Exploring Research
(why consider grad school)

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Grad School Degree Options

- Masters (typically two years)
  - Course work only
  - Course work plus thesis
  - Online (may allow thesis)
- Doctorate (typically 4-6 years)
  - Often requires (evidence of / potential for) research before being accepted
  - Leads to more challenging career options
  - Prerequisite for some jobs (faculty, research labs in govt./industry)

Use masters to figure out whether you want a PhD
Grad School Costs

- Grad tuition: more than undergrad (~$25k total, for masters – in-state)
- Out-of-state rates hold for
  - International students
  - non-CO residents (first year)
- Graduate Assistantships (competitive)
  - Plus full tuition coverage
- Part time and/or online options possible

Cost-benefit Analysis ($$$)

Advanced degrees lead to higher earnings.
some “current” stats are a bit dated)

- An advanced degree (masters or above) in the
STEM fields, for mathematical sciences
occupations leads to ~33% higher earnings
(https://www.bls.gov/careeroutlook/2015/artic
le/should-i-get-a-masters-degree.htm#STEM:
median $60k to $80k annual salary)
- The sooner you get it, the better your earnings
- Worst case: costs are amortized in 1.5 years
- Over a 40 year career, you earn ~$1M more (or
retire 10 years early)
It's not just the money

- More challenging assignments
- Faster advances
- Explore what really drives you intellectually

Why today?

Keep your options open
- In final semester, apply for
  - Industry jobs (more than just one)
  - and also grad school (to multiple departments)
  - Decide only when all offers are in hand
- What you do to for grad school application could help you land a better industry job
- Grad applications
  - Due at start of your final semester
  - Need letters of recommendations (from faculty members or professional supervisors)
Consider doing a summer/fall research internship
Summer research internship

- Work under the supervision of a faculty member on a project (individual/group)
- Gain experience about
  - Research domain
  - Sustained effort on a single problem
  - Work in a team (often)
  - Communicate/present your results
- What you do will help even your industry job search
  - Employers look for similar skills

The CS Department

- 21 active faculty members (tenure track) plus ~5 instructors, and additional support staff
- ~700 undergraduates
- ~150 graduate students (on campus)
  - ~50 PhD
  - ~100 MS/MCS
- Plus active online program
Research Areas

- AI/ML Bioinformatics, Evolutionary Computation, Vision + HCC
- Security, IoT, Databases, Networks
- Software Engineering
- Big Data & Distributed Systems
- Algorithms, Cyber-Physical Systems
- HPC, Compilers, Languages, and Systems
- To know more see faculty rapid fire presentations Fall 2018 Aug, 27 & Sep 17. Talks/videos/slides at
  - https://echo360.org/media/684f2a84-dab1-4e67-aeb0-da06f87021e/public
  - https://echo360.org/media/1e03cdf8-bf16-40a1-a84b-1718062933eb/public

Sanjay Rajopadhye
http://www.cs.colostate.edu/~svr

- Areas: Parallel Algorithms & Architecture, Languages, Compilation, VLSI. Current topics:
  - Hardware accelerators, Energy efficiency
  - GPGPU/CUDA/AI chips
  - Application: RNA-RNA interactions (potential to impact cancer research) Target 10^8-fold speedup
- Seeking new students (grad/undergrad)
  - CS/Systems/theory/ECE background welcome
- Summer 2019 plans/projects
  - Commitment: 10hrs/week, funding may be possible (proposal pending)
  - Up to 4 students
  - Other topics possible
Francisco R. Ortega
http://mulab.org

- Areas: HCI - VR/MR/AR User Interaction
  - Gesture Elicitation and Recognition
  - Multi-Modal Interaction (e.g., gesture + speech)
  - Virtual and Augmented Reality (using head-mounted displays)
  - Multi-Touch and Bi-Manual interaction
  - Embodied Conversational Agents (Avatars)
- Seeking new students (grad/undergrad)
- Summer 2019 plans/projects
  - Commitment: 15 to 20hrs/week, funding may be possible.
  - Summer Capacity: 2 Undergraduate students. Graduate students please talk to me but space is available for any graduate student.
    - (Additional capacity may be available at a later time)
  - Other topics possible within HCI/VR/AR

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Sangmi Pallickara (Big Data)
http://www.cs.colostate.edu/~sangmi

- Voluminous data management
- High throughput storage and retrieval of observations
  - Support for large number (~10^{11}) of small files
  - Petascale datasets
- Query support: Range queries, analytic queries, approximate queries, and probabilistic queries
- Om-memory storage systems

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Online scheduling of streams (generated by sensors and IoT devices) in the presence of resource uncertainty
- Refinements include interference alleviation, application buffering, and backpressure for flow control

Cloud Computing
- Virtualization, containerization, and serverless computing

Edge Computing
- Resource constrained edge devices such as the Raspberry Pis

Distributed Generation of Sketches