

Strategies for “Socially Distant” University-Company Collaborations

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ABSTRACT

In the early months of 2020, the COVID-19 pandemic abruptly transformed the way the world works and collaborates. With most work-related travel curtailed and many knowledge workers constrained to work-from-home, face-to-face interaction was replaced by a world of virtual communication and collaboration. In 2021, workflows continue to evolve for universities, corporations, and governments to support “socially distant” R&D, education, and organizational infrastructure. This paper reports on a ICSE 2021 workshop panel focused on how COVID-19 has inspired changes to university-company collaborations, for better or worse. The panel was organized and moderated by Steven Fraser (Innotec) with invited panelists Sheri Brodeur (MIT), Randy Katz (UC Berkeley), Xue [Steve] Liu (McGill), Stefanie Molthagen-Schnöring (HTW-Berlin), and Sheng-Ying [Aithne] Pao (NTHU Taiwan).

Categories and Subject Descriptors

K.4.3 [Organizational impacts]: Computer-supported collaborative work; D.2 [Software engineering]

General Terms

Management

Keywords

COVID-19, Digital transformation, Virtual collaboration, University-company partnerships

1. INNOVATION BY COLLABORATION

Collaborations incubate and spread new ideas. Both universities and companies use collaboration as a research strategy. University-company interactions connect researchers and practitioners – often catalyzing new technologies. For example, when companies host interns, students acquire industrial experience. Ideas often flow both ways: companies attend university symposiums to broaden understanding for new results, and company staff may hold adjunct or visiting scientist roles to inject industry experience into research programs. Conferences and other meetings create the serendipity of informal meetings and hallway conversations, which helps catalyze new connections. Collaborations create opportunities to connect to both people and funding. Companies want to sustain their talent pipelines, so they recruit university graduates that they meet in collaboration programs. University-based research projects benefit from a regular flow funding from governments and corporate. University spin-off startups benefit from the resources and market exposure derived from university-company partnerships. [1]

With the COVID-19 pandemic, many forms of face-to-face collaboration have become limited. Universities, companies, governments, and conferences have adapted to the new norms of social distancing. There have been some relatively innovative solutions to keep collaborations on track.

At the ICSE 2021 Conference, the Software Engineering Research and Industrial Practice (SER&IP) Workshop featured a discussion by a distinguished panel of experts in university-company collaborations. These panelists shared their experiences with “socially distant collaboration” and discussed several pandemic-inspired models. The panelists’ pre-panel positions were published [2] and the panel featured:

Sheng-Ying [Aithne] Pao, a professor at National Tsing Hua University in Taiwan, has built on her research experience in university (MIT, UC Berkeley) and industry. In her current faculty position in Taiwan, Aithne remains connected to the needs of industry: “I serve as the CEO of the Startup Garage in Tsing Hua, where we bring in different talents, investors, and researchers, from universities and also from industry.”

Sheri Brodeur is Director of Corporate Relations, in MIT’s Industrial Liaison Program. She interfaces with MIT’s industrial partners (250 companies), helping these companies meet their ongoing technology and education needs. Sheri also works to connect companies with MIT’s university research programs, and through the MIT Startup Exchange promotes collaboration and partnerships between MIT associated startups and industry.

Xue [Steve] Liu has two roles: professor in the School of Computer Science at McGill University and VP of R&D, Chief Scientist, and Co-Director of the Samsung AI Center Montreal. Steve’s research has been in AI, Machine Learning, Cyber-Physical Systems, IoT (Internet of Things), and Big Data and Cloud Computing. From 2016 to 2019 Steve served as the Chief Scientist of Tinder Inc. – one of the world’s largest dating and social discovery applications.

Randy Katz has been a professor of Computer Science at University of California-Berkeley since 1983 and serves as the Vice Chancellor for Research. Randy explained that UC Berkeley is involved in many collaborative research programs, which pre-pandemic would have hosted large annual or semi-annual face-to-face meetings.

Stefanie Molthagen-Schnöring is a Professor of Business Communication at the HTW University of Applied Sciences in Berlin, where she is currently Vice President for Research and Transfer. Her research focuses on communication at the interface of business, politics, and society. Stefanie was unable to attend the online panel due to unforeseen issues.

