Discovering more: Computer Science Research

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Research

Never be lazy about thinking. That's how you build up understanding and develop a bag of techniques that you can use.

Thinking is fun. If you don't find it so, it's an indication you are in the wrong business. *Mihir Bellare*

One of the characteristics of successful scientists is having courage. Once you get your courage up and believe that you can do important problems, then you can. If you think you can't, almost surely you are not going to. Courage is one of the things that Shannon had supremely. You have only to think of his major theorem. He wants to create a method of coding, but he doesn't know what to do so he makes a random code. Then he is stuck. And then he asks the impossible question, ``What would the average random code do?" He then proves that the average code is arbitrarily good, and that therefore there must be at least one good code. Who but a man of infinite courage could have dared to think those thoughts? That is the characteristic of great scientists; they have courage. They will go forward under incredible circumstances; they think and continue to think. *Richard Hamming*

Excelling in a Ph.D. program requires different skills than doing well in undergrad. Undergraduate education tests you through class projects (that do not last more than a semester), essays, midterms and finals. For the most part, you work alone. Your professor may not know your name. Every other student in your class takes the same tests or does similar projects. But in a Ph.D. program, you must select and complete a unique long-term research program. For most of us, this means you have to learn *how* to do research and all that entails: working closely with your professors, staff and fellow students, communicating results, finding your way around obstacles, dealing with politics, etc. *Ronald T. Azuma*

Sources in order:

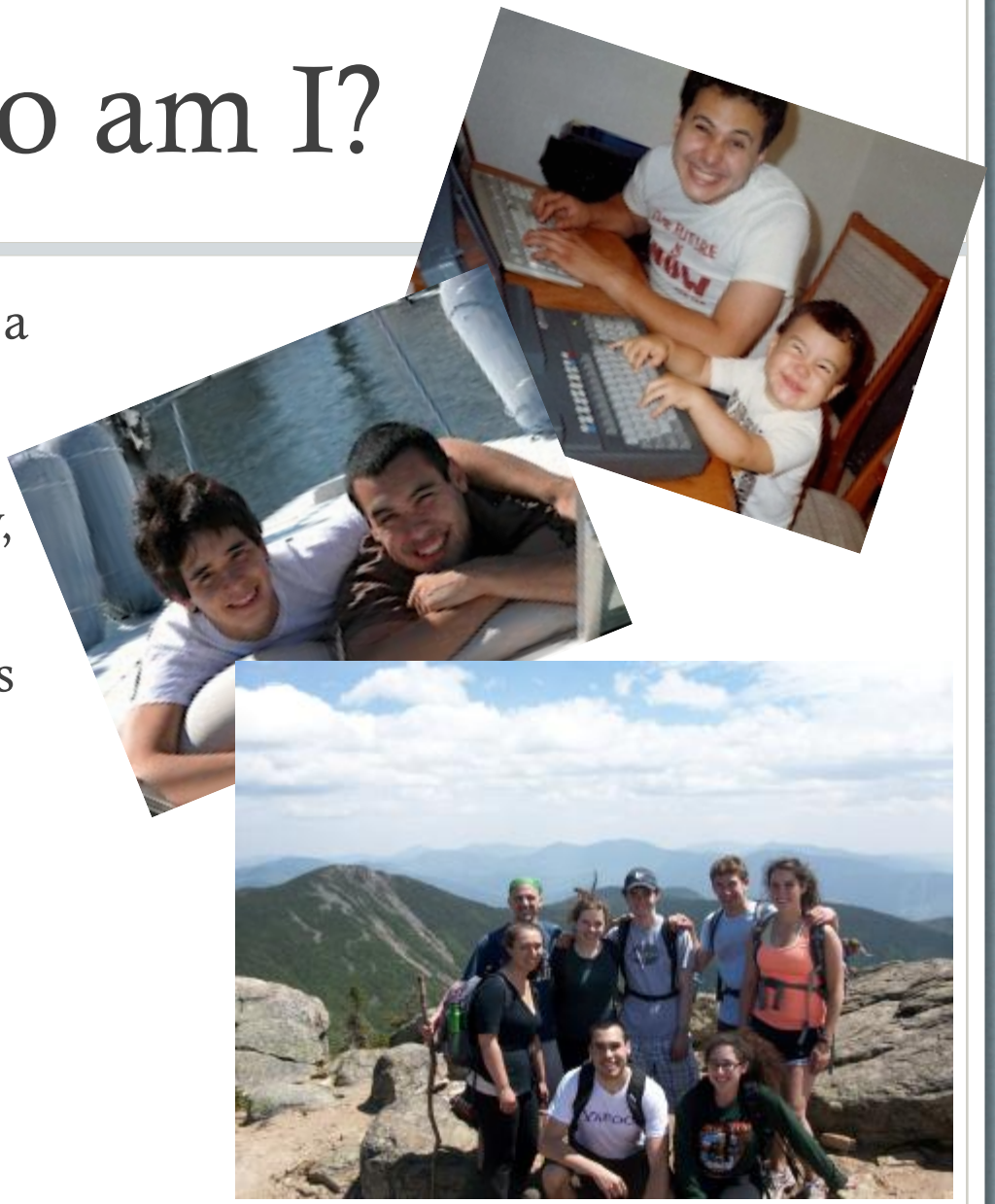
- "The Ph.D. Experience". Mihir Bellare. From: http://cseweb.ucsd.edu/~mihir/phd.html
- "You and Your Research". Richard Hamming. Transcriptions of the Bell Communications Research Colloquium Seminar. March 7, 1986.From: http://www.cs.virginia.edu/~robins/YouAndYourResearch.html
- "So Long, and Thanks for the Ph.D!". Ronald T. Azuma. 1997-2003. From: http://www.cs.unc.edu/~azuma/hitch4.html

