How can academia and industry work together to address educational issues?

Panel Presentation

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IBM University Relations Programs

- **PhD Fellowships**
  - Tuition + Stipend + Summer Internship
  - Candidates nominated by academic departments each year

- **Faculty Awards**
  - Each award is about $40K per year
  - Candidates nominated by IBM researchers

- **Shared University Research (SUR) Program**
  - Equipment award program
  - Proposals developed jointly by faculty and IBM researchers

Additional Programs at IBM Laboratories

- **Summer Internship Programs**
  - ❑ Graduate students at research labs for up to 12 weeks.
- **Academic Visitor Program**
  - ❑ Faculty visiting a research lab for an extended period (one academic term to one year).
- **Postdoctoral Scholars Program**
  - ❑ One-year or two-year appointment at a research lab.

- **Centers for Advanced Studies**
  - ❑ 21 worldwide; located at software development labs
  - ❑ Collaboration with academia: internships, sabbatical visits

Key Questions

- What are ways in which industry can help address the crisis in computing (increasing CS enrollments, promoting greater diversity in the field, etc.)?

- What are possible effective means for academic/industry collaboration (in addition to and beyond just monetary support)?

Possible Answers

- **Student Programs**
  - ❑ Summer Internships
  - ❑ Co-op Programs

- **Mutual Exchange Programs**
  - ❑ Long-term faculty visits in industrial labs
  - ❑ Industrial researchers teaching at universities

- **Improved academia & industry intellectual property practices**

- **Industry sharing data with academic researchers**

Student Programs

- **Summer internships for undergraduate & graduate students**
  - ❑ Standing agreements with local universities.
  - ❑ Guaranteed internships for qualified students.

- **Co-operative education programs for undergrad. students**
  - ❑ Five-year program alternating between school and work.
  - ❑ Implemented with great success at the U. of Waterloo:
    four months long work terms; up to two years of relevant work experience.

- **Advantages**
  - ❑ Complement academic experience with relevant work.
  - ❑ Both students and industry benefit.
  - ❑ Helps underprivileged students, increases diversity.

Mutual Exchange Programs

- **Faculty visits in industrial labs**
  - ❏ Long-term visits, often combined with a sabbatical leave
  - ❏ Faculty spend time in research labs or software development labs.

- **Industrial researchers teaching at universities**
  - ❏ Industry grants researchers release time to teach at local universities.
  - ❏ Upper-division undergraduate & graduate courses.

- **Advantages:**
  - ❏ Promotes interaction between industry & academia.
  - ❏ Brings new skills to the classroom, enriches the instructional experience.

Improved Intellectual Property Practices

- Intellectual property issues are a **complex** problem and challenge.

- Intellectual property is often an **obstacle** to collaborative engagements between academia and industry.

- Typically, a separate IP agreement is required for every separate engagement between academia and industry.

- Much is to be gained by streamlining IP agreements, adopting blanket IP agreements covering a spectrum of collaborative engagements between academia and industry.

- But there are **no** easy answers …

Sharing Data with Academic Researchers

- Experimental computer science is relatively inexpensive (unlike physics, biology, …)

- Experimental computer science gives students an opportunity to become engaged in research early.

- Yet, experimental computer science is still at a rather undeveloped stage.

- Lack of real-world data is a serious obstacle to the development of experimental computer science in academia.

- But industry data are proprietary …

Finally, let us not forget K-12 Education

- Computer science curriculum in elementary and high school education is virtually non-existent
  (AP courses in CS notwithstanding).

- Industry and academia can work together towards developing and putting into place a CS curriculum for K-12 education.

- In the long run, this may be the answer to the declining enrollments in computer science.

- There is a need for innovative programs in this area
  - IBM Transition-to-Teaching Program (started in 2005): transitions professionals to a second career in teaching.