Holcombe Department of

Electrical and Computer Engineering

Clemson University

Fall Semester, 1999

Electrical and Computer Engineering

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Electrical and Computer Engineering

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Electrical and Computer Engineering

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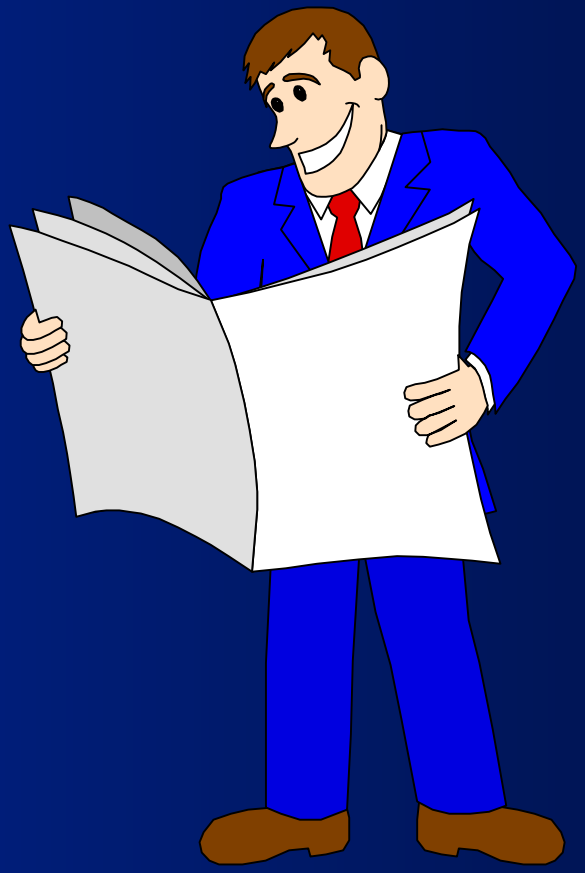
Important ECE Contacts

- ***Dr. John Gowdy***
  ECE Department Chair
- ***Dr. Tom Drake***
  ECE Undergraduate Coordinator
- ***Ms. Maria Barrett***
  ECE Undergraduate Program Office
- ***Ms. Gwen Hamilton***
  ECE Scheduling Coordinator

A few facts about the Electrical and Computer Engineering Programs...



A few facts about the Electrical and Computer Engineering Programs...

- Electrical Engr.
  - 135 Credit Hours
  - Average of about 17 hours/semester
  - 5 math courses
  - 6 hours of technical electives
  - 10 hours of free electives
  - ABET accredited
- Computer Engr.
  - 140 Credit Hours
  - Average of 17.5 hours/semester
  - 7 math courses
  - 12 hours of technical electives
  - 10 hours of free electives
  - ABET accredited

What starting salaries are ECE graduates earning?

- Computer Engr. BS
  - **$48,312** (Average)
  - **$65,500** (Max)
  - Last year's average was **$42,613** (a **13%** increase!)
- Electrical Engr. BS
  - **$43,124** (Average)
  - **$55,000** (Max)
  - Last year's average was **$41,221** (a **5%** increase!)

1998-1999 BS Engr Salary Offers

Curriculum	*Avg CU Offer*	*Nat'l Avg*
Agricultural	$35,000	$38,667
Ceramic	$38,500	$ N/A
Chemical	$49,188	$46,929
Civil	$34,980	$36,076
Computer	$48,312	$45,666
Electrical	$43,124	$45,180
Industrial	$42,370	$43,086
Mechanical	$43,556	$43,275

Starting Salaries for Graduate Degrees in ECE

- Computer Engineers
  - MS $52,533 (CU), $58,673 (National)
  - Ph.D. $64,417 (National)
- Electrical Engineers
  - MS $55,000 (CU), $57,162 (National)
  - Ph.D. $70,848 (National)

What's it take to be an Electrical or Computer Engineer?

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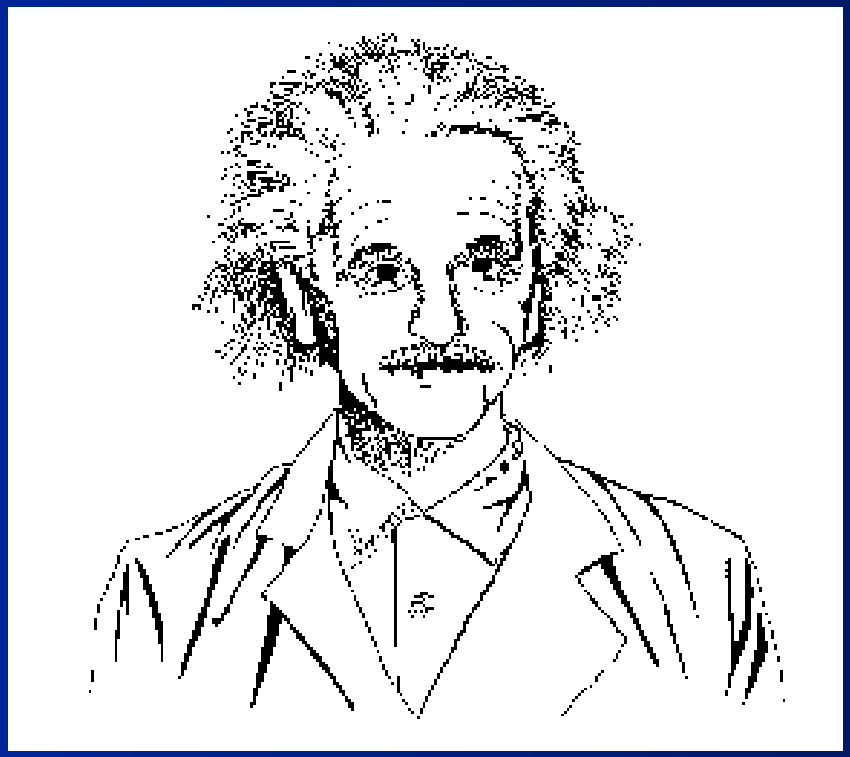

