



SEAS

The Charles L. Brown Department of Electrical and Computer Engineering

Welcome!!!!

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Outline

- **Who are we?**
 - The University of Virginia
 - The School of Engineering and Applied Science
 - The Electrical and Computer Engineering Department
- **Research Program**
- **Graduate Student Responsibilities**

The University



Founded by Thomas Jefferson in 1819

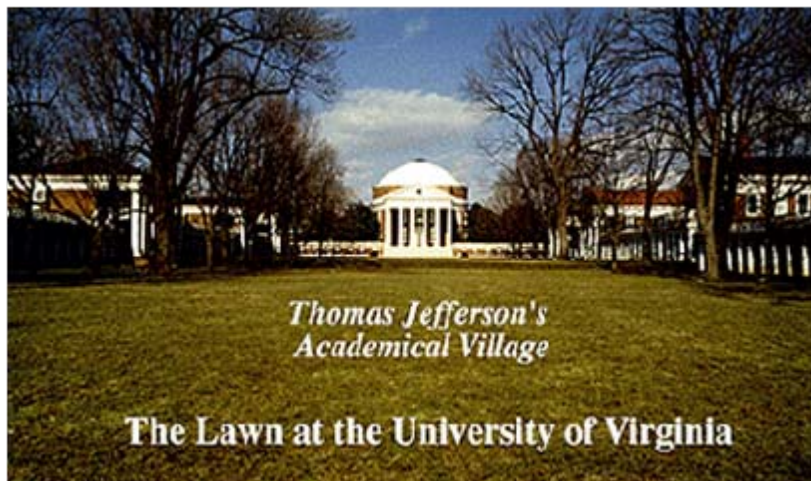
- **dedicated to the notion that an educated population is essential to a democracy**

**Ranked by some in the top 1-3 public universities & top dozen overall
9 colleges / 2 professional schools (Law and Medicine)**

12,040 undergraduate students

4220 graduate students/ 1700 first-professional students

2496 faculty / ~\$114M annual research program



**Especially noted for its
humanities departments,
professional schools,
library**

**Increasing Resources for
Engineering and Science**



SEAS

The School of Engineering and Applied Science

9 Departments [CS, ECE, SIE, CE, ChE, MAE, BME, MSE, STS]

158 faculty

~2000 undergraduate students

— **top 1-2 entering SATs of any public engineering school**

601 graduate students

— **top 2-3 entering GREs
of any public engineering school**

**exceptional commitment to
teaching**

\$50M annual research program



CHARLES L. BROWN DEPARTMENT *of* ELECTRICAL *and* COMPUTER ENGINEERING

Goal ----

to be among the top 10
research programs in
microelectronic systems

- ~ 25 faculty (plus 6 research faculty)
- ~ 210 undergraduate students (2-4 year)
- ~ 115 graduate students (55/58 Masters/PhD)
- ~ 60 electrical/computer engineering undergraduate and 35 graduate degrees/yr
- ~ \$10M external research support

Concentration Areas:

Applied Electrophysics

Microelectronics

Communications

Control Systems

Computer Engineering



Intel's Pentium 4 contains tens of millions of transistors. Courtesy: Intel

Undergraduate Program

- **ABET- accredited programs in:**
 - Electrical Engineering
 - Computer Engineering (joint with CS)
- **Five concentration areas**
 - Digital systems
 - Controls
 - Applied electrophysics
 - Communications
 - Microelectronics
- **Extensive minor options**
 - Biomedical engineering
 - Systems engineering

