

---

# Computing Technology in International Development: Who, What, Where, When, Why and How?

**Matthew Kam**

Carnegie Mellon University  
5000 Forbes Avenue  
Pittsburgh, PA 15213 USA  
mattkam@cs.cmu.edu

**Susan Dray**

Dray & Associates, Inc.  
2007 Kenwood Parkway  
Minneapolis, MN 55405 USA  
susan.dray@dray.com

**Kentaro Toyama**

Microsoft Research India  
"Scientia" – 196/36 2<sup>nd</sup> Main  
Sadashivnagar, Bangalore 560080  
India  
kentoy@microsoft.com

**Gary Marsden**

University of Cape Town  
Rondebosch 7701  
Cape Town, South Africa  
gaz@cs.uct.ac.za

**Tapan Parikh**

University of California, Berkeley  
102 South Hall  
Berkeley, CA 94720, USA  
parikh@ischool.berkeley.edu

**Ed Cutrell**

Microsoft Research India  
"Scientia" – 196/36 2<sup>nd</sup> Main  
Sadashivnagar, Bangalore 560080  
India  
cutrell@microsoft.com

**Abstract**

Building on the successes of prior workshops at CHI and other HCI conferences on computing in international development, we propose a panel to engage with the broader CHI community. Topics to be discussed include why international development is important to HCI as a discipline, and how CHI researchers and practitioners who are not already involved in international development can contribute.

**Keywords**

Developing world, Economic development, HCI4D, ICT4D, ICTD, International development

**ACM Classification Keywords**

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

**General Terms**

Human Factors, Economics

**Introduction**

Designing and evaluating affordable technologies appropriate for local communities in underdeveloped regions is one way in which we can lend our

---

Copyright is held by the author/owner(s).

CHI 2010, April 10–15, 2010, Atlanta, Georgia, USA.

ACM 978-1-60558-930-5/10/04.

professional knowledge as HCI academics and practitioners to improve lives in the least privileged parts of the world. Systematizing this body of knowledge is one way to ensure that future projects can learn from past efforts. In recent decades, this interest to make a difference using our computing backgrounds has led to the growth of various communities such as HCI4D (Human-Computer Interaction for Development) [8] and the broader ICT4D (Information and Communication Technology for Development) [7].

Indeed, since the first presentation in this area at CHI in 1997 by Grisedale et al. [6], we have witnessed increasing submissions in this topic to HCI publication venues, as well as a proliferation of workshops in HCI and other computing conferences [1] [2] [3] [4][5], [9] [10]. These developments have helped to coalesce a small community in CHI that is passionate about making computing a positive force for economic development.

A crucial step in expanding this group is to engage with the broader CHI community. The proposed panel is therefore timely for promoting such a dialogue around foundational issues, which broadly, are about topics such as (i) why HCI4D/ICT4D is important to CHI and HCI as a discipline, and (ii) how CHI researchers and practitioners who are not already involved in ICT4D may contribute.

### Topics

The topics that fall under the above issues include:

- Would HCI be incomplete without HCI4D? What makes HCI4D unique in the context of CHI? For

example, does HCI4D typify “extreme HCI” in which existing HCI methods and techniques that originated in Western societies break down when applied in highly challenging developmental contexts? Are the lessons from HCI4D applicable to the broader HCI community?

- What is the value that HCI brings to ICT4D? What are some of the challenges associated with HCI in ICT4D?
- One of the consistent constraints in international development is financial, but it is relatively rare for the CHI community to consider the financial constraints of technology. Is this consideration something that distinguishes the HCI4D community? Is it possible to do good HCI4D work that ignores financial constraints? What can the rest of the CHI community learn from this “cost realism”?
- Are HCI issues the critical problems to solve in ICT4D projects for them to be successful? Can good HCI claim any successes in ICT4D so far?
- How can we encourage and support the development of HCI and HCI4D capacity in areas of the world (including in the so-called “developing” world) which are currently under-represented in the larger HCI/HCI4D communities?

### Confirmed Panelists

**Ed Cutrell** manages the Technology for Emerging Markets (TEM) group at Microsoft Research India. The TEM group works to address the needs and aspirations of people in emerging-market countries, ranging from

those who are already consuming computing technologies and services to those for whom access to computing technologies remains largely out of reach. Trained in cognitive neuroscience, Ed has spent the last 10 years working in the field of HCI, working on a broad range of topics including input technologies, visual perception, information interaction (e.g., searching and browsing), and intelligent notifications and disruptions. With the move to Bangalore, he's excited to focus on technologies for millions of people who have been largely ignored by HCI, but who may have much to gain from the use of IT.

**Susan Dray** (moderator) heads Dray & Associates, Inc. and has worked as a leader in the field of HCI since its infancy 30 years ago. She has taught, presented, and consulted on every continent except Antarctica, and has published widely as well. She also has done many user research projects aimed at developing appropriate technology for the so-called "developing world" and has helped to build the HCI4D professional community. She has a doctorate in Psychology from UCLA and is a Board-Certified User Experience Professional (CUXP). In 2009, Susan was named an ACM Distinguished Engineer.

