NC State Engineering in the 21st Century

Louis A. Martin-Vega, Ph.D., P.E.
Dean of Engineering
North Carolina State University
February 3, 2011
North Carolina College of Agriculture and Mechanic Arts established in 1887

1887

Engineering Departments established

1895

Wallace C. Riddick Jr. becomes the College’s 1st professor of civil engineering (also 2nd President and 1st football coach)

1921

Lucille Thomson becomes the 1st woman to enroll at the university. Thomson studies electrical engineering.

During Riddick’s leadership:
- School grows to include 12 departments
- Engineering Experiment Station organized

1923

Riddick named first dean

1937

School of Engineering formed

Blake Ragsdale Van Leer named dean

During Van Leer’s leadership:
- Service division in Diesel and Internal Combustion Engineering established

1944

North Carolina Engineering Foundation, Inc. formed

“On the Shoulders of Giants”

1921

Lucille Thomson becomes the 1st woman to enroll at the university. Thomson studies electrical engineering.

1944

North Carolina Engineering Foundation, Inc. formed
During Lampe’s leadership:
- Three major buildings constructed: Riddick Engineering Laboratories, Broughton Hall and Burlington Nuclear Laboratories
- Department of Engineering Research, Industrial Extension Service, Department of Mineral Industries, Department of Nuclear Engineering and Engineering Placement Office established
- Furniture manufacturing and management, construction, heating and air conditioning and nuclear engineering developed to serve special industrial needs

J. Harold Lampe named dean. Serves 17 years, the longest tenure of any dean of engineering at NC State.

NC State operates the world’s 1st non-governmental university-based nuclear reactor.

Ralph E. Fadum named dean.

During Fadum’s leadership:
- Department of Engineering Mechanics and Department of Materials Engineering established
- Nuclear Reactor Program established

1973

Hardy Liston and Robert Clemons become the 1st African American graduate students to enroll at NC State. Liston and Clemons study mechanical engineering and electrical engineering, respectively.

Hubert Winston becomes the 1st African American to receive a doctoral degree in chemical engineering.

1975
Larry K. Monteith named dean of engineering

1978

Sarah A. Rajala becomes the 1st woman PhD faculty member to join the College of Engineering

1979

Gov. James Hunt allocates land to NC State – the early beginnings of Centennial Campus

1984

During Monteith’s leadership:
- Plans developed for Engineering Graduate Research Program for Centennial Campus
- Increased emphasis on developing graduate programs, computing facilities, television and video-based engineering education and recruitment of minority students

1987

School of Engineering becomes College of Engineering

1989

Christine Grant becomes the 1st African American woman faculty member hired in the College of Engineering and in the Department of Chemical Engineering

1994

Groundbreaking held for Engineering Graduate Research Center
2002
Formal groundbreaking held for Engineering Building I

2003
Groundbreaking ceremony held for Engineering Building II

2005
Dedication ceremony held for Engineering Building I

2006
Louis A. Martin-Vega named dean. Martin-Vega becomes the 1st Hispanic dean at NC State

1996
Nino A. Masnari named dean

During Masnari’s leadership:
- Engineering Buildings I and II open
- Alumnus Edward P. Fitts gives largest gift ever received by the College of Engineering
- Groundbreaking held for Biomanufacturing Training and Education Center

Bond referendum of $468 million passed. Renovation and construction of almost 30 buildings on NC State’s campus is a critical step in achieving the goal of relocating the entire college to Centennial Campus.

Dedication ceremony held for Engineering Building II

Dedication ceremony held for Engineering Building I

NC State UNIVERSITY

nc state ENGINEERING
Engineering Academic Departments

- Biomedical Engineering (BME)
- Chemical and Biomolecular Engineering (CBE)
- Civil, Construction, and Environmental Engineering (CCEE)
- Computer Science (CSC)
- Electrical and Computer Engineering (ECE)
- Industrial and Systems Engineering (ISE)
- Materials Science and Engineering (MSE)
- Mechanical and Aerospace Engineering (MAE)
- Nuclear Engineering (NE)

Engineering Departments in Other Colleges

- Biological and Agricultural Engineering (BAE)
- Forest Biomaterials (formerly Wood and Paper Science)
- Textile Engineering, Chemistry and Science (TECS)
Undergraduate Academic Programs

