Computer Engineering Sophomore Seminar

• Not a typical course, not doing engineering

• Intent is to:
  • Understand the profession & career choices
  • Build professional skills
  • Become able to leverage what UK offers
  • Build a sense of community
Profession & Career Choices

• What do computer engineers really do? (we will have some examples)
• What sorts of companies & jobs?
• Career path options
Professional Skills

• How to present yourself
  • Resume writing
  • Job search and interviewing

• Developing professional ethics

• Professional organizations: IEEE, ACM, PE
Leveraging What UK Offers

- Computer Engineering at UK
  - CPE degree requirements
  - Double/Dual majors, minors
  - Scholars program, Graduate school

- Faculty & facilities
- Student organizations
- Undergraduate research opportunities
- Co-op and Internship options
A Sense Of Community

• CPE is **not a department**
  • Undergrad is joint, administered by ECE
  • Grad is joint, administered by CS
  • **You belong in both ECE and CS**

• Departmental activities for ECE and CS
  • **ECE JumpStart**, 9-11AM, Aug. 24, FPAT 4th commons
  • **CS Keeping Current**, Noon, Aug. 30, Marksbury Theater
...
# Course Content (may change)

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Course Structure and Grading

50%  Attendance and participation
50%  Homework and quizzes

• Material from lectures, cited activities, canvas, or http://aggregate.org/CPE200

• Class and other activity schedule will be announced via canvas

• No final exam
About Me

• 1\textsuperscript{st} college grad in my family (my wife too)
• I started out as a double major EE+ME
• My degrees all say “Computer Science,” but are from an EE department

• Professional experience
  • Computer Engineering professor since 24
  • Research and consulting with companies
  • I ran the manufacturing company my Dad founded for a couple of years...
About Me

- Hank Dietz, ECE Professor, CPE DUS, and James F. Hardymon Chair in Networking
- Office: 203 Marksbury

- Research in:
  - Parallel computing HW+SW
  - Computational photography
  - Improving making technologies
- Lab: 108/108A Marksbury – I have **TOYS**! 
What Is Computer Engineering?

- Electrical Engineering is circuits & HW?
- Computer Science is programming & SW?

Computer Engineering is looking at HW+SW computing systems as a whole, with deep understanding of interactions between HW/SW.
What is a computing system?
Computing Systems?

- Personal Computers (PCs)
PCs (yeah, old ones)
#1 Machines, http://top500.org

8730112 cores, 1.1EFLOPS, 21MW
Computing Systems?

- Supercomputers
- Clusters, Farms, Grids, and Clouds (Warehouse Scale Computers – WSC, Software as a Service – SaaS)
- Servers
- Personal Computers (PCs)
- Personal Mobile Devices (PMDs)...
  usually “smart phones” and tablets
M-Unit Sales, Global Personal Electronics

https://www.grandviewresearch.com/industry-analysis/personal-consumer-electronics-market
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- Embedded computers, IoT (Internet of Things)
Embedded and IoT
Computer Engineering is the enabler for most tech.

• Most modern devices depend on embedded computers for their basic functionality

• Computer engineers might work for
  • NVIDIA, Intel, AMD, IBM, Apple, etc.
  • Indeed top-rated employers are: Microsoft, Capital One, Northrop Grumman, Cisco, Verizon
  • Small groups are in most companies…
Enabler, yes!
But for how long?
Moore’s Law – The number of transistors on integrated circuit chips (1971-2018)

Moore's law describes the empirical regularity that the number of transistors on integrated circuits doubles approximately every two years. This advancement is important as other aspects of technological progress - such as processing speed or the price of electronic products - are linked to Moore’s law.

The data visualization is available at OurWorldinData.org. There you find more visualizations and research on this topic. Licensed under CC-BY-SA by the author Max Rose.
Enabler, yes! But for how long?

- *Everything* is getting exponentially better
  - Can do more with new devices
  - Not the same exponent for everything

- Because everything is changing fast, demand is high, but you need to keep up…

Computer Engineers must be **lifelong learners**