**Matthew Kam** is an Assistant Professor in the HCI Institute at Carnegie Mellon University. His Ph.D. dissertation was the first research project to investigate how e-learning games on cell phones can be designed to extend literacy and second language learning among children living in rural areas and the urban slums in the developing world. It is currently being scaled-up in India, with early replication underway in Africa and China. With a fellowship from the United Nations and University of California, Berkeley, Matthew participated

as a third-party evaluator of a microfinance transaction technology in Uganda spearheaded by Hewlett-Packard. Matthew earned all his degrees at the University of California, Berkeley: Ph.D. in Computer Science with a minor in Education, B.S. in Electrical Engineering and Computer Sciences, and B.A. in Economics.

**Wendy A. Kellogg** manages the Social Computing Group (SCG) at IBM's T. J. Watson Research Center focusing on research in social computing, including mobile social computing for the "next billion" users, and "green IT." SCG began working in the ICT4D domain in late 2008; current work in this area includes collaborations with IBM's India Research Lab's Spoken Web team, Georgia Tech's work addressing homeless users and their case workers, and projects with NGO and university partners in Africa. Originally trained in Cognitive Psychology, Wendy has served on the National Academy of Science's Computer Science and Telecommunications Board, is an ACM Fellow, and a member of the CHI and IBM Academies.

**Gary Marsden** is Professor of Computer Science at the University of Cape Town in South Africa. He is the head of the ICT4D Research Centre and director of the Hasso Plattner Institute Research School in ICT4D. His research areas cover mobile interaction design and the use of mobile technology for development in Africa. In 2007 he was awarded the ACM SIGCHI Social Impact Award for his work in these fields.

**Tapan Parikh** is an Assistant Professor at the School of Information at the University of California, Berkeley. For the past ten years, Tapan has been designing, developing and deploying information systems in the rural developing world - initially in India, and now also

in Latin America and Africa. Tapan's dissertation project, CAM, was the first integrated mobile phone framework for rural data collection, specifically adapted for device, user and infrastructure constraints. While in India, Tapan co-founded ekgaon technologies, a management and technology company serving rural communities. He holds a Sc.B. in Molecular Modeling with Honors from Brown University, and M.S. and Ph.D. degrees in Computer Science from the University of Washington, where he won the William Chan award for best Ph.D. dissertation. Tapan was also named Technology Review magazine's Humanitarian of the Year in 2007, for his work bringing accessible mobile data services to microfinance groups in rural India.

**Kentaro Toyama** is co-founder and assistant managing director of Microsoft Research India, in Bangalore, where he supports the lab's daily operation and contributes to strategy and overall management. He also leads the "Technology for Emerging Markets" group, which conducts multidisciplinary research to identify applications of computing and electronic technology for socio-economic development. In 2006, he co-founded the IEEE/ACM International Conference on Information and Communication Technologies and Development (ICTD), as a global platform for rigorous scholarship in this area. Prior to his work in India, Kentaro did research in computer vision, multimedia, and digital graphics and taught mathematics at Ashesi University in Ghana. Kentaro graduated with a PhD in computer science from Yale and a Bachelors in physics from Harvard.

### Acknowledgements

We thank Andy Dearden for his input.

### References

- [1] Aykin, N., Chavan, A.L., Dray, S., and Prabhu, G. Global Innovation Design. Panel at *Human-Computer Interaction International*. Beijing, PRC, August 2008.
- [2] Best, M., Dearden, A., Dray, S., Light, A., Thomas, J., Aykin, N., Buckhalter, C., Chetty, M., Kam, M., Krishnan, G., Maunder, A., and Sambasivan, N. HCI for Community and International Development. Workshop at *CHI 2008*, Florence, Italy, April 2008.
- [3] Best, M., Dearden, A.M., Dray, S.M., Light, A., Thomas, J.C., Buckhalter, C., Greenblatt, D., Krishnan, S., and Sambasivan, N. Sharing Perspectives on Community-Centered Design and International Development. In *Proc. of INTERACT 2007*.
- [4] Dearden, A., Best, M., Dray, S., Light, A., and Thomas, J. User Centered Design and International Development. Workshop at *CHI 2007*, San Jose, CA, April 2007.
- [5] Dearden, A.M., Dunckley, L., Best, M., Dray, S.M., Light, A., and Thomas, J.C. Socially Responsible Design in the Context of International Development. In *Proc. of INTERACT 2007*.
- [6] Grisedale, S., Graves, M., and Grunsteidl, A. Designing a graphical user interface for healthcare workers in rural India. In *Proc. CHI 1997*, ACM Press (1997), 471-478.
- [7] Heeks, R. *The ICT4D 2.0 Manifesto: Where Next for ICTs and International Development?* Development Informatics Working Paper Series, Paper No. 42, Development Informatics Group, Institute for Development Policy and Practice, University of Manchester, UK, 2009.
- [8] Ho, M., Smyth, T., Kam, M., and Dearden, A. Human-Computer Interaction for Development: The Past, Present and Future. To appear in *Information Technology and International Development*, Vol. 5, No. 4.
- [9] Light, A., Dray, S., Kam, M., Kodagoda, N., Ho, M., Sambasivan, N., and Thomas, J.C. Human-centered Computing in International Development. Workshop at *CHI 2009*, Boston, MA, April 2009.
- [10] Thomas, J., Dearden, A., Best, M., Winschiers, H., Dray, S., Aykin, N., Chetty, M., Kam, M., and Maunder, A. Building an International Community: Designing Interactive Systems for/with Communities in the Developing World. Workshop at *DIS 2008*, Cape Town, South Africa, February 2008.