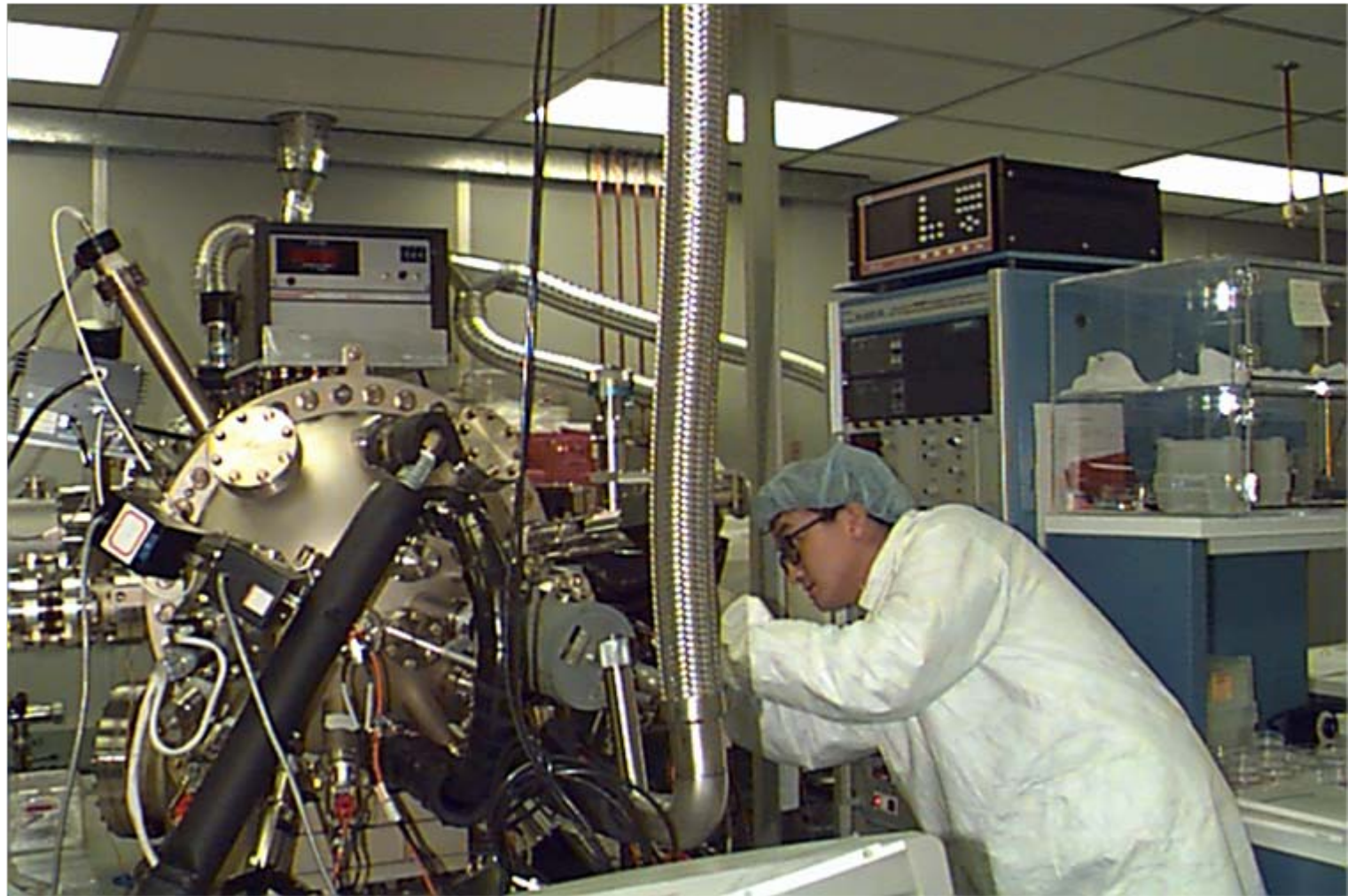
Graduate Program

- **Masters of Engineering**
 - Thirty hours of coursework
- **Masters of Science**
 - 24 course credit hours
 - 6 research credit hours
 - Thesis (with a oral presentation)
- **Doctor of Philosophy**
 - 12 course credit hours (above a Masters)
 - Qualifying exam
 - Dissertation (with an oral presentation)
 - Minimum of one journal paper submission
 - Graduate teaching experience

Areas of Faculty Research

- **Micro/Nano Electronics**
 - Molecular and nano electronics
 - Photonics
 - Laser Processing
 - Terahertz devices and circuits
 - Low Power Electronics
 - Intelligent sensors/systems
 - RF/wireless circuits
 - MEMS
- **Communication and Control Systems**
 - Signal and image processing
 - Medical Diagnostic imaging/processing
 - Optical and wireless communications
 - Information Theory
 - Adaptive and nonlinear control
- **Digital and Computer Systems**
 - Fault-tolerant/safety-critical computing
 - Embedded systems
 - Mixed signal design
 - Hardware/software codesign
 - Dependability assesment
 - Integrated circuit and system design
 - Design automation

3500 sq.ft. Class 10,000 Cleanroom



\$2.5M equipment upgrade underway

CHARLES L. BROWN DEPARTMENT *of* ELECTRICAL *and* COMPUTER ENGINEERING

- **Recently hired faculty:**
 - ***Mool Gupta***: Laser Processing, Photonics
 - ***Avik Ghosh***: Theory and modeling of nano devices
 - ***Ben Calhoun***: Low Power CMOS VLSI
 - ***Toby Berger***: Information Theory
 - ***Joe C. Campbell***: Photodetectors, photonics
 - **Archie Holmes**: MOCVD/MBE Crystal Growth (Jan 07)
- **Major equipment upgrade for cleanroom processing**
- **MSENT building (Wilsdorf Hall) near completion (10/06)**