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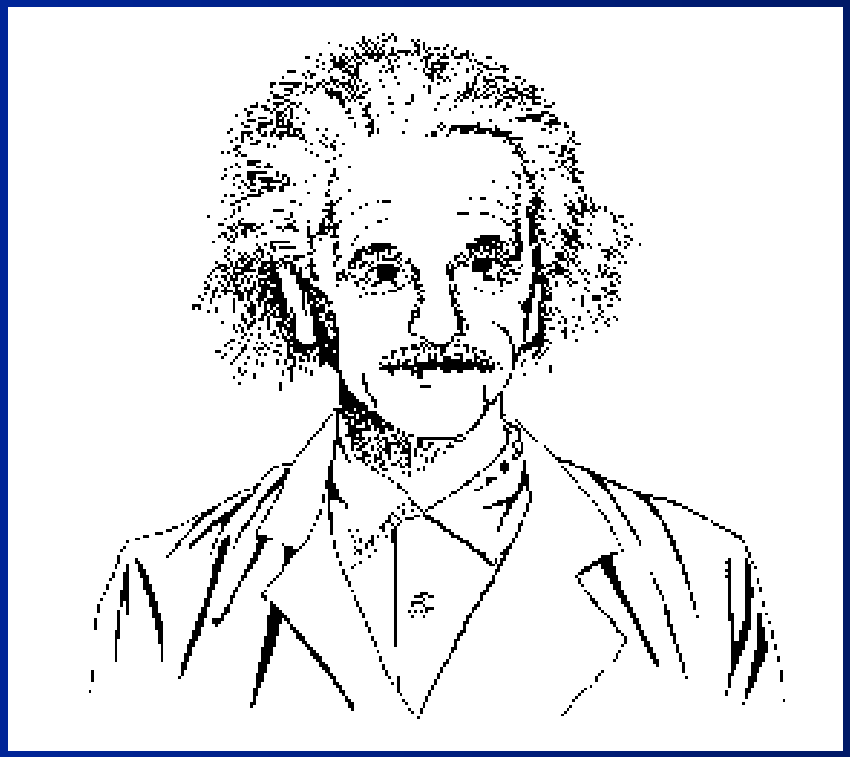
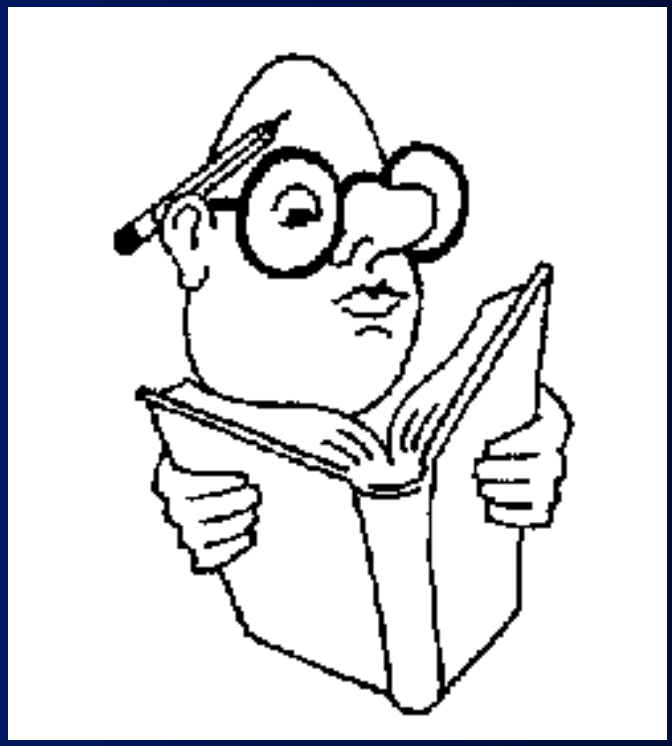




You're a good candidate to be an EE or CpE if:

- You enjoy challenges and are willing to work hard and persevere.
- You have a solid foundation in Math and Science and enjoy applying mathematics to practical problems.
- You are flexible and adapt to changes.
- You are motivated to "keep up" with rapid changes in technology.

What's so special about E&CE?

- Electrical and Computer Engineering is perhaps the most dynamic of the engineering fields.
- E&CE is a very diverse group of sub-disciplines with a common foundation.
- E&CE's are very versatile and find themselves doing all types of jobs.

Electrical and Computer Engineering's Heritage

- 1700's: Franklin, Galvani, Volta, and others sought to understand an unseen, unnamed energy by tests using kites, frog legs, zinc, and salt water.
- 1800's: Ampere, Faraday, Ohm, Oersted, and others discovered properties and relationships of electrical phenomena

This century!