- Civil Engineering [1936]
- Electrical Engineering [1936]
- Mechanical Engineering [1936]
- Aerospace Engineering [1948]
- Chemical Engineering [1948]
- Industrial Engineering [1948]
- Biological Engineering [1958]
- Construction Engineering and Management [1958]
- Nuclear Engineering [1965]
- Materials Science and Engineering [1969]
- Computer Science [1987]
- Computer Engineering [1990]
- Textile Engineering [1990]
- Environmental Engineering [1995]
- Biomedical Engineering [2002]
- Paper Science and Engineering [2003]
- Engineering - Mechatronics Concentration (Asheville) [2004]

[Date of first accreditation]
Graduate Academic Programs

- Aerospace Engineering [MS, PhD]
- Biological Engineering [MBAE, MS, PhD]
- Biomedical Engineering [MS, PhD]
- Chemical Engineering [MChE, MS, PhD]
- Civil Engineering [MCE, MS, PhD]
- Computer Engineering [MS, PhD]
- Computer Systems Networking [MS]
- Computer Science [MCS, MS, PhD]
- Electrical Engineering [MS, PhD]
- Industrial Engineering [MIE, MS, PhD]
- Integrated Manufacturing Systems Engineering Institute [Master of Integrated Manufacturing Systems]
- Materials Science and Engineering [MME, MS, PhD]
- Mechanical Engineering [MS, PhD]
- Nuclear Engineering [MNE, MS, PhD]
- Operations Research [MOR, MS, PhD]
- Textile Engineering [MS]
## Distance Education Graduate Academic Programs

### Programs Prior to 2006

- MS in Aerospace Engineering
- MS in Chemical Engineering
- Master of Civil Engineering
- Master of Computer Science
- Master of Engineering
- Master of Mechanical Engineering

### New Programs

- MS in Computer Engineering
- MS in Computer Networking
- MS in Electrical Engineering
- Master of Environmental Engineering
- Master of Integrated Manufacturing Systems Engineering
- Master of Materials Science and Engineering
- Master of Nuclear Engineering
New Programs

Undergraduate Program:
- BS in Computer Science-Game Development Concentration
- BS in Engineering (Craven Community College)

Graduate Programs (New or Under Development):
- MS in Electric Power Systems (professional degree) *
- MS and Master’s of Biomanufacturing (professional degree) *
- Master’s of Nanoengineering (distance education) *
- Master’s of Life Cycle Engineering
- Master’s of Supply Chain Engineering and Management
- Joint Master of Industrial Engineering/MBA

Certificate Programs:
- Graduate certificate in Computational Science and Engineering
- Graduate certificate in Renewable Electric Energy Systems*
- Joint NCSU/UNC-CH graduate certificate in Nanobiotechnology
- Joint NCSU/UNC-CH graduate certificate in Medical Devices

*Externally funded
NC State Engineering

Students

- Enrollments Fall 2010
  - Undergraduate 6,000
  - Graduate 2,492
- Degrees Awarded (2009-10)
  - Undergraduate 1,011
  - Graduate 723

- Among all U.S. engineering colleges*:
  - 4th largest undergraduate enrollment
  - 11th largest graduate enrollment
  - 7th in number of BS degrees awarded
  - 14th in number of MS degrees awarded
  - 13th in number of PhD degrees awarded

* ASEE figures for 2009
Student Success 2006-2010

- Astronaut Scholarship Foundation (2006-2010) - Consecutively awarded
- 1st Place, IEEE Computer Society International Design Competition (2006) - Computer Science Senior Design Team
- Leader of the Pack Scholarship (2006) - Textile Engineering
- Outstanding Student Chapter Award – AIChE (2007, 2009) - Awarded 13 out of the last 15 years
- Rhodes Scholarship Finalist (2007)
- Barry M. Goldwater Scholarship (2008)
- Cisco/NACME Scholarship (2009)
- Third Place and Rookie Award at NASA Competition (2010) - Mechanical and Aerospace Engineering
- 1st Place, BMEStart Design Competition (2010) - Biomedical Engineering
- Women in Aerospace (WIA) Foundation Scholarship (2010) - Inaugural recipient
- 66 Park Scholars (2010)
NC State Engineering

Diversity Profile*

- 3rd in BS degrees awarded to African Americans among non-HBCUs
- 13th in BS degrees awarded to women
- 14th in MS degrees awarded to women
- 9th in PhDs awarded to women
- 8th in number of African American T/TT faculty
- 13th in number of women T/TT faculty

