ECE411 Practicum Lecture 0

Introduction

“Where are we going? And why are we in a handbasket?”

2014/10/01

ECE411, Inc.

Over the next 10 weeks, you will:

- **Choose** your own project
- **Specify, design, build, and test** your project
  - Acting like you're an **engineering team** taking a new product to market
  - Using some industry **best practices**
- **Demo** your project to Mark and me

Mark's Job as Professor

- **Project management** tools and processes
- **Communications** tools and processes
- Small selection of **industry best practices**
- Emphasis on engineering in **teams**

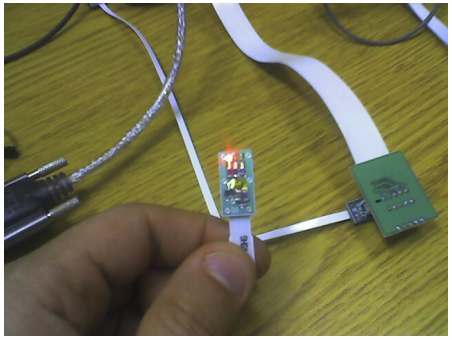
- Essentially:
  - Teaching you skills so that you're not *completely* useless when you walk out of here in June

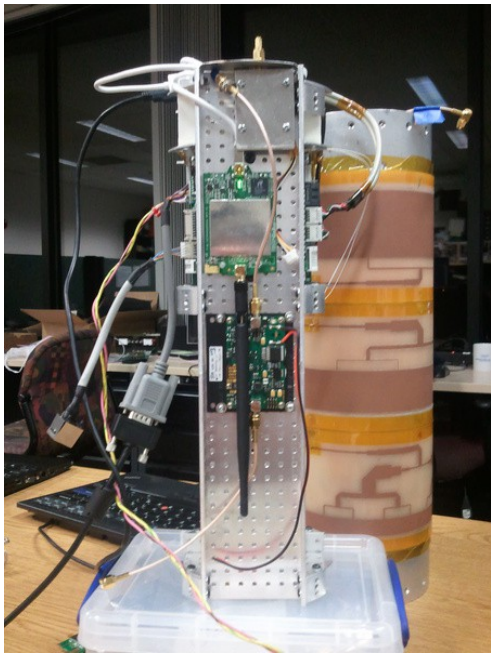
My Job: I'm your new CTO

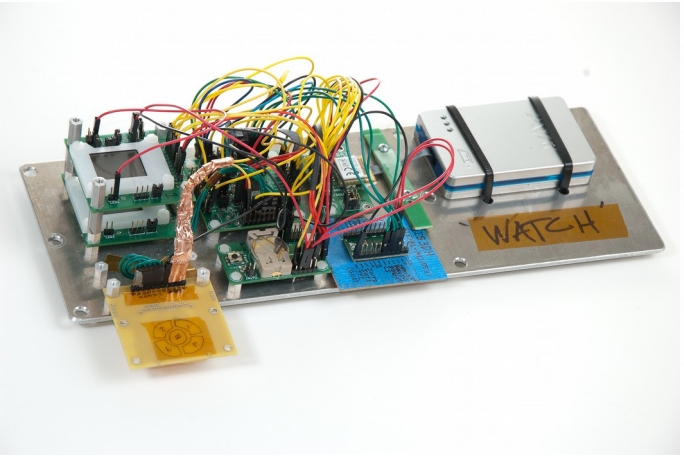
- Managing ~ 20 new MVPs in Q4 2014
- This means I will be:
  - Gatekeeper for NPIs
  - Tracking progress and budgets in real time
  - Giving a final review on MVPs at end of Q4
  - Monitoring hand off to manufacturing
- Essentially:
  - I'm your technical manager for the next 10 weeks.
  - Don't make me fire you.