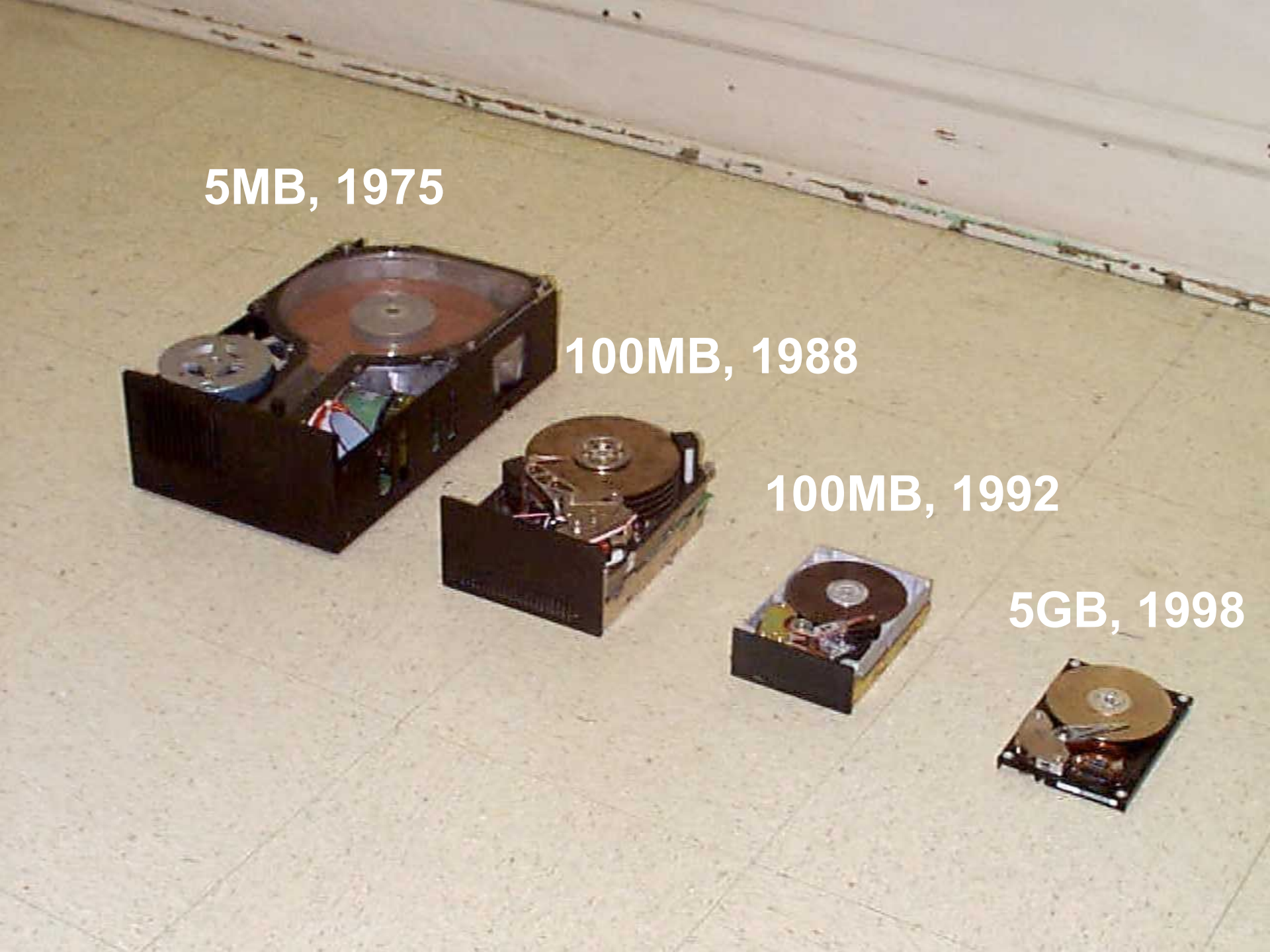
- 1900s: *Exponential growth!*
  - Electric power generation and distribution to industry then homes at the turn of the century
  - Telegraphs, telephones, TVs, atom bombs, vinyl records, 8 track tapes, cassettes, CDs, computers, video games, lasers, cellular phones, beepers, and on and on...

Two real revolutions

- Smaller and faster:
  - Reel to reel tapes, vinyl records to CD's and DVD's
  - Computers, electronics, etc.
- New ways of doing things:
  - GPS navigation systems
  - Fly-by-wire Aircraft control

Computer Technology

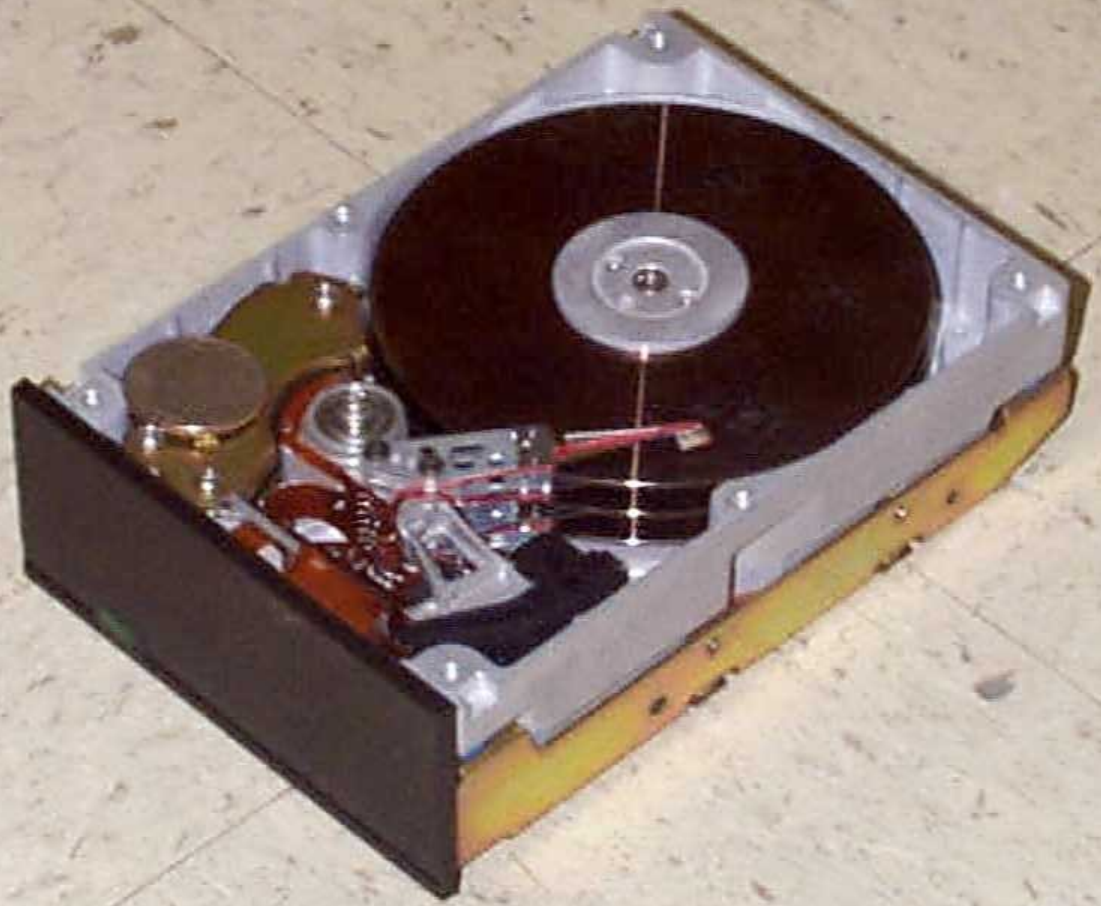
- Faster, smaller, cheaper
  - Disk drives (storage)
  - Memory
  - Digital hardware


5MB, 1975
100MB, 1988
100MB, 1992
5GB, 1998

1978: 5 MB Drive, $5000 or $1000/MB

1988: 100 MB Drive

1992: 100 MB Drive, $250 or $2.50/MB



1998: 5 GB Drive, $100 or $0.20/MB

GPS (Global Positioning System)