* ASEE 2009 data
Undergraduate enrollment increased by 373 or 6.6%

Quality of entering freshmen improved with more than half in top 10% of high school class

Master’s enrollment increased by 489 or 47.5%

Doctoral enrollment increased by 163 or 20%
NC State Engineering

Faculty

- 726 faculty and staff, including 260 tenured and tenure-track faculty members
- 10 members of the National Academy of Engineering
- 1 National Medal of Technology recipient
- 1 US Army Commander’s Award recipient
- 1 Emmy Award winner
- 1 Electronic Design Hall of Fame member
- 3 among AIChE 100 Engineers of the Modern Era
- 88 Presidential and NSF recognitions, including
  - 62 NSF Career Awards
  - 4 Presidential Mentoring Awards
Centers, Institutes and Laboratories

- Advanced Transportation Energy Center (ATEC)
- Analytical Instrumentation Facility (AIF)
- Applied Energy Research Laboratory (AERL)
- Biomanufacturing Training and Education Center (BTEC)
- Center for Advanced Computing and Communication (CACC)
- Center for Efficient, Scalable and Reliable Computing (CESR)
- Center for Engineering Applications of Radioisotopes (CEAR)
- Center for Nuclear Power Plant Structures, Equipment and Piping (CNPPSEP)
- Center for Robotics and Intelligent Machines (CRIM)
- Center for Transportation and the Environment (CTE)
- Constructed Facilities Laboratory (CFL)
- Ergonomics Center of North Carolina (ECNC)
- Furniture Manufacturing and Management Center (FMMC)
- Future Renewable Electric Energy Delivery and Management Systems Center (FREEDM)
- Institute for Computational Science and Engineering (ICSE)
- Institute for Maintenance Science and Technology (IMST)
- Institute for Next Generation IT Systems (NEXT)
- Institute for Transportation Research and Education (ITRE)
- Integrated Manufacturing Systems Engineering Institute (IMSEI)
- Minerals Research Laboratory (MRL)
- Nanofabrication Facility @ NCSU (NNF)
- North Carolina Solar Center (NCSC)
- Nuclear Reactor Program (NRP)
- Power Semiconductor Research Center (PSRC)
- Precision Engineering Center (PEC)
- Semiconductor Power Electronics Center (SPEC)
- Silicon Solar Research Center (SiSoC)
- Silicon Wafer Engineering and Defect Science Center (SiWEDS)
New Faculty

- Over 60 faculty hires
- 8 new department heads
- 13 new female faculty members
- 7 new underrepresented minority faculty members
- 1st female department head

- Significant critical mass in interdisciplinary areas
  - Bioengineering
  - Info. & Comm. Tech.
  - Energy & Environment
  - Transportation & Logistics
  - Health Systems Engineering
  - Nanotechnology
  - Security & Critical Infrastructure
  - Robotics & Sensors Tech.
Growth in Research Expenditures

- Research expenditures have grown from $103 million to $129 million, or 26%
Growth in Research Awards

- Research Awards ($) have doubled over the last 4 years
• The College of Engineering now generates $11.3M or 35% of total F&A versus $8.3M or 29% just four years ago.

• The College of Engineering now generates $85M or 31.7% of total research awards ($) versus $42M or 21.9% just four years ago.
Strategic Vision

Emphasis on the integration of research and education

- Engineering Health Systems
- Bioengineering
- Nanotechnology
- Robotics & Sensor Technology
- Advanced Materials & Manufacturing
- Energy & Environmental Systems
- Transportation & Logistics
- Information & Communications Technology
- Security & Critical Infrastructure
- Nanotechnology
- Bioengineering
NAE Grand Challenges for the 21st Century

• Sustainability
  make solar energy more economical
  provide energy from fusion
  develop carbon sequestration methods
  provide access to clean water
  manage nitrogen cycle

• Health
  advance health informatics
  engineer better medicines
  reverse-engineer the brain

• Security
  restore and improve urban infrastructure
  prevent nuclear terror
  secure cyberspace

• Joy of Living
  enhance virtual reality
  advance personalized learning
  engineer the tools of scientific discovery
Summit on the NAE Grand Challenges

