Duke Overview

12,000 students (half undergraduates), 1500 faculty, 26,000 employees (campus and health system)

- #8 ranked US University (USNWR)
- #1 ranked US University for Industry Collaboration >$130M per year (includes health system)
- Located in the Research Triangle – Designated as a US ‘economic cluster’ and top academic center

Pratt School of Engineering

- Four Departments: Biomedical Engineering, Electrical and Computer Engineering, Mechanical and Materials Science, Civil and Environmental Engineering
- 91 Tenure Track Faculty
  1007 Undergraduate Students
  405 Graduate Students
- #2 ranked BME program in United States
  3 of 5 ABET programs in Top 20
- CIEMAS: New 322,000 sqft interdisciplinary research and teaching complex opened Summer 2004

Students

- Pratt SAT Scores: 1467 (Average): Verbal: 706, Math: 761
- DISTINCTIVENESS: 92% in upper 10% of class
Environmental Impact of Buildings

- 65.2% of total U.S. electricity consumption
- 37% of total U.S. primary energy use
- 30% of total U.S. greenhouse gas emissions
- 136 million tons of construction and demolition waste in the U.S. (approx. 2.8 lbs/person/day)
- 12% of potable water in the U.S.
- 40% (3 billion tons annually) of raw materials use globally
- Americans spend 90% of time indoors
- 105% increase in average house size over past 50 years

Aerial View of Site
Goals

1. Adaptability
2. Innovation
3. Performance
4. Sustainability
5. Integration

Mission Statement

• “Provide students with a distinguished education that stresses teamwork, leadership, project management, and interdisciplinary collaboration.”
  – Tom Rose, “Smart House Plan of Action, 2005”
Smart walls
Foundation

HVAC System
Green Roof
Rainwater Collection
Distribution

Interior/ Exterior Courtyard
Green Screens
Photovoltaics
Passive Solar
Solar Hot Water

Cross-Ventilation
BUILDING PROGRAM

5 Double Bedrooms
3 Full Bathrooms
1 Half Bathroom
Laundry Space
Mechanical Space

COURTYARD
CENTRAL LIVING ROOM
GROUP STUDY
Kitchen
Dining
Media Room
Clean + Dirty Lab
Exterior Decks and Porches

Vision of a Student!

Mark Younger
ECE Major 2003
Trust/Support of the Administration

• The Smart House is an experiment to see what the force of student ingenuity can do. I'm very proud to be president of the kind of university that has a venture like this.
  – President Brodhead

Experiential Learning

• Interdisciplinary Design Course
Current Status

The Home Depot Smart Home building design maximizes the ability to design, test, and develop new smart home products, services, standards, and technologies in a supportive, live-in laboratory.
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