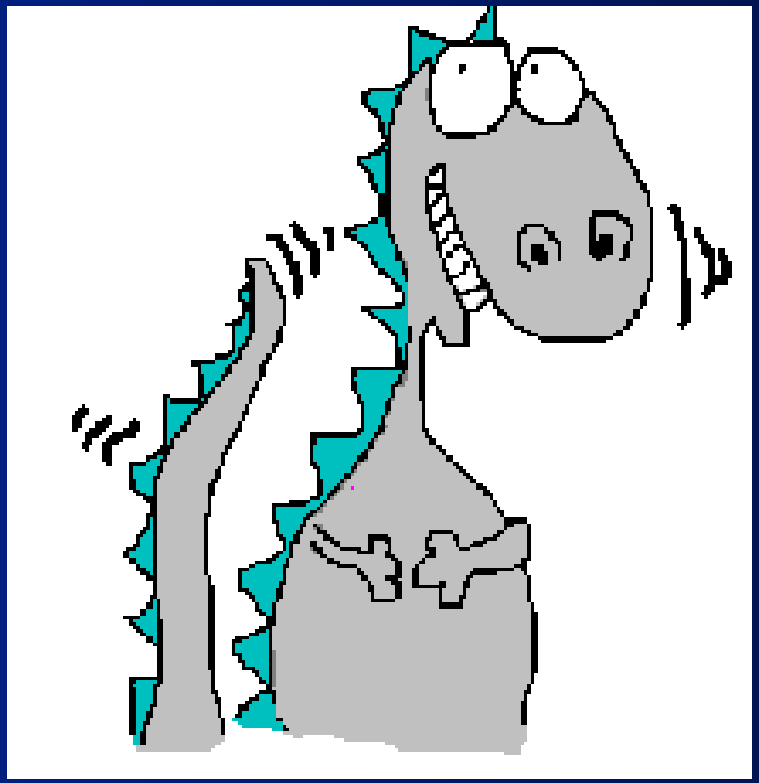
- GPS Technology is a new way of finding a location very precisely using satellite signals.
- Revolutionizing navigation in aircraft, marine, and land-based applications
- Surveying applications

Wow - how technology has advanced!

- Think about the progress that has taken place in your lifetime!
- Where do we go from here?
- What is your role in the future?
- Do you want to create this future or would you rather benefit from it?

Let’s take a look at what the future might look like.....

Now that you've seen what the future might be like, let's talk about careers!



What do ECE's do?

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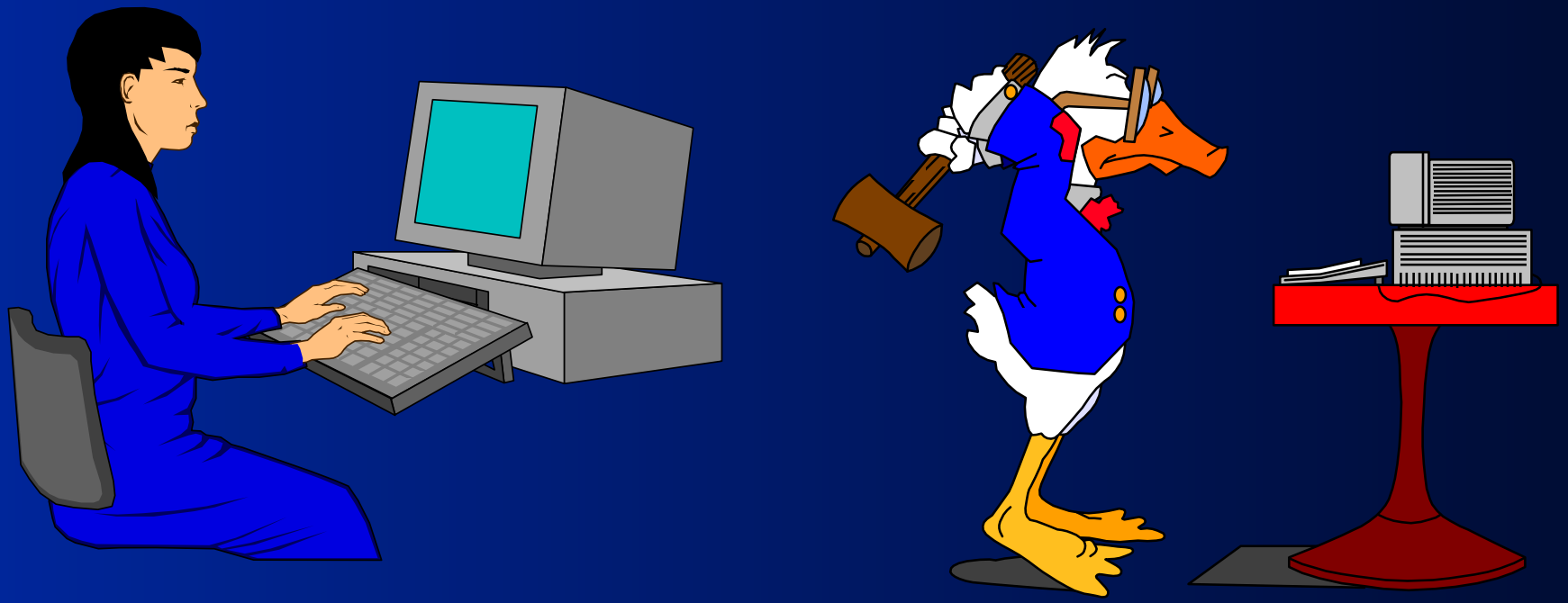


HP 48G
Graphi
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Some typical ECE job titles

- Project engineer
- Design engineer
- Quality control engineer
- Software/Hardware engineer
- Sales engineer
- Field engineer
- Test engineer

