Research as a Career

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@robotsmarts
Research Related Goals

- Stay informed about advances in your research area
- Stay published in your field
- Stay connected to members in your community
- Stay excited about doing research
- Develop your research “elevator pitch”
Specific Strategy 0: Research Elevator Pitch

• Three sentence description
  o Problem you are interested in
  o Why it is important
  o Approaches you are exploring

• Remember: the elevator ride is short!
Exercise – Research Elevator Pitch

• Find a group/partner (2-3) [15 seconds]
• Think of/Write down your research elevator pitch [1 minute]
• Share with your group [3 minutes]
Specific Strategy 1: Read and Reflect

• Read a paper/chapter/blog/article every week
• Reflect on that paper **with you in mind**
  • Do they use a new technique that I can use?
  • Did they present their work in a way I can adopt?
  • Did they expose a particular insight or result that supports my work?
• Reflect on your learnings every few weeks (take notes if necessary)
Specific Strategy 2: Get Out in the World

- Attend one major conference a year
  - Reconnect with existing friends
  - Use weekly reading to meet new people
  - Talk about your work
- Serve on a PC or grant review panel
  - Ask your friends/advisor/mentors to suggest you
  - Go in person
- Have students present research posters
  - Create students people want
Specific Strategy 3: Collaborate with at Least 1 Peer*

- Someone who does research in a related area
- Someone whose primary research is outside of your area but who is *physically local*

Don’t let your ego or pride get in the way

*Students are not your peers*
Creating a pro-research environment
Schedule Time Daily for Research

• Every week
  • Create a list of small research tasks (for you, for your students, …)

• Every weekday
  • Schedule 30-60 minutes for research (research-based writing counts!)
My Productivity

8am - noon

5pm - 7pm

Time

Productivity
Create a Support System

- Collaborators and Peers can be great motivators!
- Create research accountability group
  - Track research progress
  - Provide encouragement
- Create a system of people for feedback
  - Less intimidating people get work in early stages
  - Ask more established folks for feedback on work closer to being finished
Exercise – Reflect (5-10 minutes)

• What time of day are you most productive on research?
  o Strategize together - What could you do during that time?

• Strategize – What type of individuals might you include in a support group?
• In private – Write down specific names.
Funding your research
Some Practical Suggestions

• Find out about university funding
  • Travel and research grants
• Ask your colleagues how they got funding and how much
• Go to your grants office
• Call program officers and ask questions
• Ask people for successful proposals
• Ask successful researchers to comment on a draft of your proposal
Funding Opportunities

- NSF
  - Career
  - REU
  - RUI
  - ROA
- DARPA
- DOE
- HHMI
- NIH

- Sloan Foundation
- CRA-W
  - DREU and CREU
- Microsoft New Faculty Fellowship
- Packard Foundation
- Google Research Awards
Managing Research Projects
Determining Your Research Scope

• Choice of a research project
  • Your current expertise/skills
  • New skills you would like to learn
  • Available resources (physical, human)
  • Resource you try to get
  • Long term vision, short-term goals.
• Think about impact and practicality
Quantifying Your Available Human Capital

• How will you spend your time?
  • Doing actual research (reading, thinking)
  • Managing / interacting with participants
  • Academic year vs. summer

• How much time and effort will your collaborators give?
  • Other faculty may have limited time
  • Industry researchers give and demand lots of effort
  • Students may require training
How Do You Make Collaboration Succeed?

- Workshops during which people work together on open problems (theory).
- Have a student work on the project.
- Communicate on regular schedule.
- Set concrete goals.
- Work with people with complementary expertise.
- Work with people you like.
Before Tenure

Establish yourself.

• Try to differ from Ph.D work.
• Quality better than quantity.
• Stay focused.
• Choose projects that are not too risky.
• Publish papers with your own students (not always with senior faculty/Ph.D advisors).
After Tenure

More freedom to branch out to new areas

• Choose a good entry problem (expertise, flavor, resources).
• It takes a few years to really enter a field.
• But this is sometimes necessary.
• Always learn new things.
• Keep a few high risk/high rewards projects and some “safer” projects.
• Consider leading large projects.
• Think about impact.
Working With Students
Recruiting Students: Getting the Word Out

• Talk about research at admit day sessions and research colloquia
• Post research on door and web page
• Ask colleagues teaching introductory classes for names of good students and approach those students
• Teach courses that reach out to new graduate students.
Be Very Selective

- Trial run to evaluate
  - Personality
  - Initiative and passion
  - Interest
  - Diligence
- Ways to get started
  - Credit during semester
  - Paid research during semester
  - Summer research
Tips for Working With Students

• Be positive!
• Break research projects down into small, semester length tasks
  • Plan for each task to be done by a different student
• Create organization
  • Create contract specifying expectations
  • Communicate and meet on set schedule
Tips for Working With Students

• Supervise students
  • Develop general skills (communication, analytical, writing, critical thinking)
  • Develop research specific skills
  • Teach them about the research process
• You want students to succeed.
  • Measure progress not just by # papers published, but also how much have the students grown.
Manage a Research Group

- Encourage collaboration among students.
- Each student is given a project to lead.
- Give fair credits.
My Personal Habit

• Spend one semester to brainstorm/read papers/converge on a research topic.
• At least 1 hour one-to-one meeting per week.
• Correct their writing on paper.
• At the beginning and end of each semester we summarize the student’s progress, check where he/she stands and set expectations/milestones.
• Encourage student to do an internship in industry to make better decisions on their career paths.
Breakout Group Exercise
(Groups of 3-4)

The CRA-WPrize is a new international competition designed to encourage the next-best research ideas. The prize is an award of $5M that can be used to further the research and development efforts needed to make this idea a reality.

Your group’s task
• Based on research projects within your group – discuss a concept to propose. This can either be a collaboration of ideas or a single idea (but must be based on research that is already being done by 1 to N members of your group).
  • What is the idea?
  • How can it be used in or by society?
  • How many years of research will it take to develop?
• Identify a spokesperson. Present your next-best research idea to the rest of the participants.
Reflections & Summary