Broadening the Reach 2014

How to Communicate with Researchers

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Outline

• Research Terminology
• Types of Researchers
Research Terminology

How to Communicate with Researchers (Neeman)
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Is Oxygen a Metal?

• How many of you believe oxygen is a metal?
Oxygen in Real Life

• Atomic number 8
• Chalcogen
• Key element in life
• Also rust

Oxygen in Astronomy

• The universe is made of the following:
  – Hydrogen
    • Atomic number 1
    • 75% of all baryonic mass
    • Most stars are made of hydrogen plasma
  – Helium
    • Atomic number 2
    • Noble gas (inert)
    • 24% of total elemental mass
  – Other

http://en.wikipedia.org/wiki/Helium
Planets etc

What are planets made of?

• Cores of iron, nickel etc
  – Earth’s core is 89% iron, 6% nickel, 5% other

• Mantles of silicates

http://en.wikipedia.org/wiki/Planets#Mass
http://en.wikipedia.org/wiki/Earth
So What’s a Metal?

• To a chemist, metals have a very specific chemical definition.

• To an astronomer (especially a cosmologist), metals are anything that isn’t hydrogen or helium.
Projection

• What happens if you put a mathematician, a psychologist and a movie producer into a room and ask them to discuss projection?
Scale

• At quantum scale during femtoseconds, how much does gravity matter?
• How about at cosmological scale over eons?
CS or IT?

• What happens if a domain scientist refers to CS as IT?

• Wait, CS people do research? I thought they were just there to help everyone else with their real research.
Is Simulated Data Actually Data?

• I had a colleague in Chemical Engineering who told me that, if he referred to data from a simulation as “data” in front of his colleagues, he’d be laughed out of the discipline.
Science vs Engineering

• Science is focused on discovery.
• Engineering is focused on design.
• In which case:
  – Is a design project research?
  – Do engineers do science research?
  – What is research about software?
Researcher Types
Researcher Types

• Faculty
  – Tenure-Track Faculty
  – Tenured Faculty
  – Research Faculty

• Staff
  – Postdocs
Tenure-Track Faculty

At research-intensive institutions:

• **Incentive Structure**: I need to publish lots of paper, bring in lots of grant money and graduate students, or I’m fired.

• **Need**: I need stuff to work now and keep working reliably.
Tenured Faculty

At research-intensive institutions:

- **Incentive Structure**: I need to publish lots of paper, bring in lots of grant money and graduate students, or I don’t get a raise and I don’t get a named chair.

- **Need**: I need stuff to work now and keep working reliably.
Research Faculty

• If I don’t bring in grant money, I’m laid off.
• I need to publish a lot to keep bringing in grant money.
Postdocs

• I need to publish a lot or I’ll lose my postdoc.
• I need to learn how to get lots of grant money, and even actually get some of my own, so I can get a permanent position.
Probability of Success

• FY2013: 22% overall
  – BIO: 21%, CISE 21%, EHR 18%, ENG 21%, GEO 26%, MPS 25%, SBE 21%
    • Office of Director 47%, Office of Polar Programs 100%
  – AR 18%, KS 17%, MO 19%, NE 19%, OK 15%, SD 17%

Funding is governed by the Law of Large Numbers: you have to submit lots of proposals to get any funding.

• NSF CC-NIE 2013: 87 proposals, 43 grants (49%)

Things to Say to a Researcher
Cost

• “This other way of doing it is cheaper than how you’re currently doing it.”

• “For the same cost, it could be so much better.”
Control

• “You get to decide how to use your piece.”
• “You can share it with whoever you want.”
Administration

• “Your students won’t have to spend their time taking care of this.”
Thanks for your attention!

Questions?