

PROMOTION RECOMMENDATION
The University of Michigan
School of Information

Kentaro Toyama, associate professor of information, with tenure, School of Information, is recommended for promotion to professor of information, with tenure, School of Information.

Academic Degrees:

Ph.D.	1998	Yale University, New Haven, CT
A.B.	1991	Harvard University, Cambridge, MA

Professional Record:

2015 – present	W. K. Kellogg Associate Professor, with tenure, School of Information, University of Michigan
2017	Curator, Educate Pavilion, Expo on Design, Innovation and Technology
2010 – 2014	Professional Researcher, School of Information, UC Berkeley
2011–2014	Consultant and Advisor, Bill & Melinda Gates Foundation
2011–present	Founder and Non-Profit Consultant, ICT Development Strategies
2010–2011	Principal Investigator, Design Revolution, Palo Alto
2004–2009	Co-Founder/Assistant Managing Director, Microsoft Research India Principal Researcher, Microsoft Corporation (Bangalore, India)
2005-2009	Visiting Scientist, Indian Institute of Science (Bangalore, India)
1997-2004	Researcher, Microsoft Research (Redmond, WA)
2002	Visiting Lecturer, Ashesi University (Accra, Ghana)
2000	Researcher, Microsoft Research Cambridge (Cambridge, UK)

Summary of Evaluation:

Teaching: Professor Toyama has earned high marks from student evaluations as an instructor in courses at the undergraduate, master's, and Ph.D. levels. He has taught three different courses at the School of Information (UMSI). These are SI 430: Information and Global Society (twice), SI 501: Contextual Inquiry (four times), and a doctoral seminar SI 710: Philosophical Approaches to ICT and Social Change (once). His teaching evaluations for all of these courses have been exceptional, even in Contextual Inquiry, a required course for all UMSI master's students. In fact, he MOOC he designed, "Understanding User Needs," as part of the UX (User Experience) Research and Design MicroMasters on EdX, is based on Contextual Inquiry. Diversity, equity and inclusion are important values and learning objectives for Professor Toyama. For example, one of his learning objectives in Information and Global Society is to "go beyond opening students' eyes to the range of cultures across the world (as manifested in different ways societies use technology." Understanding the values of different cultures and groups is a hallmark of his teaching, mentoring, and current research.

Professor Toyama's describes his approach to mentoring as a delicate balance between listening for students' own aspirations and applying his experience to help students achieve their goals. He has a long track record of mentoring. Prior to joining the faculty at UMSI, Professor Toyama had extensive experience with student advising and mentoring at Microsoft Research India, including approximately twenty-five undergraduate student interns and twelve Master's students engaged in research and publication. He also directly supervised over a dozen post-doctoral researchers and mentored sixteen Ph.D. students at Microsoft Research India. At UMSI, Professor Toyama is the principal advisor for five Ph.D. students ranging from their second to fifth years in our program. He has advised one master's thesis, one undergraduate honors thesis, and two undergraduate independent studies.

Research: Professor Toyama has had two distinct research agendas and has made an impact in each over the course of his scholarly career. His first contribution was in the field of computer vision, a subfield of artificial intelligence devoted to creating machines that can recognize images (e.g., face detection algorithms for security applications, automated video-editing software for home movies, etc.). In this research, he combined theory and techniques from human-computer interaction (HCI), machine learning, multimedia development, and geographic information systems to develop state of the art image recognition software. His findings with the greatest impact were presented in the article, “Probabilistic Tracking with Exemplars in a Metric Space” in the *Proceedings of the International Conference on Computer Vision*, which won the David Marr Prize, one of the top awards in computer vision given by the International Conference on Computer Vision. Professor Toyama’s findings in this paper were used in Microsoft’s popular Kinect system which featured motion sensing input devices that allowed users to interact with their computers without a game controller through gestures and spoken commands.

