Evolving Academia/Industry Relations in Computing Research

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Computing Community Consortium

Mission: **catalyze** the computing research community and **enable** the pursuit of innovative, high-impact research.

**What:**
- Promote audacious thinking
- Inform research directions
- Human development
- Standing committee of the CRA since 2006

**How:**
- Workshops & Conf. Blue Sky Tracks
- Whitepapers & Social Media
- Reports Out (esp. to government)
- Biannual Symposium
Background: Growing CS Enrollment


Source CRA Enrollment Survey

New York Times, Jan. 24, 2019

The Hard Part of Computer Science? Getting Into Class

Background: Computers Everywhere

Yes, this is a computer too

A Future Where Everything Becomes a Computer Is as Creepy as You Feared

New York Times, Oct. 10, 2019
CCC Industry Working Group

• Members: Ben Zorn, Greg Morrisett, Shwetak Patel, Jennifer Rexford

• Started in 2018 – mission to understand academia/industry relations


• We started with question “Have things changed since 2015?”
Our Conclusion: Major Changes since 2015

• Process:
  • Interviewed individuals including deans, CS department chairs, CS faculty, individuals at start-ups and large companies
  • Released an interim report & final report to inform community: Evolving Academia/Industry Relations in Computing Research
Key Findings

• In certain areas of computing research, we observe **significant increases in the level of interaction between professors and companies**, often in the form of joint appointments.

• **Greater engagement has benefits** including greater access to data and compute resources, engineering talent, opportunity for impact, and the ability to shape corporate vision.

• Universities need to adapt to accommodate these changes and **avoid potential negative impact**, including on students, culture, and academic principles.

• **Follow-up is required** by an organization like the CRA so that:
  • Trends are measured and understood
  • Best practices are documented and shared between universities for greater leverage
  • Students and university administrators need to be aware of these changes and plan accordingly.
Key Findings

• Significant increase in faculty joint appointments
• Increased connections may have systemic positive and negative impacts
  • Benefits of enhanced collaborations
  • Impact on university culture and education
  • Impact on research agenda
  • Awareness of conflicts of interest
• Guidance is required to avoid the worst of the negative impacts
Increases in Faculty Joint Appointments

• More faculty are having joint appointments
• Arrangements include more time at companies:
  • 50/50- half time at company
  • 20/80 – 80% at company
  • Indefinite duration
    • Universities are developing new and novel arrangements as a result
• Industry engagement extends beyond faculty to graduate students
• Why?
  • Increased demand for talent
  • Access to data, compute, engineers – allow more ambitious research
  • Ability to have impact
  • Salary
Positive aspects of academia/industry engagement

• Potential to improve the research by informing it through deployment, real-world aspects
• Increased resources can lead to greater ambition, bigger impact
• Some research cannot be done without company participation
• Academics can have positive impact on corporate culture

• Our goal – preserve all the positive aspects while minimizing the negative ones
Institutional impact

• If a professor is 50/50, what 50% at university are they not doing?
• University culture
  • Impact on university/professional service, committees such as admission and hiring
  • Impact on mentoring, face time with students
• University education mission
  • How do universities adjust for 50/50 faculty?
    • How are teaching faculty affected?
  • Are graduate students also less likely to work as TAs?
  • How are undergraduates impacted?
    • Will undergrads will do research?
Research Agenda Impact

• The research agenda of both professors and the graduate students who work with them can be significantly influenced by the company

• Industry research
  • Can be shorter-term, more directly connected to products and profit potential
  • Can shift quickly based on market considerations, reducing support for agendas that required sustained investment

• Some aspects of research may not be published due to IP, competitive concerns
Conflict of Interest Considerations

• A 50/50 faculty has two equal affiliations: university and company
• As mentor/advisor, the faculty must act in the best interest of the student, especially because a power differential exists
• Students must have
  • A clear understanding what their obligations are to company, how they related to their degree
  • Clear options in case they believe their best interests are not being served
• Professors may need to more clearly identify their affiliations when reporting their work
Call to Action – New Opportunities

• Greater connection implies more influence:
  • Leverage greater engagement between academia and industry to bring principles of academia to bear on a wide range of important problems

• Encourage co-location and shared challenges:
  • Companies are already building labs co-located with universities
  • Competitions bring companies/universities together to work on shared, pre-competitive grand challenges (e.g., DARPA Autonomous Vehicle competitions)

• Require greater transparency
  • Disclosure of their affiliations is more important than ever
  • Reviewers need to understand conflict of interest, students need to understand IP restrictions
Faculty Agreement Guidelines

• Many different arrangements are already being made
  • From disallowing altogether to broad, open agreements
  • Experimentation is necessary to understand best practices, pitfalls

• Key elements
  • Protect students, ensure transparency of the commitment, and give them information needed to make good decisions
  • Ensure fairness across department (including impacts on teaching faculty)
  • For longer term arrangements (beyond 2-year limits, overall management plan for teaching, department service, etc. is important)
Steps Beyond the Interim Report

• Community feedback is a key goal (please send!)
• Expand data gathering
  • How extensive is the issue? By department, by research area, by geography?
  • Is this a long-term trend? What if it is not?
• Understand best practices of current faculty/student arrangements
  • Ensure arrangements avoid pitfalls related to IP, COI, etc.
• Document novel company approaches to deepening academic engagement
  • Lableets, joint research efforts, funded programs
Questions?

• Final report draft available (shared with CRA)

• Give us feedback!
  https://www.cccblog.org/2019/03/06/evolving-academia-industry-relations-in-computing-research-interim-report-released-by-the-ccc/

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