed the School of Nuclear Engineering and Health Physics.

1984 The Ph.D. in nuclear engineering is awarded to a minority student. The first Ph.D. in nuclear engineering (HP) is awarded to a woman. The School of Nuclear Engineering is merged into the George W. Woodruff School of Mechanical Engineering.

1985 Tech decides to maintain its nuclear engineering program during a period of downturn because nuclear power and security are important to the economies of the southeast and the nation.

1987 Developer Richard Peters donates four acres of land known as Peters Park to the new school.

1989 Georgia Tech opens for classes on October 8 with 129 students working toward the only degree offered, the Bachelor of Science in Mechanical Engineering.

1990 The 30kCi Cesium 137 source in the Radioisotope Building is removed.

1991 A 30kCi Cesium 137 source is installed in the Radioisotope Facility (later the Cherry-Emerson Building).

1992 The Board of Regents names the research facility that contains the reactor the Frank H. Neely Nuclear Research Center.

1993 The master's degree is awarded to a woman. The first Ph.D. in nuclear engineering (HP) is awarded to a minority student.

1994 The School of Nuclear Engineering, known as the Frank H. Neely Nuclear Research Center, at Georgia Tech.

1995 The first Ph.D. in nuclear engineering is awarded to a woman.

1997 The B.S.N.E. degree becomes the B.S.N.R.E. degree to reflect the addition of radiological engineering courses in the curriculum.

1998 The M.S.H.P. degree is awarded to a woman. The first Ph.D. in nuclear engineering is awarded to a minority student.

2000 The School of Nuclear Engineering is established with the M.S.N.E. as its first degree. The first director of the School of Nuclear Engineering is named: Dr. W. B. Harrison, a professor of mechanical engineering.

2003 A new faculty member is hired as a full professor in partial fulfillment of the strategic plan. A master's degree (M.S.M.P.) in medical physics in conjunction with Emory University is proposed and is waiting for Board of Regents approval. No new graduate students were accepted into the Health Physics program. Self-selected research areas are created: fusion, fission, and health physics. ABET approval of the undergraduate program. Nuclear Engineering and Health Physics at Georgia Tech (1958-1990) by Geoffrey Eichholz, Regent's Professor Emeritus, is published. The Master's Degree in Medical Physics receives approval from the Board of Regents. A transition plan is developed for health physics students to complete the degree. Students are admitted to the Medical Physics program, which begins in fall 2004. The distance-learning program in Medical Physics begins. Enrollment in NRE continues to rise. The undergraduate program in nuclear and radiological engineering is ranked 11th in the nation by U. S. News & World Report.

2004 The first three students finished the M.S.M.P. Program, received their Master's degrees and found jobs. The undergraduate enrollment in NRE continues to increase substantially. The M.S.H.P. degree program is no longer offered. The Ph.D. in medical physics is an option in nuclear engineering.

2005 The first three students finished the M.S.M.P. Program, received their Master's degrees and found jobs. The undergraduate enrollment in NRE continues to increase substantially. The M.S.H.P. degree program is no longer offered. The Ph.D. in medical physics is an option in nuclear engineering.
This report is published each fall by the George W. Woodruff School of Mechanical Engineering at Georgia Tech. For more information about the undergraduate and graduate degree programs in nuclear and radiological engineering and medical physics, please contact us by any of the following methods:

**Letter**  Dr. Farzad Rahnema, Associate Chair of the Woodruff School and Chair of the NRE and MP Programs, George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, Georgia  30332-0405  
**Phone**  404-894-3731  
**Fax**  404-894-3733  
**E-mail**  farzad.rahnema@nre.gatech.edu or information@nre.gatech.edu  
**Online**  www.nre.gatech.edu or www.mp.gatech.edu