

# Kurtis Heimerl

528 CSE  
University of Washington,  
Seattle, WA 98115

+1 (206) 659-5878  
[kheimerl@cs.washington.edu](mailto:kheimerl@cs.washington.edu)  
<http://kurti.sh>

## Interests

My research focuses on community-based systems across computer networks, international development, and crowdsourcing.

## Academic

<b>University of Washington</b> Assistant Professor Computer Networks and ICTD	2016
<b>University of California, Berkeley</b> Postdoctoral Researcher Advisors: Eric Brewer and Tapan Parikh	2014
<b>University of California, Berkeley</b> Doctor of Philosophy, Computer Science Thesis: <i>Community Cellular Networks</i> Advisors: Eric Brewer and Tapan Parikh	2013
<b>University of California, Berkeley</b> Master of Science, Computer Science Thesis: <i>Metamouse: Improving Sharing of Existing Educational Applications</i>	2009
<b>University of Washington</b> Bachelor of Science, Computer Engineering (Magna Cum Laude)	2007

## Current Research

### Community Cellular Networks

Investigating small-scale, locally owned cellular networks. Developed extensions to OpenBTS and OpenAirInterface to enable more local content in network. Conducted longitudinal deployment of both technologies in rural Papua, Indonesia and Aurora, Philippines. Demonstrated sustainability of locally-owned cellular in Papuan context, as well as value to local community. Study and deployments ongoing.

### Crowdsourced Repair

Exploring mechanisms for engaging local lay repair talent in the installation and ongoing repair of rural infrastructure. Existing studies have shown the capacity and interest, but barriers exist.

### Digital Financial Services

As part of a grant from the Gates foundation, we have begun a number of studies focused on improving access to financial services among the underbanked. My focus has been on the security and efficacy of Internet-like services such as the Interledger Protocol.

### Cellular Security

Inquiries around cellular security such as IMSI catcher defenses and ThinSIM attacks. Specific focus on attacks against financial services such as mobile money.

## Awards

<a href="#">UW College of Engineering "Early Career" Diamond Award</a>	2018
<a href="#">MIT Technology Review "35 under 35"</a>	2014
Best Paper at DySPAN 2014: GSM Whitespaces: An Opportunity for Rural Cellular Service	2014
Community Award at NSDI 2013: Expanding Rural Cellular Networks with Virtual Coverage	2013
Best Paper at CHI 2012: Communitysourcing: Engaging Local Crowds to Perform Expert Work Via Physical Kiosks	2012
NSF Graduate Research Fellowship	2008
NSF Graduate Research Fellowship (Honorable Mention)	2007
Bob Bandes Memorial Teaching Award (Honorable Mention)	2005

## Selected Press

<a href="#">Facebook Hires Founders Of Cellular-Network-In-A-Box Company Endaga</a> Tech Crunch	2015
<a href="#">Endaga Brings Rural Villages Online With a Cell Network in a Box</a> Re/code	2014
<a href="#">Kurtis Heimerl: 35 Innovators under 35</a> MIT Technology Review	2014
<a href="#">New Eavesdropping Equipment Sucks All Data Off Your Phone</a> Newsweek	2014
<a href="#">Cellular's Open Source Future is Latched to Tallest Tree in the Village</a> Ars Technica	2014
<a href="#">Powered by the Sun, Telcos Open up Cellphone's Final Frontier</a> Reuters	2012

## Industry Experience

<b>Facebook</b> Endaga team and IP joined Facebook to continue their rural access initiatives.	<b>Menlo Park, CA 2015-Present</b>
<b>Endaga, Inc</b> Founder/CEO, focused on developing simple cellular networks that can be operated by anyone. Raised 1.2M seed round from investors such as Mitch Kapor, Jeff Hammerbacher, and Sanjit Biswas. Joined Facebook August 2015.	<b>Oakland, CA 2014-2015</b>
<b>Range Networks</b> Community Manager/Developer for open-source OpenBTS release.	<b>San Francisco, CA 2011-2014</b>
<b>Microsoft Research India</b> Intern assisting with SMS and voice technologies for the Digital Study Hall distance learning project.	<b>Bangalore, India 2007</b>
<b>Google.com</b> Intern developing additions to the Hadoop map-reduce framework.	<b>Mountain View, CA 2007</b>
<b>Amazon.com</b> Intern creating scalable, secure, and extensible service-oriented architecture components.	<b>Seattle, WA 2005,2006</b>