Me

- Andrew Greenberg
  - Email: adg@ece.pdx.edu
  - Phone: 503.708.7711 (yes, you can call me)
  - Adjunct offices are near Circuits Lounge (FAB 85-03)
- BS from PSU (Physics+EE) and Reed College
  - Capstone: “Design of a 1kW DC brushless motor for a solar racing vehicle”
- MS from PSU in EE
  - Thesis: “Open Source Software for Commercial Off-the-Shelf GPS Receivers”
- 4 jobs:
  - CTO at The TOVA Company (http://www.tovatest.com) - develops and markets a computerized, objective test for attention disorders, like ADHD.
  - CTO at APDM, Inc. (http://www.apdm.com/) - develops and markets a wireless, synchronized human movement monitors for objectively measuring human movement.
  - Low-power, cm^3-class embedded systems consultant - Angle of attack sensor for small aircraft, Disposable smart band aid used post-surgery, GPS-enabled sports watch, etc.
  - PSU - help with the EPL (http://psu-epl.github.io/) and help build rockets (http://psas.pdx.edu/)



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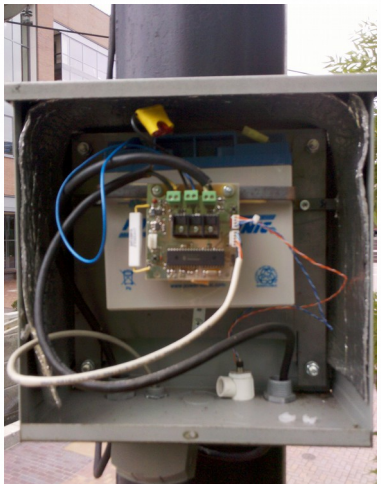

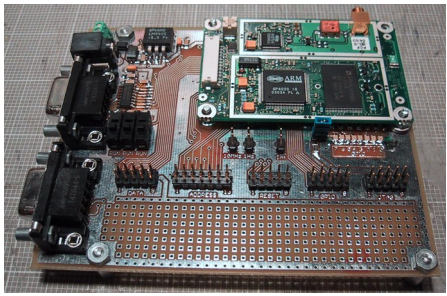

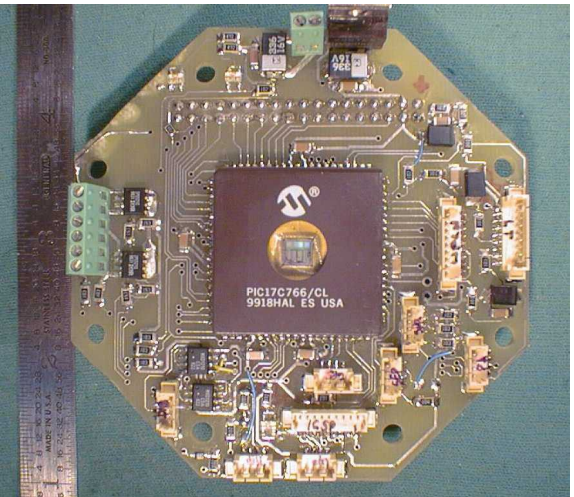
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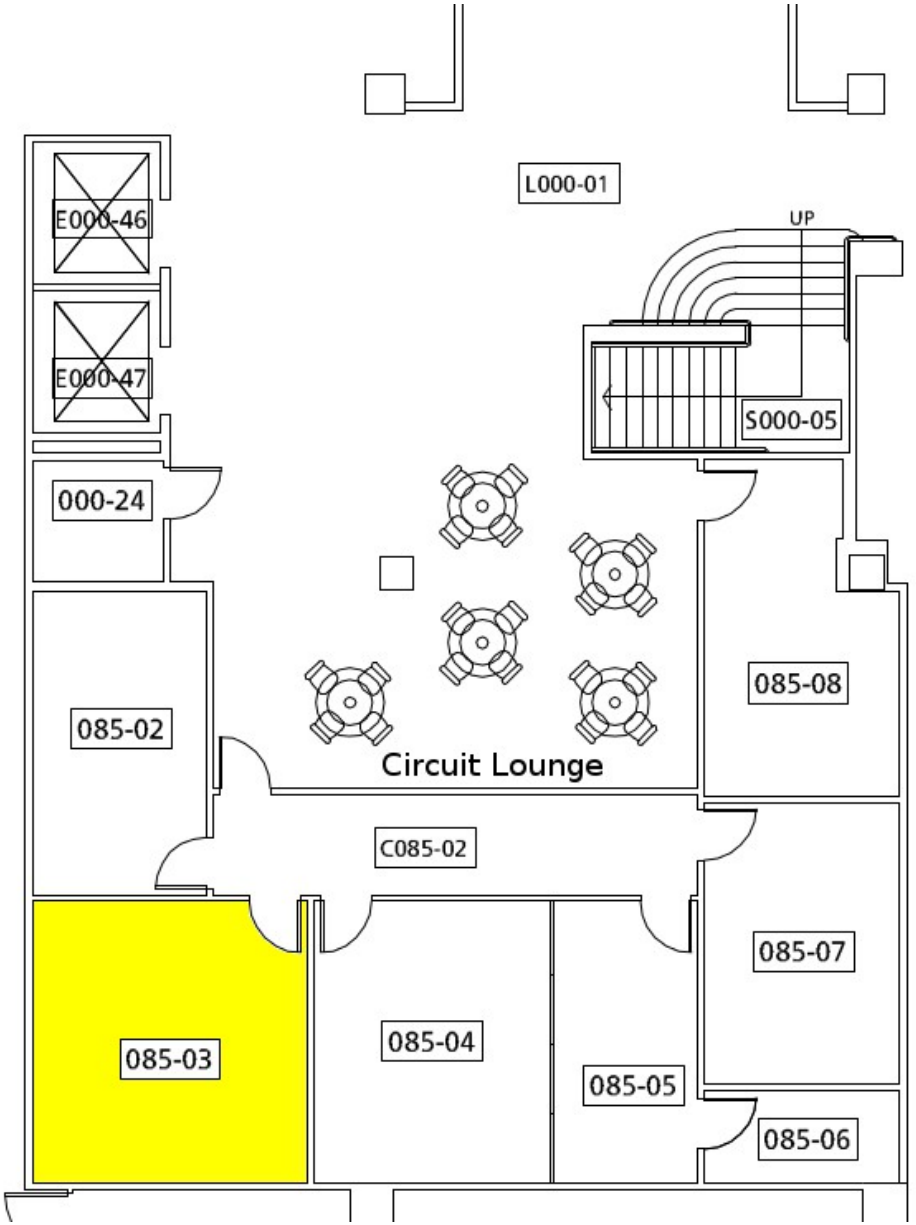
Getting a hold of me