Steve Fraser chaired the panel. Steve (Innoxec) consults from his base in Silicon Valley (California) on strategies for tech transfer and company-university open innovation. Steve served as the Lead for HP’s Global University Program, Director of the Cisco Research Center, Senior Manager in Nortel’s Disruptive Technology Program, Senior Staff in Qualcomm’s Learning Center, and as a Visiting Scientist at CMU’s SEI.

Steve Fraser started the discussion with several questions about the current socially distant collaboration environment. He posed several questions to start the panel:

- How has the pandemic changed university collaboration?
- Have there been negative consequences, e.g., have collaborators withdrawn from relationships?
- How has the nature of relationships changed?

2. DISRUPTION: THE NEW NORMAL?

COVID-19 and social distancing have created anxiety, challenges, and opportunities for our collaborative relationships. The panelists were not sure whether the new collaboration approaches will be just a 16-month blip or a new normal.

Randy Katz gave an initial positive response to Steve Fraser's questions about virtual approaches to collaboration. Zoom meetings work for existing collaborations. Randy observed, "Maybe the ease of interactions has improved, because you can visit easily without travel, and that is a major plus in the world we are living in now." However, new collaborative relationships may require a hybrid combination of face-to-face and virtual to be successful. New collaborations will have "worked" when companies benefit. "We should watch whether companies see a return on their investment – on the funding they are providing [to universities and consortia] and the time and energy of their people who are engaging [in the remote meetings]."

Sheri Brodeur and Steve Liu agreed that a hybrid interaction model is likely to continue after the pandemic ends. Sheri explained that virtual meetings can be a plus for company staff. "Often, when I was on the industry side, it was hard to get to work together – people had their 'day jobs' and sometimes the research investment with a university was hard to keep in focus." Steve Liu saw that a hybrid approach was good; however, he valued a face-to-face session at the beginning of a collaborative relationship. "The good-old-ways of meeting at conferences and visiting different companies are especially good for starting new collaborations. Building trust [face-to-face] is much easier."

Aithne Pao added that face-to-face company collaboration in Taiwan had continued despite the onset of COVID-19. She reported, "Taiwan implemented a variety of policies to manage the spread of the virus. That enabled domestic collaboration as usual." Aithne witnessed Taiwan's situation as a haven for small startup companies. "This attracted a lot of talent from Silicon Valley to Taiwan, and that increased the number of industry-university collaborations [and] startups. A lot of countries were locked down, but Taiwan could still have [face-to-face] collaborations." The impact extended to universities and corporate research labs. She saw "more people applying for faculty positions compared to the past. We attracted more talent – more researchers, more innovators, and more entrepreneurs."

Randy came back to the issue of potential long-term impact: "Maybe the quality of the interactions before students graduate and choose their professional path is impacted by COVID-19. Let's also recognize that this is a 16-month 'blip' that we may be coming out of now. In the lifetime of a graduate student, who may be spending five or six years in their graduate program, it's a lot of time. It may be a

unique generation who has been affected by this.” And Randy reported that although the job interview process of new university graduates has been working fine via Zoom, the students have been missing out on many opportunities for industrial interactions during their student years.

Stefanie Molthagen-Schnöring was unable to attend the panel in real-time, but she contributed her observations after the panel session. She observed that virtual collaboration is also a valuable tool for short-distance collaboration. With the pandemic’s imposed social distancing, Stefanie met local colleagues online with greater ease given that her metropolitan area (Berlin) can necessitate lengthy commutes. She argued that our frenzy of virtual collaboration is not just a 16-month blip where we will return our former face-to-face interactions after the pandemic; instead, it’s the start of a future where we will continue to use and expand our COVID-19-era virtual meeting skills. Stefanie’s main point was that effective online collaboration makes it easier to grow personal networks. Of course, it’s more than just Zoom meetings. Stefanie warned that we must face the question of how sustainable the new connections will be and whether they will translate into “real” research projects.