## Peer-reviewed Conference or Journal Publications

<b>ThinSIM-based Attacks on Mobile Money Systems</b> Rowan Phipps, Shirang Mare, Peter Ney, Jennifer Rose Webster, <b>Kurtis Heimerl</b> . <i>First ACM conference on Computing &amp; Sustainable Societies (COMPASS)</i> 2018
<b>Crowdsourcing Rural Network Maintenance and Repair via Network Messaging</b> Esther Jang, Mary Claire Barela, Matt Johnson, Philip Martinez, Cedric Festin, Maragaret Lynn, Josephine Dionisio, <b>Kurtis Heimerl</b> . <i>ACM SIGCHI Conference on Human Factors in Computing Systems (CHI)</i> 2018
<b>An Investigation of Phone Upgrades in Remote Community Cellular Networks</b> Kushal Shah, Philip Martinez, Emre Tepedelenioglu, Shaddi Hasan, Cedric Angelo Festin, Joshua Blumenstock, Jo Dionisio, <b>Kurtis Heimerl</b> . <i>International Conference on Information and Communication Technologies and Development (ICTD)</i> 2017
<b>Towards Building a Community Cellular Network in the Philippines: Initial Site Survey Observations</b> Mary Claire Barela, Mae Sincere Blanco, Philip Martinez, Miguel Carlo Purisima, <b>Kurtis Heimerl</b> , Matthew Podolsky, Eric Brewer, Cedric Angelo Festin. <i>International Conference on Information and Communication Technologies and Development (ICTD)</i> 2016
<b>A Longitudinal Study of Local, Sustainable, Small-Scale Cellular Networks</b> <b>Kurtis Heimerl</b> , Shaddi Hasan, Kashif Ali, Eric Brewer, Tapan Parikh. <i>Information Technologies &amp; International Development (ITID)</i> 2015
<b>Analysis of Smartphone Adoption and Usage in a Rural Community Cellular Network</b> <b>Kurtis Heimerl</b> , Anuvind Menon, Shaddi Hasan, Kashif Ali, Eric Brewer, Tapan Parikh. <i>International Conference on Information and Communication Technologies and Development (ICTD)</i> 2015
<b>Rescue Base Station</b> Ibrahim Ghaznavi, <b>Kurtis Heimerl</b> , Umar Muneer, Abdullah Hamid, Kashif Ali, Tapan Parikh, Umar Saif. <i>5th Annual ACM Symposium on Computing for Development (DEV)</i> 2014
<b>GSM Whitespaces: An Opportunity for Rural Cellular Service</b> Shaddi Hasan, <b>Kurtis Heimerl</b> , Kate Harrison, Kashif Ali, Anant Sahai, Eric Brewer. <i>IEEE Dynamic Spectrum Access Networks (DySPAN)</i> 2014 ( <b>Best Paper Award</b> )

**An Experiment in Reducing Cellular Base Station Power Draw With Virtual Coverage**

**Kurtis Heimerl**, Shaddi Hasan, Kashif Ali, Tapan Parikh, Eric Brewer. *4th Annual ACM Symposium on Computing for Development (DEV)* 2013

**Local, Sustainable, Small-Scale Cellular Networks**

**Kurtis Heimerl**, Shaddi Hasan, Kashif Ali, Eric Brewer, Tapan Parikh. *International Conference on Information and Communication Technologies and Development (ICTD)* 2013

**Expanding Rural Cellular Networks with Virtual Coverage**

**Kurtis Heimerl**, Kashif Ali, Joshua Blumenstock, Brian Gawalt, Eric Brewer. *10th USENIX symposium on Networked Systems Design and Implementation (NSDI)* 2013 (**Community Award**)

