Introduction to Graduate Study in CSE

CSE 591
Lecture 22
Prof. Patrick Crowley
Plan for Today

• Announcements
  – Final class meeting, Wed Dec 7
    • Ethical practice of research and scholarship
  – Turn in your November rotation project report!

• Questions

• Today’s discussion
  – Finish up Oct & Nov rotation project overviews
  – How Research Ideas are Funded and Evaluated
Why Should Grad Students Care About Research Funding?

• Some day, you may want to be faculty.

• Your advisor might ask you to help write grant proposals.

• This is where our nebulous discussion of “good” research has real economic consequences.
Who Pays for Computer Science Research in the US?

- Federal Government
- Industry
- Foundations
Federally Funded Computer Science Research

- NSF: (CISE)  
  - NSF is structured like a University, with a directorate for each school/department
- NIH: (various)  http://www.nih.gov/
- DARPA: http://www.darpa.mil/  
  - other armed forces research labs: ARL, NRL, ONR, AFOSR, ...
- DOE: (GTL)  http://genomicsgtl.energy.gov/
- NASA:  
  http://www.nasa.gov/audience/forresearchers/researchbizops/
- Other agencies…
NSF CISE Core Programs

Office of the Assistant Director (OAD)

Division of Computing & Communication Foundations (CCF)
- Algorithmic Foundations (AF)
- Communications and Information Foundations (CIF)
- Software and Hardware Foundations (SHF)

Division of Computer Network Systems (CNS)
- Computer System Research (CSR)
- Networking Technology and Systems (NeTS)

Division of Information & Intelligent Systems (IIS)
- Human-Centered Computing Cluster
- Information Integration and Informatics Cluster
- Robust Intelligence Cluster
National Institutes of Health
Some Key Players in CSE

National Cancer Institute
(HNC)

National Human Genome Research Institute
(HN4)

National Library of Medicine
(HNL)
Industrial Funding for Computer Science Research

• Many companies have active internal research and external sponsorship
  o Microsoft Research
  o Intel Research
  o IBM Research
  o HP Labs
  o Monsanto
  o Boeing

• Awards to external researchers are typically smaller than federal grants, but are made in the form of “unrestricted gifts”
Foundations that support Computer Science Research

• Howard Hughes Medical Institute
  o http://www.hhmi.org/

• The Alfred P. Sloan Foundation
  o http://www.sloan.org

• Others…
The Big Question

How do funding agencies decide how to spend their money?
Key Steps

1. Funders establish a broad research agenda
2. They issue specific solicitations
   Researchers submit proposals
3. Proposals undergo merit review
4. Agency staff decide which high-merit proposals should be funded
Establishing a Research Agenda

- Agencies have advisory committees and councils
  - e.g., NSF CISE Advisory Council

- Agency leadership and advisors set priorities through special reports, planning, and advice
  - e.g., NIH “Road Map”

- Program staff solicit and fund specific projects, informed by these priorities

- Different agencies’ staff have different degrees of autonomy in picking projects (e.g. NSF vs DARPA)
Asking You to Ask For Money

• Programs issue **solicitations**
  o a.k.a. RFPs, CFPs, BAAs, …
  o Briefly specifies a topic or area to be funded
  o Sets conditions that proposals must meet (including *due dates*)
  o Specifies award size and mechanism
  o Names cognizant program staff
Example Solicitations

• NSF CISE CCF Core Programs Solicitation

• NIH BISTI R01 Solicitation
Typical Proposal Properties

- For “regular” proposals, 10-15 pages of actual proposal text

- Must also submit a budget, brief CVs for all participants, and assorted administrivia

- May include letters from collaborators or other supporters of proposal
Merit Review of Proposals

• **Via Study Sections or Panels**
  o Who makes up these groups? Who chooses them?
  o How many people read your grant? How many rate it?
  o What criteria do they consider?
  o What feedback do you get?
    ▪ Scores or ratings (NIH: 1-9; NSF: OEVGFP)
    ▪ Critiques

• Program staff use scores/critiques as biggest input to final funding decision

• Typical funding rate may be 10% or less!
NSF Merit Review Criteria

- Intellectual Merit
- Broader Impacts
What is the intellectual merit of the proposed activity?
How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?
Broader Impacts

What are the broader impacts of the proposed activity?
How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?