
Technology Transfer of HCI Research Innovations: Challenges and Opportunities

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CHI'15 Extended Abstracts, April 18–23, 2015, Seoul, Republic of Korea.
ACM 978-1-4503-3146-3/15/04.
<http://dx.doi.org/10.1145/2702613.2724724>

Abstract

There has been a longstanding concern within HCI that even though we are accumulating great innovations in the field, we rarely see these innovations develop into products. Our panel brings together HCI researchers from academia and industry who have been directly involved in technology transfer of one or more HCI innovations. They will share their experiences around what it takes to transition an HCI innovation from the lab to the market, including issues around time commitment, funding, resources, and business expertise. More importantly, our panelists will discuss and debate the tensions that we (researchers) face in choosing design and evaluation methods that help us make an HCI research contribution versus what actually matters when we go to market.

Author Keywords

HCI tech-transfer; productization; research impact

ACM Classification Keywords

H.5.2. Information interfaces and presentation (e.g., HCI): User Interfaces (Evaluation/Methodology).

Introduction

Although there are many ways of assessing the impact of a research innovation, one mechanism is technology transfer or product transfer. There has been a

longstanding concern within HCI that even though we are accumulating great innovations in the field, we rarely see these innovations develop into successful products [4]. Is it simply because researchers lack the knowledge, resources, connections, experience, or time to pursue “tech transfer” in industry or commercialization through universities [5]? Or is that successful product transfer inherently is challenging because of market forces, customers, teams, and timing (and other factors)?

Despite the steady growth of HCI as a research discipline, surprisingly, the last formal panel discussion on the topic of technology transfer occurred at CHI in 1998 [4]. Given the pace of technological change, especially with web and mobile applications, there are new challenges and opportunities that today’s HCI researchers face in pursuing technology transfer. Although we can have informal discussions and debates with colleagues at HCI conferences, it is important for us to have a more formal venue to share our technology transfer experiences and lessons.

Our panel will bring together HCI researchers from academia and industry who have been directly involved in technology transfer in the last few years. They will share their experiences around what it takes to transition a user-centered innovation from the lab to the market, including issues around time commitment, funding and other resources, and business expertise. More importantly, our panelists will discuss and debate the tensions that we (researchers) face in choosing design and evaluation methods that help us make a strong HCI research contribution versus what actually matters when we go to market.

We are providing some key questions for initializing the debate on HCI technology transfer and we will also solicit additional questions from the larger community before the panel to make the discussion relevant for the audience at CHI.

Key Questions for HCI Technology Transfer

A key focus of this panel will be on themes from the first author’s paper on technology transfer that will be appearing in the CHI 2015 proceedings [1]. This paper provides one of the first in-depth accounts of how a user-centered research innovation (in this case, a novel web-based help system) transitioned to a commercial product by considering adoption-centered design issues. We decided it was necessary to discuss and debate some of the larger questions raised by our case study with other HCI experts who have had experience with technology transfer.

Who should pursue technology transfer?

Many researchers argue that technology transfer is *not* the only, or even the best, way to have research impact. In fact, many believe that we should focus on doing “good science” and advancing knowledge, leaving the job of commercialization to startups, open source projects, and other forms of applied, research and development in industry. But, at the same time, today’s universities and industry research labs increasingly face pressure to demonstrate research impact through transfer. Given these tensions, who should take lead on pursuing technology transfer?

What resources and skills are needed to pursue technology transfer?

Successful technology transfer depends on a number of factors, such as having the right resources, funding,

connections, prior experience, interest, time, and business and marketing skills [5]. If students, post-docs, faculty, or research scientists in industry labs take lead on pursuing technology transfer, what kind of a commitment do they have to make? How can they get access to tech transfer experts within their organization? How could they develop the needed skills? How can they obtain the necessary resources?

Which technology transfer path to pursue?

Even if a research team has the resources and skills to pursue technology transfer, finding the appropriate transfer path can be a challenge, particularly for university-based projects. For example, should researchers license their innovation to 3rd parties or pursue their own spin-off? Do they have access to a startup incubator or do they have to pursue the venture on their own? How do researchers know which path is appropriate for a given innovation? How can they understand the complex intellectual property issues associated with the different technology transfer paths?