Professor Toyama’s stature as a researcher at Microsoft gave him the opportunity to co-found and co-lead Microsoft Research India. It was there, working with an interdisciplinary team of computer scientists, engineers, designers, anthropologists, sociologists, and economists that his research focus changed as he experienced how difficult it was to design and deploy technologies that made a positive impact in the Global South. As a result, Professor Toyama’s research shifted from a focus on the technical aspects of designing and building systems to the social adoption of those systems. He also became more conscious of introducing systems in a way that improved people’s lives. One example of this is Professor Toyama’s leadership on the Digital Green research project. The problem he and his team were trying to address was access to current agricultural information and local information about best practices among small farmers in India. The solution devised was to create and disseminate the information in video form. Today, Digital Green has a ten million dollar operating budget and works in twelve developing countries around the globe. Professor Toyama is a co-founder and still serves as a board member.

The impact of Professor Toyama’s intellectual transformation has been huge. In addition to projects such as Digital Green, he helped to found the field of information communication technology for development (ICTD or ICT4D), including establishing a conference and a journal bearing that name. In his own research, Professor Toyama sought out theories to explain the problems he was encountering with technological adoption in developing countries. He identified and adapted amplification theory. Amplification theory challenges socio-technical theories that do not make precise the distinctions between people and technology. Technology may amplify intentions of its creators, but indiscriminate dissemination can cause technology to fail and amplify social inequities. In practice, technology often amplifies the advantages of the privileged. His book on this subject, *Geek Heresy: Rescuing Social Change from the Cult of Technology*, has won multiple awards including the 2016 American Publishers PROSE Award. Several of the external letter writers also mentioned that this work had been highly influential and pushed them to rethink aspects of socio-technical theory.

Amplification is now widely known within the Information and Communication Technologies and Development (ICTD) research community, and was cited in roughly a quarter of the papers in the last three ICTD conferences. Professor Toyama has presented the theory to broader audiences, such as the Computing Research Association’s Snowbird Conference of North American chairs of computer science, and the Association of American Colleges and Universities, a university consortium. The book has influenced technologists interested in social change and social-change practitioners who use technology. Technology companies, such as Facebook, Google, and Microsoft and international development organizations, such as the Gates Foundation, the United States Agency for International Development (USAID), and the World Bank have invited Professor Toyama to speak. Microsoft CEO Satya Nadella (*Seattle Times* 2 May 2016) and World Bank’s *World Development Report 2016: Digital Dividends* (p. 168) both cited *Geek Heresy* as an important statement on the limits of technological impact.

Professor Toyama is continuing his research on amplification theory by testing hypotheses from *Geek Heresy*. For example, he is working with other UMSI faculty, the non-profit Eastside Community Network, and residents of Detroit's Eastside to start a neighborhood tour business to help local participants publicize the history of their community and offer profit-making tours. Professor Toyama is also building quantitative evidence for amplification. His earlier study of mobile interfaces shows that people with less formal education struggle more with hierarchical menus. With economists from California Polytechnic State University, Notre Dame, and Yale, Professor Toyama is completing a randomized, controlled trial of Digital Green video teaching aids. This interdisciplinarity is a hallmark of his research.

Professor Toyama has published one book, 19 papers in refereed journals, 85 papers in refereed conferences, and 44 patents. His publications have appeared in top venues, including Association for Computing Machinery (ACM) *Transactions on Computer-Human Interaction*, Institute of Electrical and Electronics Engineers (IEEE), *Transactions on Pattern Analysis and Machine Intelligence*, and the *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI)*. He works in a field where papers in top refereed conferences are as important as publications in top refereed journals. Since he came to UMSI, he has given 12 invited talks, primarily keynote addresses, and has received over \$1.2 million in extramural funding from the National Science Foundation and private foundations. Six of Professor Toyama's publications, including the book, have been completed since he came to UMSI, and he has other work in the pipeline. His research impact and productivity are high.

