Research in industry

(from a UK/Microsoft point of view)

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My career

• BSc in computer science at Glasgow
  – Changed from BA
• PhD at Cambridge Systems Research Group
• Microsoft Research since 2001
  – “Technical Assistant” to director for first 18 months

• Research interests
  – Understanding how complex systems work
    • Request tracking
    • Network traffic correlation
Not at work

- Rowing
- Training to row
- Recovering from training to row
- Sleeping
Audience for this talk

• Anyone considering a research career in industry
What is an industrial research lab?

• How does a lab describe itself?
HP Labs

“As Hewlett-Packard's central research organization, HP Labs' job is to invent for the company's future.”

“The majority of HP's research is conducted in our business groups, which develop the products and services we offer to customers.

HP Labs' function is to deliver breakthrough technologies and technology advancements that provide a competitive advantage for HP, and to create business opportunities that go beyond HP's current strategies.

The lab also helps shape HP strategy, and it invests in fundamental science and technology in areas of interest to HP.”

http://www.hpl.hp.com/about/
IBM Research

“We don't just invent, we innovate.
Researchers come to IBM to make an impact -- on the industry and on the world. As the largest IT research organization, IBM Research enables IBM to produce more breakthroughs than any company in the industry, averaging 9.3 patents per day.

At IBM, you can collaborate with clients, universities and worldwide teams. You can work on multi-disciplinary projects that quickly lead to prototypes or long-term projects that last for years. Whatever you do, you will be in an environment that nurtures some of the most innovative and creative thinkers in the world.”

http://www.research.ibm.com/about/career.shtml
Microsoft Research

“Microsoft Research is dedicated to conducting both basic and applied research in computer science and software engineering. Its goals are to enhance the user experience on computing devices, reduce the cost of writing and maintaining software, and invent novel computing technologies. Microsoft Research also collaborates openly with colleges and universities worldwide to broadly advance the field of computer science.”

http://research.microsoft.com/
What is an industrial research lab (really)?

• R vs D
  – Where does the lab lie on the spectrum from Research to Development?
  – Most labs do a bit of both

• Why does the company have a research lab?
  – Long-term innovation
  – Highly skilled in-house technical consulting
  – Public relations (media profile, academic credentials, political)
  – ...

• What fields does the lab do research in?
  – Who chooses them?
Career paths

• Industrial research offers a variety of career paths:
  – Researcher
  – Research development engineer
  – Research management
    • Different from research leadership
  – Technical “fellow”
  – Non-research
    • Both technical and non-technical roles

• It is not unusual to move from one role to another (and back again!)
Tech transfer

• Tech transfer can be an extremely rewarding part of working in industrial research
  – The company may encourage or even require it

• There are numerous forms of tech transfer
  – From consultancy to starting a new product group

• Many challenges (irrespective of the company’s position on whether research should do tech transfer)
  – Technology
    • Is your research idea/implementation/evaluation adequate for the real world?
  – People
    • Need to build relationships
  – Policies and methods of working
    • Good intentions are not enough
  – Risk
    • To the company
    • To the researcher (usually involves a period of hard work with little to publish)

• What mechanisms are in place to enable tech transfer?
Choosing problems

• Real problems, potential for big impact
  – But not in a vacuum
    • Legacy software, interoperability
  – Access to valuable data
  – But problem may not be trendy

• Product groups have a stake
  – ... and expectations
  – Often need to manage the relationship
    • Time, effort, resources
  – Legal considerations
Some miscellaneous considerations

• Who does the work?
  – No army of students
  – Collaborations are very important
    • Internal and external

• Publishing
  – Are there procedures?
  – Are there restrictions?

• Profile in the external research community
  – Does the company value this?
    • What about attending conferences, serving on PCs, mentoring students, visiting and being visited, etc.
Some more miscellaneous considerations

- There may be opportunities to be broad, to change area
- Annual review, performance-related pay
- Interns, visitors
- Recruiting
- Legal
- PR
- Budget for kit and travel
Conclusion

• An industrial research lab provides the environment to do work that is:
  – intellectually challenging,
  – long-term,
  – in-depth,
  – solving a real problem, and
  – has an impact.

• My experience?
  – MSR Cambridge is a really great place to work!