What is CS Research?

- Research is:
  - A *work-style*. It is a unique scientific approach to study material from the past ("re") in order to search and produce new insights for the future ("search").
  - An eye-opening experience in learning and discovering the state-of-the-art in a particular field of Computer Science (i.e. Networking Systems, Software Engineering, Computational Biology, Human-centered Computing, Programming Languages, etc.).
  - A profession. By earning a research degree (Ph.D.), you have demonstrated that you are an expert in a particular field in your discipline and are able to produce good quality work (i.e. can work really *really* hard) in that field.

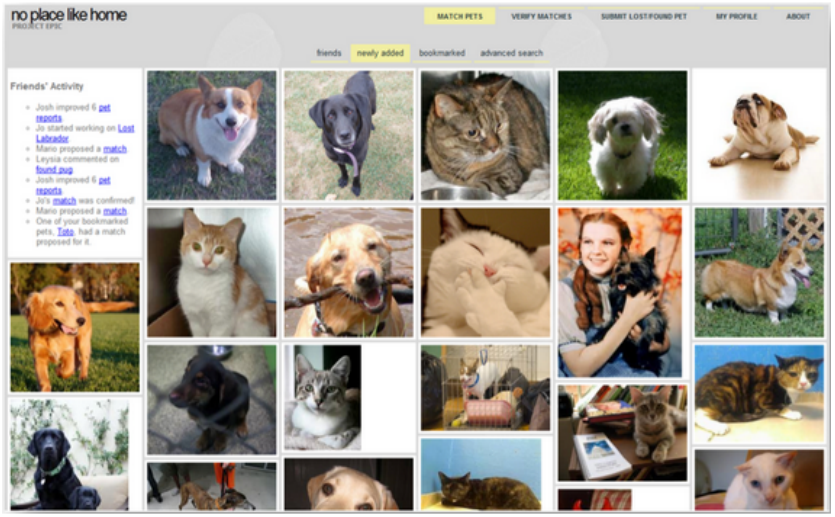
Who am I?

- 2nd year graduate student with a specialization in *software engineering*.
- My advisor is the one, the only, Ken Anderson.
- Come from UMass Amherst as an undergrad student.
- Love to:
  - play music, go hiking and biking, play computer games, eat food, watch football, hang out with friends and familia, etc.



What research am I doing?

- Lots of cool stuff:
  - **EPM** (EmergencyPetMatcher)
  - formal verification and usability methods for aiding the software engineer in building better quality and more reliable software systems.
  - Graduate courses in:
    - **Cyber-Physical Systems**
    - **Datacenter Scale Computing**
    - **Algorithms**
    - **Software Engineering**
    - More classes…



How to decide if research is right for you?

- Talk to professors about doing an undergraduate research project (i.e. independent study – you can earn credit or get paid). They're not that bad to talk to.
- ***Most importantly*** – As with anything in life, figure out what feels right for you. If you love computer science and desire to learn more about it, talk to as many people as possible (me included) and explore your options.

Thanks!