3. EVOLUTION OF INTERNSHIPS

Internships and other opportunities for students to interact with companies are evolving. Steve Liu talked about the switch to online internships, with large enterprises and global companies. Many students stayed at their home institutions – or at home – for a summer internship. For some students, this shift to online has made the internship process easier, saving time and expense, e.g., finding a summer apartment.

Aithne, an alumna of MIT, mentioned the long-running MIT “externship” program which occurs in January during MIT’s Independent Activities Period (IAP). The program matches MIT students to MIT alumni around the world. She explained that Taiwan’s gold card visa program plus the MIT externship program has enabled talent from around the world to come to Taiwan.

Sheri described MIT’s “micro-internships” response to COVID-19 where student collaborations with industry that could be as short as two weeks. These are excellent opportunities to engage with industry on specific projects. Shorter, focused internships exposed students to a greater diversity of applications.

Steve Liu believed that better virtual tools will expand the world of collaboration. Originally, many favored short-distance collaboration: working with people primarily in the same city or region. However, with the combination of lockdowns and virtual technology, interactions with people in the same city, same country, or another continent have roughly the same “virtual distance.”

4. THE COST OF COLLABORATION?

Will companies continue to pay for expensive access to university programs and consortia? We are still not sure. Sheri observed a drop-off in corporate memberships at MIT. She blamed economic uncertainty: “The world situation was so unknown that there was a drop-off in membership.” But there are signs this was a short-term issue and funding levels are growing once again. “I think we did a fairly

good job of delivering services remotely... We learned a lot and we will not go back to the way we were.”

5. EDUCATING AND UPSKILLING

There are new models for corporate upskilling, since universities have become more effective at delivering remote education.

Steve Fraser remarked that: “When things are socially-distant, companies face the same challenges that students face: they can’t go in-person to campus, so they have to learn online. Perhaps panelists might relate their experiences with partnering with companies to deliver education on new technologies or to create more awareness of the skills they need to develop.”

Sheri offered MIT’s experience with continuing education programs. MIT was one of the founders of the edX Consortium, which offers a wide spectrum of online courses. The edX catalog has a significant number of offerings based on university courses, including many MIT courses. MIT has also created a “micro-masters” program: a subset of a master’s program where people can take the core courses either in-person or online in hot subject areas like Supply Chain and Data Science.

Randy believed that universities will continue to offer education via online courses – this is one side-effect of their teaching experiences during the pandemic. “We’ve been leveraging what everyone has been learning in universities about how to present things online. It has existed for a long time, but we have had a real crash course in it in the last 16 months.”

Steve Liu admitted that he often encourages his students to take online courses, especially in topics that his own university doesn’t cover and he encourages his students to attend conferences. Online conferences have expanded the opportunity: prior to the pandemic, each student would attend only one or two conferences due to funding constraints. However, with more conferences online and lower registration fees, conferences have become more accessible to everyone. Many conferences record paper presentations and keynotes, so Steve asks his students listen to those talks. “This is another way to lower the barrier.”

Aithne pointed out a potential problem with the increased reliance on online training – cultural barriers. She has learned to make an extra effort with Asian students. “I have learned that people from certain cultures tend to more reserved in class.” She commented that many Asians feel that it is “not a good behavior to talk too much, it’s better to be a good listener.” This compares with students in the United States, where students are very much encouraged to raise their hands, to ask questions, and to make comments. “This kind of cultural difference has an impact when we move courses online. How do we design the program to encourage more participation and to take those cultural differences into account?”

Aithne reported that she learned this cultural issue when she moved from industry to her current faculty position at National Tsing Hua University, and she found that it had a big impact on online courses. “When my courses here moved online, I tried to design my courses in a different way, to encourage my students to talk and ask questions, even in the online format.”

6. COLLABORATION FUNDING

Sheri discussed the potential impact of increased government funding for research – both for universities and companies. Sheri shared her experiences in this area from the time she worked for HP. She worked to set up university-company partnerships to apply for government research grants under ARPA-E, a research program sponsored by the US Department of Energy. She pointed out, “What is really attractive to industry is leveraged funding,” the ability to leverage government funding for company research.