Others roles for ECE's

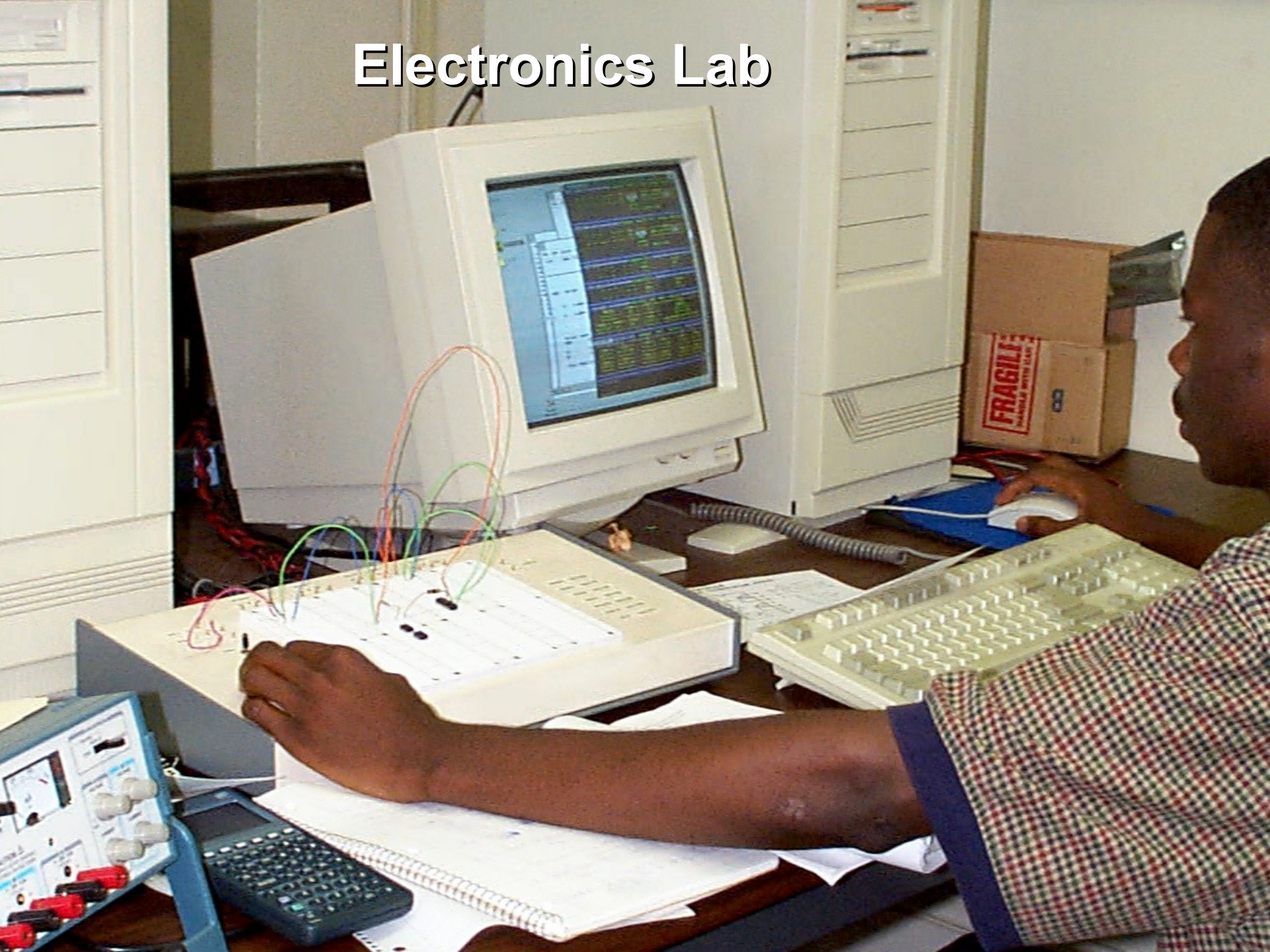
- Business
- Law
- Medicine
- Research
- Teaching
- Any function that requires problem solving skills

Examples of the Diverse Fields within Electrical and Computer Engineering

Electronics

- Electronic Devices
  - Power devices, large scale components
  - VLSI - very large scale integration
  - Advanced semiconductor devices
- Applications
  - Electronic circuits and systems, consumer electronics, aerospace electronics, power supplies, transportation, etc.

Electronics Lab



Communications and Signal Processing

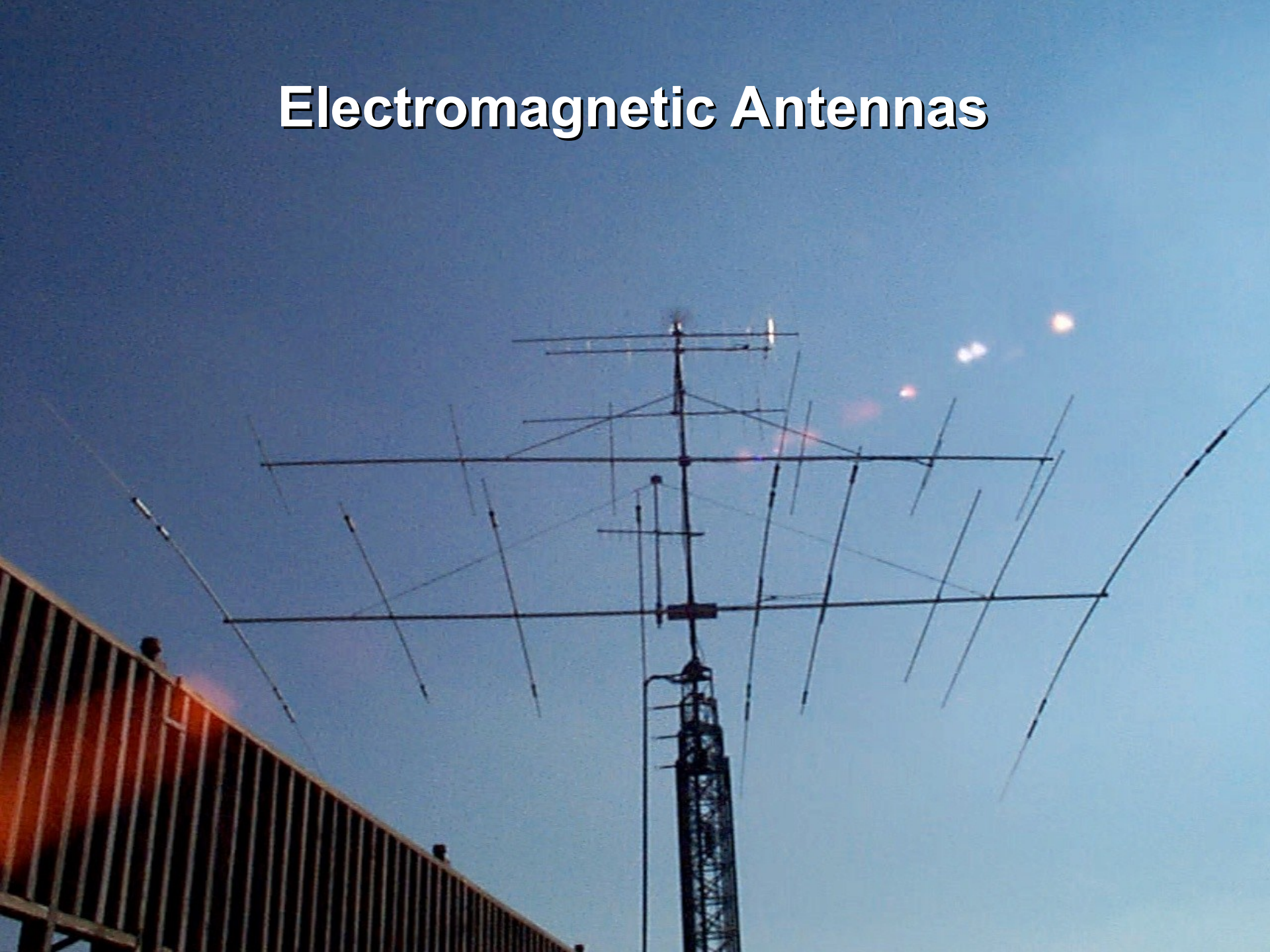
- Cellular telephones/PCS
- Conventional telephony
- Audio and visual imaging
  - radars, medical applications, audio processing, information storage
- Radio communication systems
- Test and measurement equipment