- Co-hosts: NC State & Duke
- Emcee: Marshall Brain
- Keynote Speakers
  - Jeff Immelt, CEO of GE
  - John Chambers, CEO of Cisco
  - Ted Kaufman, US Senator
  - Kristina Johnson, US Undersecretary for Energy
- More than 630 registrants

- Held March 2-5, 2010 in Raleigh
- Focused on NAE Grand Challenges related to Health and Security
Solving Society’s Energy Challenges

FREEDM--Future Renewable Electric Energy Delivery and Management Systems

$18.5 Million National Science Foundation grant

Creating the “Internet for Energy”

Director: Dr. Alex Huang

Lead Institution
NC State University

Partner Institutions
Arizona State University
Florida A&M University
Florida State University
Missouri University of Science & Technology
CASL: The Consortium for Advanced Simulation of Light Water Reactors

A DOE Energy Innovation Hub for Modeling & Simulation of Nuclear Reactors

Core University Partners
- NC State University (Lead)
- University of Michigan
- MIT

Core National Lab Partners
- Idaho National Laboratory
- Los Alamos National Laboratory
- Oak Ridge National Laboratory
- Sandia National Laboratories
- Electric Power Research Institute

Core Corporate Partners
- Tennessee Valley Authority
- Westinghouse Electric Company

NCSU Leaders

Chief Scientist for CASL:
Dr. Paul Turinsky

Education Chairman:
Dr. John Gilligan

Technical Leadership in Validation and Uncertainty Quantification:
Dr. Dan Cacuci

Vision
Create a virtual reactor for predictive simulation of Light Water Reactors
Sustainability: Research Highlights

- Dr. Robert Kelly, USDOE, Hydrogen-Dependent Conversion of Carbon Dioxide to Liquid Electrofuels by Extremely Thermophilic Archaea

- Dr. William Roberts, NSF, Algal Oils to ‘Drop-in’ Replacements for Petroleum Transportation Fuels

- Dr. Steve Peretti, Golden LEAF Fdn, Pilot Plant to Enhance Sustainable Conversion of Biomass to Ethanol Fuels in NC

- Dr. Ayman Hawari, Nuclear Reactor Program

- Dr. Greg Parsons, USDOE, Nanostructured Materials for Renewable Alternative Energy

- Dr. Jie Yu, NSF, CAREER: Multi-scale Interactions of Waves, Currents and Morphology With Application to Rip Currents

- Dr. Salah Bedair and Dr. Nadia El-Masry, Development of First-of-its-kind solar cell for improved efficiency

- Dr. Mort Barlaz, Environmental Research & Education Foundation, Integrated Solid Waste Management and Its Environmental Sustainability in a Carbon Constrained Environment
Osseointegrated Prosthetics

Collaboration between the Fitts Department of Industrial and Systems Engineering and the College of Veterinary Medicine

Dr. Ola Harrysson, ISE
Dr. Denis Marcellin-Little, CVM

- Novel, permanent custom prosthetics
- Bone fuses with prosthetic
- More like a natural arm or leg
- Successfully tested in cats and dogs
- Working with Duke U. for human testing
Rehabilitation Engineering

**Topics:** biomechanics, assistive devices, relearning, tissue engineering

**Funding:** $1,600,000/yr

Led by Biomedical Engineering and interfaces with:

**NCSU Depts:** Mechanical & Aerospace Engineering, Industrial Systems & Engineering

**UNC-CH Depts:** Physical Medicine & Rehabilitation, Physical Therapy, Exercise and Sports Medicine, Occupational Therapy
Health: Research Highlights

- Dr. Greg Buckner, NIH, Innovative Tools and Techniques for Robotic Heart Surgery
- Dr. Brian Denton, NSF, CAREER: Optimization of Screening and Treatment Delivery Systems for Chronic Diseases
- Dr. Julie Ivy, CDC, North Carolina Public Health Preparedness Systems Research Center, Engineering the North Carolina Health Alert Network
- Dr. Michael Gamsik, NIH, Noninvasive Monitoring Glutathione Metabolism in Tumors
- Dr. Laurie Williams, Security and Privacy of Health Information in Open Source Computing Environments
- Dr. A.V. Melechko, Vertically Aligned Carbon Nanofiber Synthesis and Process Integration for Cellular Interfacing Applications
- Dr. Yaroslava Yingling, Modeling of Biomaterials
- Dr. Michael Dickey, Ligands from Combinatorial Libraries for Prion and Virus Detection and Removal
NSF Engineering Research Center*
Smart Adaptive Filters for the Environment (SAFE)
Director: Dr. Behnam Pourdeyhimi, Co-Director: Dr. Ruben Carbonell