Being an ECE Graduate Student

- **GRA process**
 - Faculty/students generate ideas
 - Faculty seek funding sources through proposal development and personal interaction (students assist)
 - Faculty negotiate contracts
 - Faculty manage contract (all aspects)
 - Faculty coordinate sponsor interaction
 - Students perform the funded research under the supervision of the faculty
- **Finding GRA Support**
 - Find faculty with research in an area of interest
 - Talk to faculty about research opportunities
 - Funding occurs at irregular intervals

Being an ECE Graduate Student

- **Students should commit themselves to the project and consider themselves jointly responsible for its success.**
 - *“Project hopping” is strongly discouraged*
- **GRAs are not fellowships but stipends for work done on a research project. GRA effort almost always coincides with the thesis topic but extra efforts may be necessary.**
- **The GRA-supported student accepts a different schedule than the unsupported student. Work time is negotiated with the advisor.**

Being a ECE Graduate Student

- **By accepting a GRA, students are expected to work *at least* 20 hours per week. Times are flexible but should be negotiated with the advisor.**
- **Students should take personal pride in the available facilities (offices and laboratories) and should consider it part of their responsibility to protect and care for the equipment**
- **Take responsibility for your program. Make sure that you have performed the needed action by the appropriate date.**
- **Periodic departmental seminars are held. Students should respect the speaker and are expected attend.**

Being an ECE Graduate Student

- **Graduate Seminar (ECE 696)**
 - Required 1 credit course for first year grad students
 - Faculty present short talks on their research
 - Helps in choosing research topic/advisor
 - Overview of research in the department
- **Emminent Speaker Seminar Series**
 - Grad students required to attend
 - Reception w/beer& food follows (optional)
 - Chance to meet with speaker, students, faculty
- **Friday afternoon tea**
 - Grad students, staff, faculty
 - Tea and refreshments 3PM

Being an ECE Graduate Student

Remember: Students before you have helped to provide this opportunity for you and you should do the same for the next set of students!

Thanks and have a great year!

Questions?



ECE Faculty Research Interests

Scott Acton	Signal, Image and Video Processing
James H. Aylor (Dean)	Design Automation, Digital Systems, Test Technology
N. Scott Barker	Microelectromechanical Systems applications in Microwave and Millimeter circuits
John C. Bean	MBE, Molecular Electronics
Toby Berger	Information Theory
Travis N. Blalock	Mixed-Signal VLSI Design, Analog CMOS signal processing design
Maite Brandt-Pearce	Communications Theory, Optical Communications, Multiuser networks
Joanne Bechta Dugan (CpE director)	Reliability Analysis of hardware and software fault tolerant systems

ECE Faculty Research Interests

Benton Calhoun	Low Power CMOS VLSI
Joe C. Campbell	Photodetectors, Photonics
Boris Gelmont	Semiconductor device physics, device modeling
Avik Ghosh	Theory and Modeling of Nanoscale Transport
Mool Gupta	Laser Processing, Photonics
Tatiana Globus	Electronic and Photonic materials and devices, terahertz technology

ECE Faculty Research Interests

Lloyd R. Harriott (Chair)	Nanofabrication, Molecular Electronics, Nanoelectronics
Barry Johnson (Assoc. Dean)	Fault Tolerant Systems, VLSI testing, VLSI systems
John C. Lach	Embedded Systems, CAD algorithms, FPGA, Processor Architecture, Low Power
Arthur Lichtenberger	Superconducting Materials and Devices
P. Paxton Marhall (Assoc. Dean)	Electric Power and Machinery, Energy Conversion, Renewable Energy
Michael Reed	Electronic and Biomedical applications of MEMS
Mircea Stan	Low-Power VLSI, Nanoelectronics

ECE Faculty Research Interests

Nathan Swami	Molecular Devices- Electronics, sensing, manipulation of molecules
Gang Tao	Adaptive Control, Nonlinear Systems, Control Applications
Malathi Veeraraghavan	Networking Architectures and Protocols, Wireless Networks, Optical Networks, Computer Architecture
Robert M. Weikle	Microwave and Millimeter Wave Circuits and radiating structures
Ronald D. Williams	Computer Design, Real time systems, VLSI Design/testing
Stephen G. Wilson	Communications and Information Theory
Yibin Zheng	Statistical Signal Processing, Computed Imaging