Communications Gear

Electromagnetics

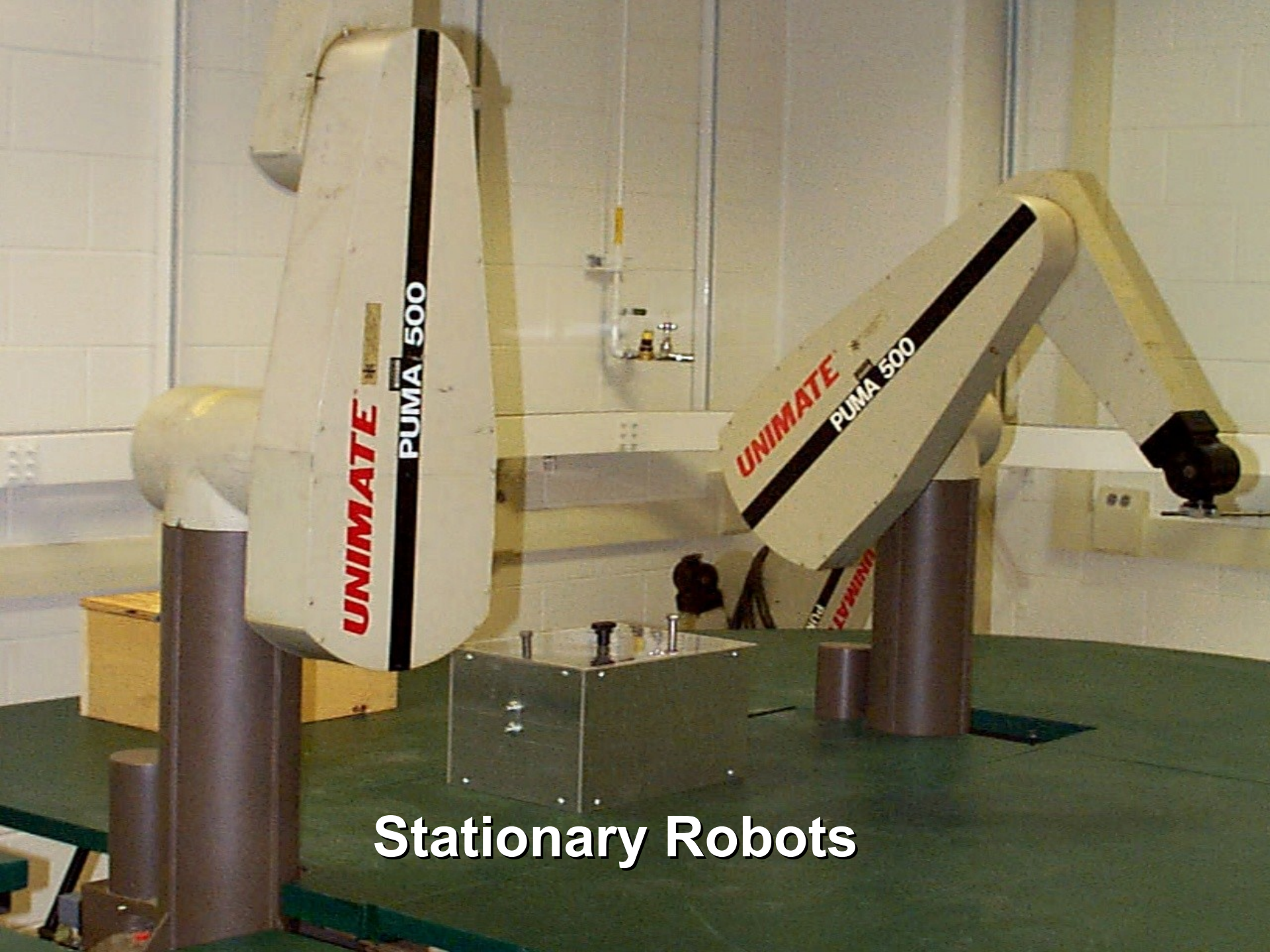
- Antennas and Waveguides
- Communications (Cellular, Satellite)
- Navigation systems (GPS, LORAN)
- Optical systems, LASERs
- Fiber optics
- Electromagnetic fields and radiation
- Magnetic materials