Should we focus more on the adoption of our innovations for successful technology transfer?

In HCI technology research, we are not required (or encouraged) to consider the eventual adoption of a system or a technique as part of the research contribution. As researchers, we mostly focus on the novelty, feasibility, and the possibility of the innovation generalizing to a specific user population [3]. But, given the importance of these perspectives for understanding market forces and pursuing technology transfer [1], what would it take for us to consider adoption and stakeholder perspectives in HCI technology research? Should we turn to usability and design practice to borrow stakeholder-centric methods in research?

Do we need a discipline of HCI technology transfer?

Finally, are we ready for a new discipline for HCI technology transfer? For example, fields such as health sciences have applied a “bench-to-bedside” philosophy to the creation of the Translational Medicine discipline, which helps bridge the gap between basic and applied research. Given the pace at which the research output of HCI innovations is increasing, should we be thinking along the same lines for HCI technology transfer?

Participants

We have recruited 6 panelists from the HCI community who have had direct experience with technology transfer at a university or an industrial research lab. These panelists have worked on a broad range of projects, including novel design tools, mobile text entry and gestural interactions, visualization and healthcare tools, and information and communication technologies for community development (ICTD). Many of these innovations originally appeared at CHI, UIST, and other prominent HCI venues.

Parmit K. Chilana, University of Waterloo (moderator)

Parmit Chilana is an Assistant Professor in Management Sciences at the University of Waterloo. As an HCI researcher, she is passionate about inventing innovative solutions to help end users learn complex software and improve software design processes. She received her PhD in Information Science from the University of Washington.

For her dissertation, Parmit invented LemonAid, a novel crowdsourced contextual help approach for web applications. She also co-founded AnswerDash, a venture-funded startup company from Washington that is commercializing LemonAid's help approach for e-

commerce and SaaS applications on the web. Parmit has recently investigated LemonAid's journey to AnswerDash [1] and looked at the challenges of making the transition from user-centered design to adoption-centered design. She will be raising questions for the panelists based on her analysis and key themes from this case study.

Mary Czerwinski, Microsoft Research

Mary Czerwinski is a Research Manager of the Visualization and Interaction (VIBE) Research Group. Mary's research focuses primarily on emotion tracking, information worker task management, multitasking, and awareness systems for individuals and groups. She holds a Ph.D. in Cognitive Psychology from Indiana University in Bloomington. Mary was awarded the ACM SIGCHI Lifetime Service Award, was inducted into the CHI Academy, and became an ACM Distinguished Scientist in 2010.

More from Mary: The VIBE research group accomplishes tech transfer via multiple paths. While it is always nice to get our code into a product directly, often times it is easier to launch an application in the various OS app stores. This has been an increasingly likely transfer route for us. For instance, all of our interventions for health and well-being are now incorporated into a phone app for Windows, Android and iOS phones. Many of our group's visualizations have been shipped via the Apps for Office store, as a product from Microsoft Research. While we do still try to get visualizations and interventions added to already existing products, having the app store route frees us up to ship at our own pace, and target specific end user populations that we care about for our research.

Tovi Grossman, Autodesk Research

Tovi Grossman is a Senior Principal Research Scientist within the User Interfaces Group at Autodesk Research, Canada. His research focuses on understanding and improving software learnability in complex end-user applications and the design of input and interaction for new forms of media and technology. Tovi received his Ph.D. in HCI from the University of Toronto.

More from Tovi: My role at Autodesk Research is to discover and investigate new research innovations, and to also pursue potential ways in which these innovations can impact existing products or give rise to completely new products and services. One of the first research projects that I led was the development of ToolClips, which embed video assistance within traditional tooltips. This work was published at CHI 2010, and can now be found within Autodesk's flagship products, such as AutoCAD, Revit and 3DSMax. My follow-up research on the Chronicle interactive tutorial system, which was published at UIST 2010, has now been released as an official service, branded as Autodesk Screencast. Working within a large software organization has allowed me to obtain a new understanding of the issues surrounding transferring innovative research technologies into working, real-world products. Through these technology transfer experiences, I have learned important lessons and strategies on how to navigate a large organization, build support for a new innovation, and realize a successful transfer of the technology into a product.