- Advance global well-being and security
- Develop a new generation of efficient, affordable, and highly sophisticated filtration devices
- Filters remove nanoparticles, chemicals, and pathogens from air, water, and biopharmaceuticals
- Reduce risk of disease from environmental contamination and terrorist acts
- Led by College of Engineering/College of Textiles
- Partners: Minnesota, Akron, U pf II-Chicago, NCCU

* Proposed
Internet Privacy and Security

• Addressing the critical shortage of information security and privacy professionals in the US

• Founder and director of ThePrivacyPlace.org

• Students graduating with PhD and JD

• Doctoral students receive national recognition

• Helps shape national policy by serving on a number of national advisory committees on privacy and security

Dr. Annie Anton
Protecting Soldiers from IEDs

Dr. Michael Steer, DARPA research

- Research on ways to detect roadside bombs
- Develop technologies to prevent remote detonation
- Dr. Steer received Army Commander’s Award for Public Service, one of the highest Army civilian awards
Security: Research Highlights

- Dr. Sami Rizkalla, Testing and Predicting Structure Integrity of Concrete Structures
- Dennis Kekas, Secure Open Systems Initiative
- Dr. George List, Establishing Monitoring Programs for Travel Time Reliability
- Dr. Peng Ning, NSF, Trustworthy Virtual Cloud Computing
- Dr. Robin Gardner, Development of Accurate and Fast Monte Carlo Spectral Simulation Algorithms for Proliferation Detection
- Dr. Joel Ducoste, EPA, An Integrated Approach to Understanding and Reducing Fat Oil and Grease (FOG) Deposit Formation for Sustainable Sever Collection Systems
- Dr. Margery Overton, DHS, Engineering the Civil Infrastructure for Enhanced Resilience of the Built and Natural Environments
- Dr. Yan Solihin, Beyond Secure Processors-Securing Systems Against Hardware Attacks
Digital Games Research Initiative

- Focal point for educational and research activities in games across campus
- 15 faculty from five colleges: Engineering, Design, Management, Education, Humanities & Social Sciences
- $7M+ in active funding, including NSF, ARO and industry support
- Impact on state
  - Explicit draw for industry locating in the state
  - Advise on public policy and legislation with Commerce and State Legislature
Joy of Living: Research Highlights

• Dr. James Lester, NSF, Developing Science Problem Solving Skills and Engagement Through Intelligent Game-Based Learning

• Dr. David Kaber, Karl Kaufmann, NASA, VR Flight Simulator: The Role of Pilot Individual Differences in Perceptions of Aviation Display Clutter and Performance

• Dr. Bob Young, NSF, Mathematics Instruction Using Decision Science and Engineering Tools (MINDSET)

• Dr. Frank Mueller, NSF, A Root Cluster for Systems Research into Scalable Computing

• Dr. Laura Bottomley, NSF, Engineers and Teachers Working for Mathematics Success

• Dr. George Rouskas, NSF, Computing Across Curricula

• Dr. Paul Franzon, US Dept. of Ed., Micromachined Braille Display
NAE Grand Challenge Scholars Program

Five Components

1. **Research experience.** Research related to a Grand Challenge.

2. **Engineering+ curriculum.** Engineering education that intersects with public policy, business, law, ethics, human behavior, risk as well as medicine and the sciences.

3. **Entrepreneurship.** Preparing students to translate invention to innovation; to develop market ventures that scale to global solutions in the public interest.

4. **Global dimension.** Developing students who are able to address global challenges and lead innovation in a global economy.

5. **Service learning.** Developing and deepening students’ social consciousness and their motivation to bring technical expertise to bear on societal problems.
COE Research Experiences for Undergraduates

• The number of students in REUs has doubled in the last 4 years

• The award value of REUs has tripled in the last 4 years
Engineering Entrepreneurs Program (EEP)

One of the most innovative programs at NC State, EEP was created in the College of Engineering in 1993 by Dr. Tom Miller to help prepare engineering students for the world of technology entrepreneurship. Many Engineering Entrepreneurs have gone on to create very successful companies.
NC State’s influence extends well beyond North Carolina’s borders.