**Convergence of Position Auctions under Myopic Best-Response Dynamics**

Matthew Cary, Aparna Das, Benjamin Edelman, Ioannis Goitis, **Kurtis Heimerl**, Anna Karlin, Scott Kominers, Claire Mathieu, Michael Schwarz. *Transactions on Economics and Computation (TEAC)* 2013

**Communitysourcing: Engaging Local Crowds to Perform Expert Work Via Physical Kiosks**

**Kurtis Heimerl**, Brian Gawalt, Kuang Chen, Tapan Parikh, Björn Hartmann. *Annual conference on Human Factors in Computing Systems (CHI)* 2012 (**Best Paper Award**)

**A Case Study on Designing Interfaces for Multiple Users in Developing Regions**

**Kurtis Heimerl**, Janani Vasudev, Kelly Buchanan, Tapan Parikh, Eric Brewer. *1st Annual ACM Symposium on Computing for Development (DEV)* 2010

**Metamouse: Improving Multi-user Sharing of Existing Educational Applications**

**Kurtis Heimerl**, Janani Vasudev, Kelly Buchanan, Tapan Parikh, Eric Brewer. *International Conference on Information and Communication Technologies and Development (ICTD)* 2010

**Greedy Bidding Strategies for Keyword Auctions**

Matthew Cary, Aparna Das, Benjamin Edelman, Ioannis Giotis, **Kurtis Heimerl**, Anna Karlin, Claire Mathieu and Michael Schwarz. *ACM Conference on Electronic Commerce (EC)* 2007

## Workshop Papers

**Unplanned Obsolescence: Hardware and Software After Collapse**

Esther Jang, Matt Johnson, Edward Burnell, **Kurtis Heimerl**. *Proceedings of the 2017 Workshop on Computing Within Limits* 2017

**The Village Base Station**

**Kurtis Heimerl**, Eric Brewer. *4rd ACM Workshop on Networked Systems for the Developing World (NSDR)*, 2010

**Message Phone: A User Study and Analysis of Asynchronous Messaging in Rural Uganda**

**Kurtis Heimerl**, RJ Honicky, Eric Brewer, Tapan Parikh. *3rd ACM Workshop on Networked Systems for the Developing World (NSDR)*, 2009

**Metamouse: Multiple Mice for Legacy Applications**

**Kurtis Heimerl**, Divya Ramachandran, Joyojeet Pal, Eric Brewer, Tapan Parikh. *Proceedings of the 27th international conference extended abstracts on Human factors in computing systems (CHI Extended Abstracts)* 2009

## Demonstrations

**Poster and Demonstration of Expanding Rural Cellular Networks with Virtual Coverage**

**Kurtis Heimerl**, Kashif Ali, Joshua Blumenstock, Brian Gawalt, Eric Brewer. *Demo at 10th USENIX symposium on Networked Systems Design and Implementation (NSDI)* 2013

**Communitysourcing: Engaging Local Crowds to Perform Expert Work Via Physical Kiosks**

**Kurtis Heimerl**, Brian Gawalt, Kuang Chen, Tapan Parikh, Björn Hartmann. *Interactivity at the annual conference on Human Factors in Computing Systems (CHI)* 2012

**Metamouse: Multiple Mice for Legacy Applications**

**Kurtis Heimerl**, Divya Ramachandran, Joyojeet Pal, Eric Brewer, Tapan Parikh. *Demo at International Conference on Information and Communication Technologies and Development (ICTD)* 2009

## Technical Reports

**How Users Understand Cellular Infrastructure**

**Kurtis Heimerl**, Tapan Parikh. *University of California, Berkeley Technical Report No. UCB/EECS-2012-42*

**Transforming Community-based Healthcare with CommScape**

Kuang Chen, **Kurtis Heimerl**, Tapan Parikh, Christine Robson and Beth Trushkowsky. *University of California, Berkeley Technical Report No. UCB/EECS-2009-155*

**Enabling Innovation Below the Communication API**

Ganesh Ananthanarayanan, **Kurtis Heimerl**, Matei Zaharia, Michael Demmer, Teemu Koponen, Arsalan Tavakoli, Scott Shenker, Ion Stoica. *University of California, Berkeley Technical Report UCB/EECS-2009-141*