Chris Harrison, Carnegie Mellon University

Chris Harrison is an Assistant Professor of Human-Computer Interaction at Carnegie Mellon University, directing the Future Interfaces Group. His research group creates novel sensing and interface technologies

that foster powerful and natural interactions between humans and computers. This research often lies in emerging use modalities, such as wearable computing, touch interfaces and gestural interaction.

More from Chris: In 2009, Julia Schwarz and I started work on FingerSense, a technology that allows touchscreens to not only to know where a user is touching, but also how – for example, with the fingertip, knuckle, nail or stylus – which could be used to trigger more advanced interactive functionality. We submitted the research to UIST 2010, but it was rejected; a revised submission to CHI 2011 was also rejected. However, we really believed in the idea — its utility and simplicity — and so we substantially retooled the paper and it was finally accepted to UIST 2011. Shortly after, we crossed paths with Sang Won Lee, who shared our enthusiasm and vision for the technology's potential. Together, we co-founded Qeexo, and by the start of 2015, we had expanded to 11 employees with offices in Pittsburgh, PA and San Jose, CA. We've found the industry to be highly receptive to our technology, but also deeply conservative with respect to altering the user experience of their shipping products.

Ranjitha Kumar, University of Illinois (UIUC)

Ranjitha Kumar is an Assistant Professor in the Department of Computer Science at the University of Illinois at Urbana-Champaign, and the Chief Scientist at Apropose, Inc., a data-driven design company she founded in 2013, now backed by Andreessen Horowitz and New Enterprise Associates. Her research has received best paper awards and nominations at premiere conferences in HCI, and been recognized by the machine learning community through invited

papers at IJCAI and ICML. She received her PhD from the Computer Science Department at Stanford University in 2014.

Tapan Parikh, University of California-Berkeley

Tapan Parikh is an Associate Professor at the UC Berkeley School of Information, where his work focuses on HCI, mobile computing and the design of information and communication technologies for community development (ICTD).

More from Tapan: One of the hallmarks of ICTD research is building and testing real systems with field partners, at which point students are already thinking about commercialization and sustainability. My students have been no exception - with several of them pursuing their own startups. My students and I have been involved in some capacity with seven startups - Endaga, Acopio, LeadGenius, Awaaz.De, Captricity, NextDrop and Ekgaon. Many of these projects were developed in a Social Entrepreneurship course that I teach at UC Berkeley, which applies user-centered design methods to develop sustainable business enterprises. I will talk about some of the challenges in this work - including balancing a long-term research vision with real world impact, as well as the needs and aspirations of users (many of them coming from poor communities), with the demands of investors and the need for financial sustainability.

Shumin Zhai, Google

Shumin Zhai is an HCI research scientist interested in both foundational issues of user interfaces and practical innovations. He joined Google in Mountain View California in January 2011. Previously he worked at the IBM Almaden Research Center in San Jose California for 15 years. He originated and led the SHARK/

ShapeWriter project that pioneered the touch screen gesture typing paradigm. He is active in the HCI academic community and is currently the Editor-in-Chief of ACM Transactions on Computer-Human Interaction. He has been a visiting professor and lectured at universities in the US, Europe and China. He is a Fellow of the ACM and a Member of the CHI Academy.

Panel Format

Before the panel

We will publicize the panel in advance of the CHI conference through social media platforms, such as Twitter and Facebook and create an anonymous survey. The goal will be to solicit questions from the HCI community about aspirations and concerns that professors, students, industry researchers, managers, and others have around tech transfer and would like to see discussed during the panel.

During the panel (80 min)

- (a) Brief overview of the panel's goal and format by moderator. (~2 min)
- (b) Quick introduction of each panelist. (~5-8 minutes)
- (c) Each panelist will talk about their technology transfer involvement. (~10-12 minutes)
- (d) The moderator will pose 4-5 key questions related to tech transfer challenges and opportunities (and any additional questions solicited from the community

prior to the panel). Panelists will state their position and provide argument. (~30 min)

- (e) Floor will be opened up for audience questions and additional discussion. (~30 min).

Acknowledgements

We thank Andrew J. Ko and Jacob O. Wobbrock for their feedback and helpful discussions.

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