Recent and Significant Publications:

Toyama, K. (2015). *Geek Heresy: Rescuing Social Change from the Cult of Technology*. New York: PublicAffairs.

Toyama, K. (2017). From needs to aspirations in information technology for development. *Journal of Information Technologies and Development*, 1-22.

Rifat, M. R.; J. Chen; K. Toyama. (2017). Money, God, and SMS: Using religious SMSs to influence donation behavior in a Bangladeshi mosque. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '17)*. ACM, New York, NY, USA, 5941-5953.

O'Neill, J., K. Toyama, J. Chen, B. Tate, A. Siddiqui. (2016). The Increasing Sophistication of Mobile Media Sharing in Bangalore. In *Proceedings of the International Conference on Information Technology and Communication and Development (ICTD '16)*. ACM, New York, NY, USA, Article 17, 11 pages.

Service: Professor Toyama has an impressive record of service to UMSI, the University of Michigan, and the Information and Communications Technologies and Development (ICTD) community. Within the School of Information, Professor Toyama has been the vice-chair and is now the chair of the Master of Science in Information (MSI) Program Committee where he has played an important role in the revision and implementation of the new MSI curriculum. He worked diligently on the human computer interaction (HCI) faculty search committee in 2015-2016, which achieved outstanding results. Perhaps most importantly, Professor Toyama has worked with other faculty to energize and organize the ICTD research community in the school. Further, he has taken on other responsibilities appropriate to his very visible and respected status in the school, such as election to the Dean's Advisory Committee and appointment by the Provost to the Dean Search Advisory Committee.

At the level of the University of Michigan, Professor Toyama serves on the Academic Affairs Advisory Committee and is currently its chair. He is on the Faculty Advisory Committee for the Office of Diversity, Equity and Inclusion and has led a process to generate a consensus on a faculty statement on the emergence of discriminatory and racist statements at UM. Professor Toyama has also led and supported several other University-wide activities, including the Science and Technology Studies Colloquium, the Center for Socially Engaged Design, and served as the UMSI representative on the

Council on Global Engagement (2015-2016). In terms of external service, Professor Toyama has been active in the computer vision, human-computer interaction (HCI) and ICTD fields. In computer vision and HCI he has served on program committees for major conferences and the editorial boards of top journals in those fields. He remains active in those venues serving as the co-editor-in-chief (2012-present) of the *Information Technologies and International Development* journal and active as a program chair and on the steering committee for the International Conference on Information and Communication Technology and Development (2005-present).

External Reviewers:

Reviewer A: “Professor Toyama is both a thought leader and an actual leader. His research has helped shape the emerging discipline of ICTD, and his singular leadership has helped give that discipline a voice among a broad community of scholars.”

Reviewer B: “...[Professor] Toyama’s work has been more effective at causing me to pause and say ‘Wow, I haven’t thought of that!’ than the work of essentially any other researcher in my field.”

Reviewer C: “... [Professor] Toyama is much more than a prolific researcher, educator, mentor, fundraiser and speaker. He is a visionary, a true thought leader, and a mover and shaker. I recommend his promotion to the rank of full professor in the strongest of terms.”

Reviewer D: “...[Professor] Toyama’s scholarly achievements, the external support he has garnered for his research, and his strong service and outreach record would make him a strong candidate for promotion to professor at any leading institution here and abroad.”

Reviewer E: “The School of Information is an excellent setting for his work, with its interdisciplinary focus and depth. I cannot imagine anyone better suited to be a senior Professor in your School, and strongly support his promotion.”

Summary of Recommendation

Professor Toyama’s accomplishments in the areas of teaching, research, and service meet and exceed the promotion requirements to achieve the rank of professor. Therefore, with the overwhelming support of the promotion and tenure committee of the School of Information, I enthusiastically recommend Kentaro Toyama for promotion to professor of information, with tenure, School of Information.



Thomas A. Finholt
Dean, School of Information

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