## Teaching Experience

- University of Washington** **Seattle, WA 2017, 2018**  
Lead instructor of CSE461 Computer Networks. Led classes of over eighty students and developed new course content.
- University of Washington** **Seattle, WA 2016, 2017**  
Lead instructor of CSE590 and CSEP 590 Information Communication Technologies and Development (ICTD). Created the courses, including the syllabus and grading content.
- University of California, Berkeley** **Berkeley, CA, 2013**  
Summer Undergraduate Program in Engineering Research at Berkeley (SUPERB) Mentor for Cristine Dierk working on communitysourcing and Mark Watt working on cellular security
- University of California, Berkeley** **Berkeley, CA 2012**  
Lead Instructor of undergraduate class CS-194-22: Cellphones as a computing platform
- University of California, Berkeley** **Berkeley, CA, 2011**  
Summer Undergraduate Program in Engineering Research at Berkeley (SUPERB) Mentor for Kehontas Rowe from Mills College working on communitysourcing.
- University of California, Berkeley** **Berkeley, CA 2010**  
Graduate Student Instructor of graduate class CS-294-35: Cellphones as a computing platform under Professor Eric Brewer.
- University of Washington** **Seattle, WA 2006-2007**  
Teacher's assistant for operating systems courses under Professor Ed Lazowska
- University of Washington** **Seattle, WA 2005**  
Teacher's assistant for introductory computer programming courses under Professor Hal Perkins and Lecturer Stuart Reges.

## Academic Service

- Demos Chair: ACM ICTD X**
- Notes Chair: ACM COMPASS 2018**
- Program Committee: ACM COMPASS 2018**
- Program Committee: ICTD 2013, 2015, 2016, 2017**
- Program Committee: ACM DEV 2014, 5**
- Program Committee: HotMobile 2015**
- Program Committee: CHI Work-in-Progress 2013, 2014**
- Reviewer: CHI 2013, 2015, 2016, 2017, 2018**
- Reviewer: CHI Late Breaking Work 2018**
- Reviewer: IMWUT 2017**
- Reviewer: UIST 2014**
- Reviewer: UIST Demos 2012**
- Reviewer: ITID 2011**

## Presentations

- An Investigation of Phone Upgrades in Remote Community Cellular Networks**  
*ACM ICTD '17*, November 2017, Lahore, Pakistan
- Community Cellular Networks**  
*ICTD Class, University of Colorado*, October 2017, Boulder, Colorado, USA
- Expanding Cellular Coverage with Community Networks**  
*Catholic Relief Services Webinar*, September 2017, Online
- Community Cellular Networks**  
*Asia Institute of Technology Networking Seminar*, July 2017, Bangkok, Thailand
- Community Cellular Networks**  
*GSM Association Lunch*, June 2017, London, UK
- Community Cellular Manager**  
*OpenCellular Workshop*, June 2017, Nairobi, Kenya
- Expanding Cellular Coverage with Community Networks**  
*NYC Cellular Class*, February 2017, New York, New York, USA

**Community Cellular Networks***DUB Seminar*, December 2016, Seattle, Washington, USA**Community Cellular Manager***TIP Summit*, November 2016, Menlo Park, California, USA**Community Cellular Networks: Infrastructure for Financial Inclusion***Evidence to Action*, May 2016, San Francisco, California, USA**Community Cellular Networks***Liberation Technology Seminar*, October 2015, Palo Alto, California, USA**Community Cellular Networks***University of the Philippines ICTD Seminar*, September 2015, Diliman, Manila, Philippines**Community Cellular Networks***Royal Holloway University Seminar*, April 2015, Egham, UK**Community Cellular Networks***University of Indonesia Networks Seminar*, March 2015, Jakarta, Indonesia**Community Cellular Networks***Rightscon Manila*, March 2015, Manila, Philippines**Rescue Base Station***ACM DEV '14*, December 2014, San Jose, California, USA**Community Cellular***Indonesian Broadcasting Expo (IBX)* October 2014, Bandung, Indonesia**Community Cellular***Jagongan Media Rakyat (JMR)* October 2014, Jogjakarta, Indonesia**GSM White Spaces: An Opportunity for Rural Coverage**