Electromagnetic Antennas



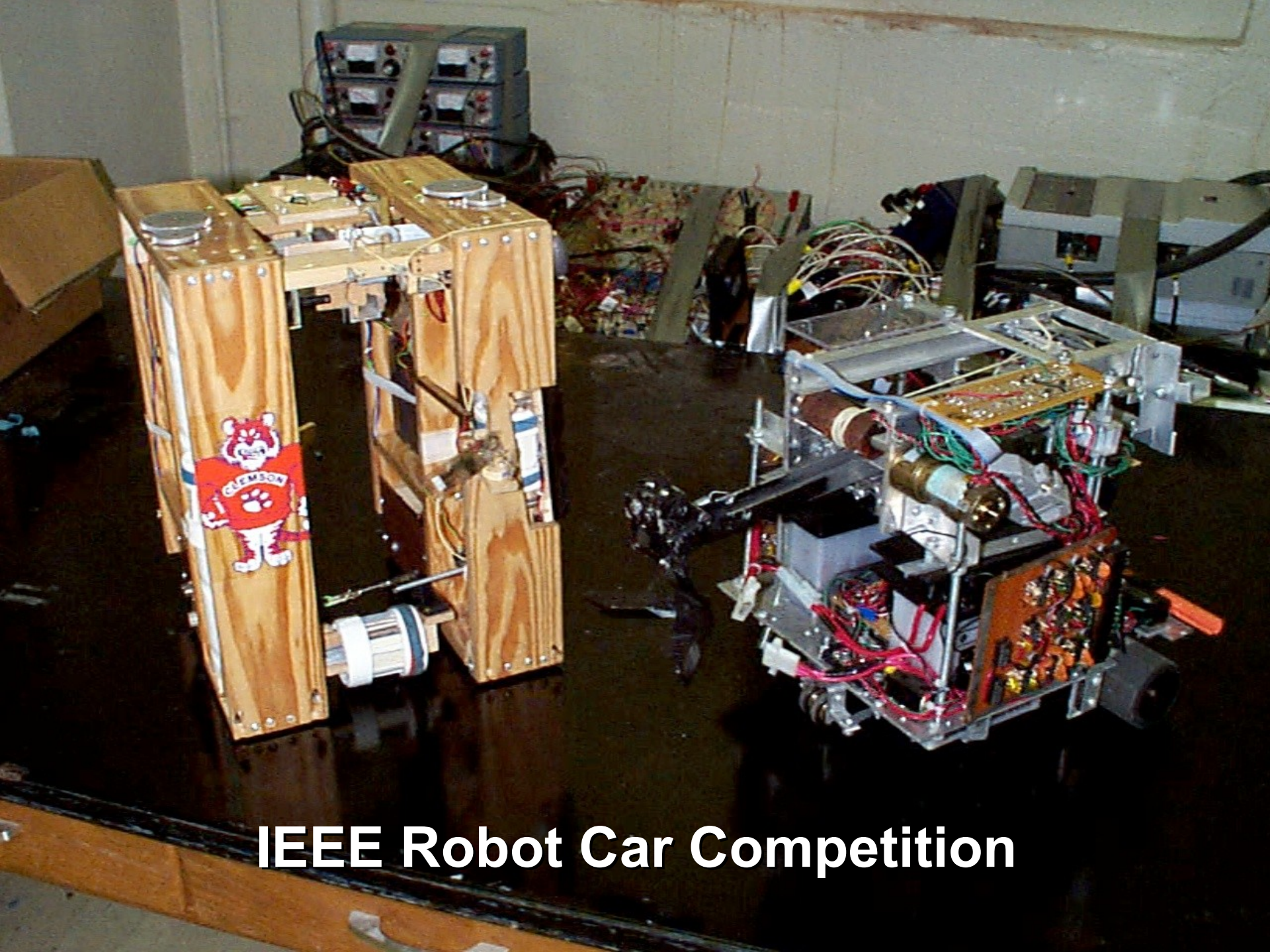
Controls and Robotics

- Industrial Robots
  - Manufacturing
  - Hazardous Environments
- Control systems
  - Aircraft, spacecraft controls
  - Transportation
  - Mechanical and electrical systems
  - Multi-disciplinary applications



Stationary Robots

Mobile Robot



IEEE Robot Car Competition

Power Engineering

- Utilities
  - Generation, transmission, distribution of electrical energy.
- Energy utilization
  - Industrial, residential, and commercial systems: process controls, HVAC, electromechanical systems
- Alternative sources
  - Solar, geothermal, tidal, etc.

Power Transformer


A disaster waiting to happen!

Computer Hardware

- Microprocessor and Parallel Processing Applications
  - PCs, Workstations, Mainframe, and Supercomputers
- Data processing and input/output systems
- Computer Architecture

Fastest Computer on Campus


Computer Hardware Lab

Computer Software

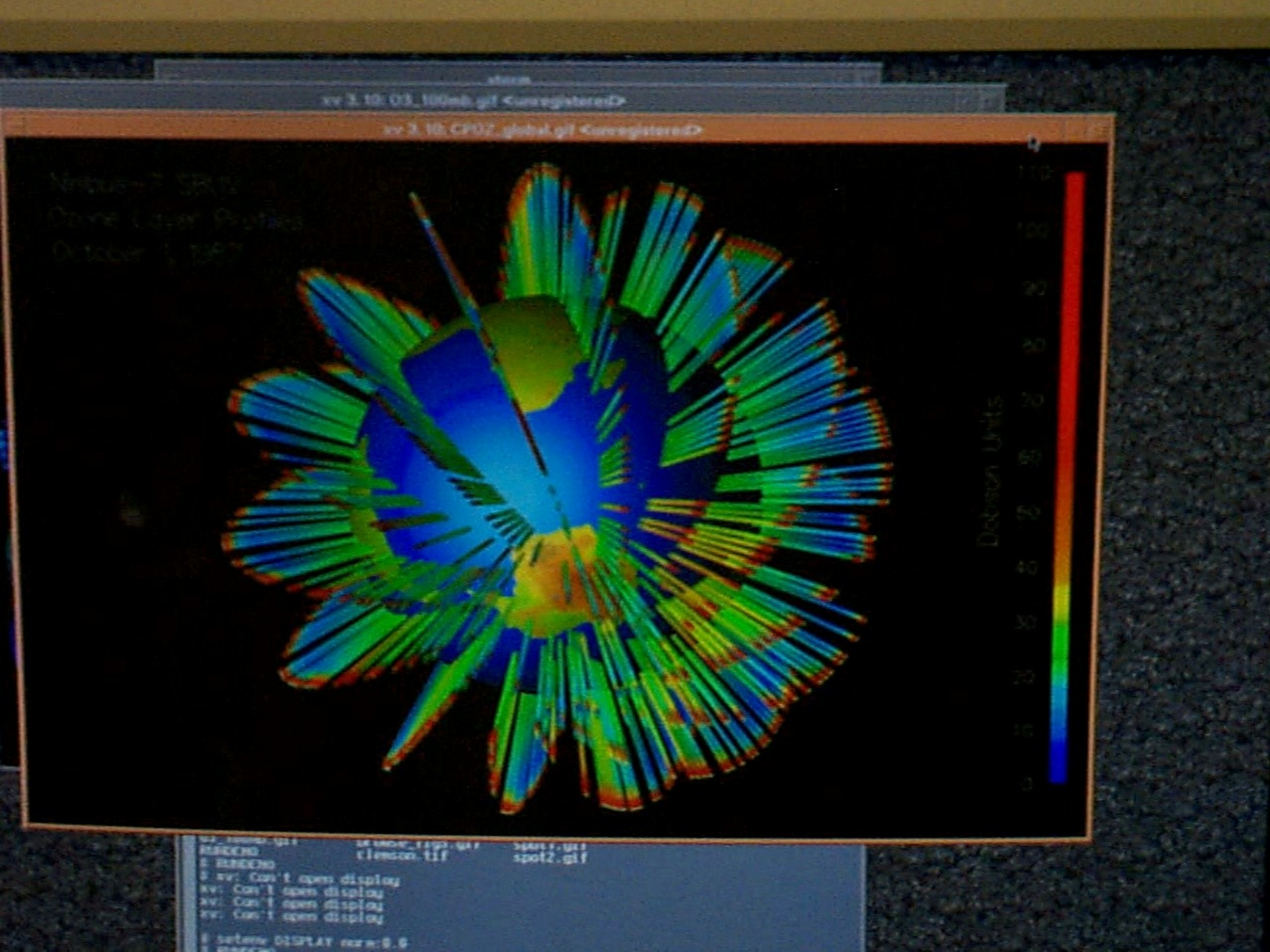
- Software Engineering
  - Object-oriented programming
  - Data linking and user interfaces
  - Multimedia
  - Standards
- Applications Software
  - Word processing, data acquisition and analysis, scientific programs (MATLAB, PSPICE), Mathematica
  - Virtual reality


