

Why Grad School

(and research topics in systems)

Neil Spring

25 Oct 2005

Why

- Jobs at the end (PhD)
 - Faculty
 - Research labs
- Knowledge (Master's)
 - Learn from (with) smart friends
 - Learn advanced material
 - Learn new stuff
- Not the document or the Dr., regardless of how much your parents want to frame it.

What it takes

- Resolve, bullheadedness
- Desire, drive
- Writing and speaking skills
- Time management
- **Smart people get no pass**; if you've never studied before, prepare.

Whither motivation?

- Teaching, students (mine)
 - Organize information
 - Entertain
 - Altruism
- Research (a common statement)
 - Never reinvent
 - Endless challenges
 - Contribute new knowledge
- Autonomy (typical of older students)
 - I've seen my "boss" maybe three times?
 - People may take your ideas more seriously

Remember your goals

- TA'ing contributes little (unless for a class you haven't taken, or for faculty you want to know).
- Manage your advisor – do not expect to be directed from above.
- Excel... at something.

Systems (1/3) – areas

Three large areas:

1. Networks: reinventing the Internet with security, qos, accountability...
2. Peer-to-peer: building systems that need no central server,
3. Virtualization: vmware-like tricks for many vm's; moving boundaries between operating system and application

Systems (2/3) – problems

Four canonical problems:

1. Scale: easy to make solutions for two, hard for two million. easy to make code that runs on desktops, hard to add cell phones.
2. Security: easy when people cooperate, hard to defend against evil.
3. Management: troubleshooting, configuration, etc.
4. Performance: duh.

Systems (3/3) – methods

Four basic methods:

1. Measurement: understand today's artifact
2. Simulation: a future system completely in software
3. Emulation: hardware/software mix
4. Overlay deployment: run on PlanetLab – ~300 sites worldwide

Why systems?

- Often better funded than theory
- Often easier to predict success
- Uses your Perl skillz
- Often large groups

Summary

- Grad school teaches you more stuff.
- Grad school develops non-technical skills.
- Grad school is personal.
- Systems research is fun. And sometimes funded.