**Study Abroad**
Students looking for a study-abroad experience have plenty of options at NC State. Locations listed below include some of the more popular programs for engineering students.

- Australia
- Botswana
- Brazil
- China
- Ghana
- Mexico
- South Africa
- Spain
- Sweden
- Wales

**International Connections**
Faculty and students in the College of Engineering are working with some of the world’s brightest minds and studying in some of the coolest places. These programs and partnerships are just a small sampling of NC State’s global reach.

- Austria
- Canada
- China
- Germany
- India
- Italy
- Japan
- Jordan
- Russia
- Sierra Leone
- South Korea
The Engineer of 2020:
NC State’s Engineering K-12 Outreach

- Engineering Summer Camps
- RAMP-UP
- Engineering on the Road
- Freshman Engineering Design Day, featuring high school and middle school students
- Teacher Workshops
Summer Camps
HI-FIVES: Leveraging Game Making to Engage Middle School Students in Science

- Joint work with Computer Science, College of Education and Friday Institute
- Virtuoso system: turning game consumers into game creators
- Exploit passion for game playing to engage students in their science curriculum
- Over 1,000 NC public middle school students across the state
- Increase engagement, attitudes toward curriculum content
- PIs: Annetta (CED), Young (COE), Miller (DELTA)
Future Challenges and Opportunities

- People
- Infrastructure
- Advancement
- Economic Development
- Reputation
People

“The single most important thing we do as a University is to hire and retain extraordinary people”

“The acid test of leadership is the ability to hire and keep extraordinary people”

E. Gordon Gee
President, Ohio State
2007
Faculty Development

• Recruit, promote and retain excellent faculty across the College.

• Actively engage faculty, administrators and staff across departments.

• Celebrate faculty success, achievement and promotion.

Facilitate discussion leading to collaboration and strong networks across departmental faculty.

• Faculty Development Roundtable (Advisory)
• Faculty Development Website Portal
• Effective Leadership Development
• International Research Connections
• Managing Graduate Students
• New Faculty Orientation Workshop
• Building Future Faculty (BFF)
• Plug-N-Play Modules
• Agency Visits
• Faculty Retreats
• PURPOSE Institute (Promoting Underrepresented Presence on Science and Engineering Faculty)
• ADVANCE Summits for Women Faculty
<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Cases</strong></td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td><strong>NSF CAREER Awards</strong></td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><strong>Women/URM</strong></td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>&gt;2 yrs Experience prior to appointment</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td><strong>Average funding</strong></td>
<td>$.9M</td>
<td>$1.2M</td>
</tr>
<tr>
<td><strong># PhD Students</strong></td>
<td>2.7</td>
<td>3.2</td>
</tr>
</tbody>
</table>
• Research Awards ($) have doubled over the last 4 years
## COE Student/Faculty Ratio

<table>
<thead>
<tr>
<th>Year</th>
<th>UG Enrollment</th>
<th>T/TT Faculty</th>
<th>UGS/Faculty Ratio</th>
<th>Average Top 10 Public COE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>5,627</td>
<td>230</td>
<td>24.4</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>6,000</td>
<td>260</td>
<td>23</td>
<td>18.94</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Enrollment</th>
<th>T/TT Faculty</th>
<th>Total Student/Faculty Ratio</th>
<th>Average Top 10 Public COE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>7,467</td>
<td>230</td>
<td>32.5</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>8,492</td>
<td>260</td>
<td>32.7</td>
<td>26.87</td>
</tr>
</tbody>
</table>

“We’ve barely moved the needle”
21st Century Infrastructure

Our challenge is to complete the move of the College to Centennial Campus.

- EB I, II and III are completed.
- EB IV and V are in planning and design stages.
- BTEC is also located on Centennial Campus.
- Keystone Centennial Science Center is the home of NSF FREEDM Systems Center.
Development

• *Achieve!* Campaign
  - More than $265 million raised
  - Exceeded the College goal by $40 million
• Established 12 new distinguished professorships between 2006 and 2010
• Increased the number of endowments from 286 in 2006 to 354 in 2010 (an increase of more than 23%)
• Grew the corpus of the endowment from $35.8 million in 2006 to more than $51.5 million (an increase of more than 43%)
Engineering Alumni