Computer Lab

Computer Communications

- "Information Superhighway"
  - Internet, World Wide Web
- Data transmission
  - Wireless, Local area networks, Spread Spectrum
- Non-conventional communications:
  - Utilities: Demand side management
  - Cable TV: Telephony and data communications and cellular service

Data Communications


xv 3.10: 03_100mb.gif <unregistered>
xv 3.10: CP02_global.gif <unregistered>
clenson.tif
spot2.gif
xv: Can't open display
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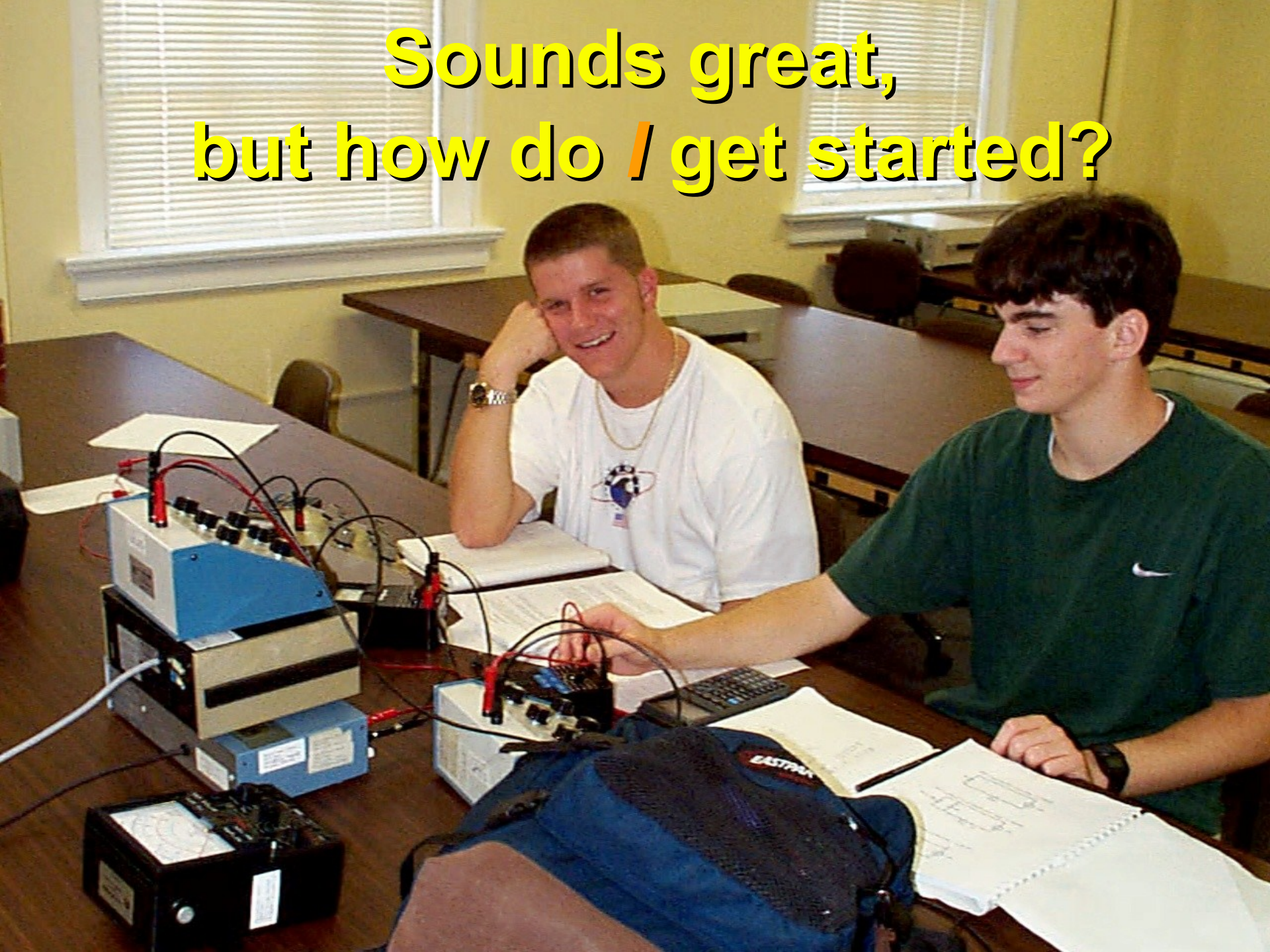
Sounds great,
but how do I get started?


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but how do I get started?

Please visit E&CE during open house!

We look forward to having
you as an E&CE student!

Department of

Electrical and Computer

Engineering