Randy reported that the US government will be investing more in scientific research soon. The US Congress is considering a dramatic increase funding from the United States federal government, primarily focused on applied research and translation opportunities. The plan is for the National Science Foundation (NSF) to establish a new directorate focused on applied research. There is also the possibility of yet another “Advanced Research Products Agency” for areas like health. Randy explained “This would create a focused-product model with other societal challenges that need new solutions. I think industry will be a major partner with universities on how those things will go forward.”

Steve Liu was encouraged by government research funding in Canada and hoped that collaboration will increase. “I would add that Canada is doing quite well in government funding, especially supporting industry-academia collaborations. NSERC (Canada’s Natural Sciences and Engineering Research Council) funding opportunities require the Principal Investigators to have industrial collaborations.”

7. FACE-TO-FACE COLLABORATION

The personal touch is very elusive in a pandemic – faster networks and more powerful computers are not a substitute. Panelists described a need for face-to-face collaboration and serendipity to build trust among collaborators and to better develop talent. Every panelist touched on this issue:

Randy: “We have lost some things and gained some things. The personal touch and getting to know each other as people – which is so important for human capital development and the feedback and mentorship – we’ve lost some of the qualities of those things. But on the other hand, the barriers of time and distance have been reduced. We’ve been able to do a panel like this that spans the globe.”

Steve Liu: “Even though COVID-19 has been a big challenge for the whole world, let’s take it also as an opportunity. Online education, online collaboration, together with traditional physical collaboration are all mixed together. I think it’s the new way to go.”

Sheri: “I help coordinate a lot of research partnerships, and with this [virtual] format, we are getting together more often than with face-to-face interactions. Everyone’s comfort with this virtual format will help the partnerships be better.... The serendipity issue is important, I hear you loud and clear. But I think we can make it better by leveraging this hybrid model.”

Steve Fraser: “What I really miss is serendipity of hallway conversations. I had the experience of going on campus as a company partner and meeting students who were asking good questions or giving an interesting demonstration. It is difficult to see these things when you are not physically present. I met Aithne when she was a graduate student working on her master’s degree at the MIT Media Lab. I

happened to be walking through the hallway and I was interested to see what she was doing. Serendipity is something that is hard to reproduce in the virtual world.”

Aithne: “This personal interaction could never be replaced by technology and online tools, even though we have faster internet and more and more powerful computers. We as humans don’t want to be replaced by AI or machines.... It is important to have face-to-face interactions, and the environment and policies from the government have a significant impact on our future collaborations.”

8. SUMMARY AND THE FUTURE

At the conclusion of the session, each panelist summarized their experience on how the pandemic has directly affected university collaboration.

Randy Katz shared his thoughts about interactions have changed:

- Positive: virtual meetings have broadened participation
- Negative: the quality of the interactions is not as good as before
- Future: hybrid (mix of virtual and in-person) collaborations

There have been a few negative impacts of the socially distant model of collaboration, but universities and companies are doing their best not to be discouraged. Everyone has put in extra effort to make things work. Sheri Brodeur wasn’t worried about the future: “The shortage of talent is going to drive industry and universities to need each other more.”

Of course, the fidelity of relationships has suffered in the past 15 months. We all miss the face-to-face interactions that help build trust, and serendipity aids creativity and innovation. Aithne Pao pointed out that government policy (both public health measures and government attention to industry needs) will have a significant impact on our future collaborations.

Universities and companies continue to find new ways to collaborate. It is likely that some of the new pandemic-inspired collaboration modes will persist and flourish. There may be more hybrid conferences, more virtual talks sponsored by universities, and more opportunities for professors and students to collaborate with companies. For example, Steve Liu agreed that new “online internships” created unique opportunities for many students, opportunities that would have previously been impeded by travel limitations and visa issues.

Universities and companies will need to continually learn and adapt to technological and social changes resulting from socially distant collaborations. The “new ways of working” in companies and universities (such as an increase in work-from-home days) will likely continue to evolve parameters for future collaborations.

9. REFERENCES

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This paper appeared in the January 2022 issue of ACM SIGSOFT Software Engineering Notes (Vol. 47, No. 1, pp. 12-14, DOI: [10.1145/3502771.3502776](https://doi.org/10.1145/3502771.3502776))