• More than 50,000 living COE alumni
• Engineering alumni play a major role in new business creation & economic development
• Our alumni include:
  - CEOs of Fortune 500 companies
  - High-tech entrepreneurs who have founded companies like Cree, Channel Advisor and others
  - Leaders of 10 of the state’s largest 100 private companies

And...
  - One Nobel Prize recipient

Dr. R.K. Pachauri, NC State Alumnus and Nobel Laureate
Industrial Extension Service “Manufacturing Makes It Real Tour”

• Celebrated success of the 1B4NC campaign
• 300 manufactured-in-NC products donated or loaned for tour display
• Over 10,000 companies manufacture products in North Carolina
Economic Development
2006-2010

- 295 new invention disclosures
- 258 new patents filed
- 95 new patents issued

- 15 new start ups:
  - Alditri
  - AP Solutions, Inc.
  - D Poly Systems
  - GaNDevices, Inc.
  - Genesis Semiconductor
  - Hexatech
  - ImagineOptics, Inc.
  - IntelliCATH Surgical Corp
  - Ligamar, Inc.
  - LumenZ, LLC
  - Physcient
  - Tec-Cel
Creating jobs. Inventing solutions. Improving lives.

During difficult economic times, NC State engineering continues to make its mark on North Carolina’s economy.
<table>
<thead>
<tr>
<th>Institution</th>
<th>2007 Rank</th>
<th>1994 Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Maryland</td>
<td>16</td>
<td>37</td>
</tr>
<tr>
<td>Duke</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>Wake Forest</td>
<td>33</td>
<td>26</td>
</tr>
<tr>
<td>Virginia</td>
<td>34</td>
<td>28</td>
</tr>
<tr>
<td>Virginia</td>
<td>37</td>
<td>36</td>
</tr>
<tr>
<td>Clemson</td>
<td>&gt;50</td>
<td>&gt;50</td>
</tr>
<tr>
<td>University</td>
<td>2010 Rank</td>
<td>2007 Rank</td>
</tr>
<tr>
<td>------------</td>
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<tr>
<td>GT</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Maryland</td>
<td>22</td>
<td>16</td>
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<td>30</td>
</tr>
<tr>
<td>Virginia</td>
<td>39</td>
<td>37</td>
</tr>
<tr>
<td>Clemson</td>
<td>56</td>
<td>&gt;50</td>
</tr>
</tbody>
</table>
2010 Ranking of Engineering Colleges

NC State’s College of Engineering ranks:

- 32nd among all engineering colleges in the world
- 25th among all US engineering colleges
- 17th among US public engineering colleges

* Ranking developed by the Center for World Class Universities and the Institute of Higher Education of Shanghai Jiao Tong University, China
Paths to Professions Series: Top Recruiters Rank NC State Engineering 15th

19 (tie). North Carolina State University, Raleigh

North Carolina State, an NCAA Division I university, has 10 undergraduate colleges serving students from all North Carolina counties. The majority of students -- 91% -- comes from in-state, and just more than half -- 56% -- are male.

How majors match up
- Engineering (15)

Upcoming Application Deadline: Oct. 15 (Early Action 1); Nov. 1 (Early Action 2); Feb. 1 (Regular)
Tuition (2010-2011): In-state $5,829; Out-of-state $18,314
Undergraduate Enrollment: 25,255
Admissions Phone: 919-515-2434
Admissions Email: undergrad — admissions@ncsu.edu
Long-Term Goal

“To become and be perceived as the leading public college of engineering in the country and one of the premier colleges of engineering in the world”
Our daily commitment to our students is to ensure that the “E” in Engineering truly stands for Excitement.
You never know where an engineering degree will take you . . .

Neil Armstrong: Astronaut, CEO, First Man on the Moon . . . Engineer

Louis Martin-Vega: NSF AD, Dean, South Pole Visitor . . . Engineer
Personal Accomplishments

ASEE Engineering Deans Council
   Co-Chair, National Engineering Deans Institute (2007)
   Vice Chair, Engineering Public Policy Committee (2009-2011)
   Board of Directors (2010-2012)

IIE-Institute of Industrial Engineers

National Science Foundation
   Co-Chair, Committee of Visitors, Division of Industrial Innovation and Partnerships, Engineering Directorate (2008-2009)

MOSI National Hispanic Scientist of the Year (2007)

Hispanic Business Magazine
   100 Most Influential Hispanic Leaders (2008)

North Carolina Professional Engineers
   Outstanding Engineer in North Carolina (2009)