New York University, September 2014, NYC, NY

**Community Cellular Networks**

MIT D-Lab, September 2014, Boston, MA

**Building Community Cellular Networks With Endaga***EmTech* September 2014, Boston, MA**Building Community Cellular Networks With Endaga***USAID Frontiers in Development* September 2014, Washington, DC**Technology and Infrastructure for Developing Regions**

Facebook/Internet.org, July 2014, Palo Alto, CA

**Community Cellular Networks in Rural Papua, Indonesia**

Center for Southeast Asia Studies, February 2014, Berkeley, California

**Sustainable, Small-Scale Cellular Networks***ICTD '13*, December 2013, Cape Town, South Africa**An Experiment in Reducing Cellular Base Station Power Draw With Virtual Coverage***ACM DEV 4*, December 2013, Cape Town, South Africa**Building and Running Community Cellular Networks with OpenBTS***IEEE Engineering For Change Webinar*, November 2013, Broadcast Online**Technology in Delivering Social Impact***Social Impact Speaker Series*, University of California, Berkeley, November 2013, Berkeley, California, USA**GSM White Space: Spectrum Regulation in Support of Community Cellular Networks***Change Seminar*, University of Washington, October 2013, Seattle, Washington, USA**Community Cellular Networks**

Google, October 2013, Mountain View, CA, USA

**Community Cellular Networks**

Facebook, October 2013, Menlo Park, CA, USA

**Expanding Rural Cellular Networks with Virtual Coverage***NSDI '13*, April 2013, Lombard, Illinois, USA**The Village Base Station**

University of the Philippines, Diliman, March 2013, Diliman, Philippines

**The Village Base Station: Community Cellular Radio***Pakistan-ICTD Workshop*, Lahore University of Management Sciences, January 2013, Lahore, Pakistan

**The Village Base Station**

*Change Seminar*, University of Washington, December 2012, Seattle, Washington, USA

**Mobile Security Survival Guide: What Every Activist and Rights Defender Needs to Know**

*Google Internet at Liberty*, June 2012, Washington DC, USA

**Communitysourcing: Engaging Local Crowds to Perform Expert Work Via Physical Kiosks**

*CHI '12*, May 2012, Austin, Texas, USA

**Communitysourcing: Engaging Local Crowds to Perform Expert Work Via Physical Kiosks**

*BiD Seminar*, University of California, Berkeley, April 2012, Berkeley, California, USA

**Introduction to OpenBTS/hands-on hacking**

Lookout Mobile Security, March 2012, San Francisco, California, USA

**The Evil Telco**

*OpenBTS HackDay - the Open Mobile Network*, June 2011, New York, New York, USA

**Metamouse: Improving Multi-user Sharing of Existing Educational Applications**

*ICTD '10*, December 2010, Egham, UK

**Infrastructure**

*School of Information ICTD Seminar*, October 2010, Berkeley, California, USA

**The Village Base Station**

*NSDR '10*, June 2010, San Francisco, California, USA

**MetaMouse: Improving the Sharing of Existing Applications**

*CITRIS Talk*, University of California, Berkeley, March 2010, Berkeley, California, USA

**Message Phone: A User Study and Analysis of Asynchronous Messaging in Rural Uganda**

*NSDR '09*, October 2009, Big Sky, Montana, USA

## References

**Eric Brewer**

Professor, Computer Science, University of California, Berkeley

[brewer@eecs.berkeley.edu](mailto:brewer@eecs.berkeley.edu)

**Tapan Parikh**

Associate Professor, Cornell Tech

[tapan@represent.org](mailto:tapan@represent.org)

**Richard Anderson**

Professor, Computer Science, University of Washington

[anderson@cs.washington.edu](mailto:anderson@cs.washington.edu)

**Bill Thies**

Researcher, Microsoft Research India

[thies@microsoft.com](mailto:thies@microsoft.com)

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<http://kurti.sh/cv.pdf>