- Office hours Wednesdays 4-5pm, or by appointment
- Office: FAB 85-03
- adg@ece.pdx.edu
- Cell: 503-708-7711
  - Call / text – Urgent communications *only*



How about you?

- Who’s on the standard 4 year track?
- Who’s on the > 4 year track?
- Who’s already had a career (post-bacs)?
- Who has 10 years of ECE experience?
- Who’s interested in:
  - Embedded? Robotics? Power? DSP? RF? IC design? FPGAs? Analog? Communications?

How many of you have...

- Drawn up a detailed schematic.
- Laid out a printed circuit board (PCB)
- Had the PCB manufactured (by hand or by service)
- Ordered your own components
- Soldered the components to the PCB (by hand)
- Tested and debugged the board
- Had the system (mostly) work

Prediction: Less than 10%

If PSU has done its job, then...

- You can do math pretty well.
- You know the basics in a lot of EE domains (analog, digital, software, etc).
- You've had a project or two here and there, but mostly labs.
- Mostly, you've done **theory and simulation.**

Abstract to Applied

More abstract → Mathematics

Mathematical Physics

Physics

Applied Physics

Engineering Principles

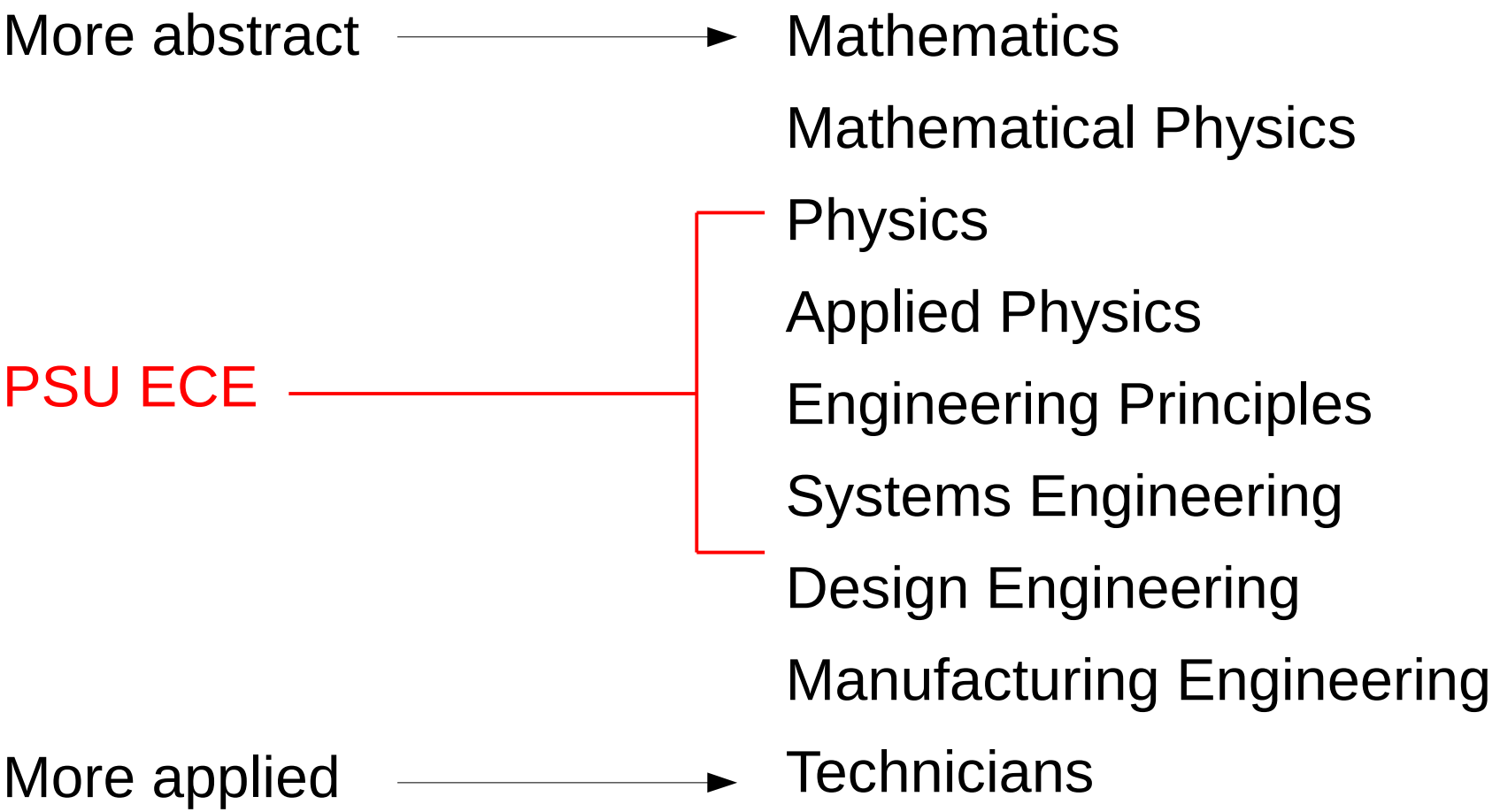
Systems Engineering

Design Engineering

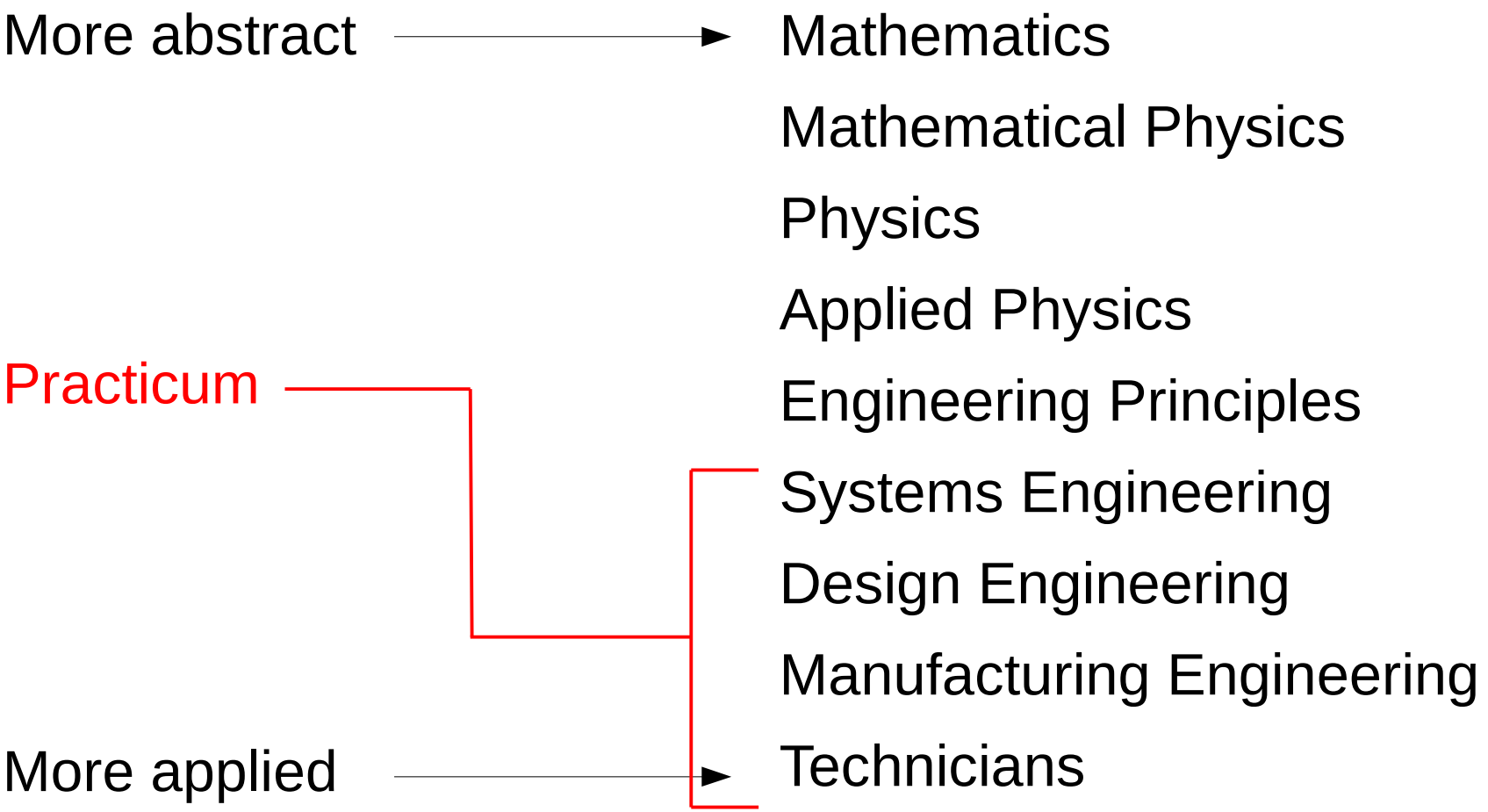
Manufacturing Engineering

More applied → Technicians

Abstract to Applied



Abstract to Applied



But.. but...

- Why am I building an embedded system?
- This doesn't apply to my focus!
- Practical experience is for technicians!
- Teams? I *hate* people!
- But I *want* to be useless in industry!

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It's 2014.

- Everything is now an embedded system.
- Internet of Things (IoT) is now Real™
- IoT affects almost everything about industry, from Power to IC design to RF.
- If not IoT, then data acquisition and remote monitoring... which is still IoT.
- Very, very few of you will never work with hardware.

Plus...

- Projects are *great* for resumes.
- *You* get to decide what to build.
- You need a real project to apply the important 411 coursework.
- Street cred.

Makers vs Engineers

- “Maker” is the new term for hobbyists and artists.
- Some makers create and use shockingly sophisticated electronics far beyond anything you've ever done.
- You (almost) have a 4 year engineering degree, but *might* have never built a thing.
- LMFTFY.

What have you built?

- Anyone willing to share a project?
  - 5,000 bonus points to those who do.
- Anyone have a project on Github?
  - 10,000 bonus points for that.

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Peer Mentors

- If you consider yourself fairly experience with:
  - Designing electronics and PCBs.
  - Analog design.
  - Programming microcontrollers/FPGAs.
  - Surface mount soldering.
- … then please email me **this week** with your experience.
  - *Really, I'm not kidding.*
  - “Peer mentors” will get extra credit (!)