

Kurtis Heimerl

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Interests

My research builds community-based systems for rural areas, with a specific focus on networking.

Academic

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

Current Research

Community Cellular Networks

Investigating small-scale, locally owned cellular networks. Assisted in the development of open-source SDR-based solutions, including OpenBTS, Osmocom, OpenAirInterface, and Open5GS. Extended the platforms to support integration with telecoms as well as distributed operation. Deployments in Indonesia, Philippines, and Mexico. Future deployments planned in Tacoma, Canada, and Peru.

Ecological Sustainability

Working with the OI Pejeta conservancy to build text-based tools for community engagement. Deployments ongoing.

Data Science for Social Good

Partnering with Grab Holdings, the largest ride-sharing company in South-East Asia to explore the use of their platform to positively impact marginalized populations in covered countries.

Network Security

Exploring uptake of secure messaging in “the long tail” of the Internet.

Awards

UW College of Engineering “Early Career” Diamond Award	2018
MIT Technology Review “35 under 35”	2014
ISIF Asia Community Network Award	2018
Best Paper at COMPASS 2020: Can Phones Build Relationships? A Case Study of a Kenyan Wildlife Conservancy’s Community Development	2020
Diversity and Inclusion Award at CSCW 2019: Trust and Technology Repair Infrastructures in the Remote Rural Philippines: Navigating Urban-Rural Seams	2019
Best Student Paper at ASSETS 2019: Deep Learning for Automatically Detecting Sidewalk Accessibility Problems Using Streetscape Imagery	2019
Community Award at NSDI 2019: Scaling Community Cellular Networks with CommunityCellularManager	2019
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
Bob Bandes Memorial Teaching Award (Honorable Mention)	2005

Selected Press

Building a “cell tower in a box” to connect some of the billions of people lacking internet access GeekWire	2018
Facebook Hires Founders Of Cellular-Network-In-A-Box Company Endaga Tech Crunch	2015
Kurtis Heimerl: 35 Innovators under 35 MIT Technology Review	2014
New Eavesdropping Equipment Sucks All Data Off Your Phone Newsweek	2014
Cellular’s Open Source Future is Latched to Tallest Tree in the Village Ars Technica	2014

Funding

Facebook: Enabling Small-Scale Cooperative Cellular Networks for Distributed Internet Access Development and deployment of a distributed, decentralized cellular network in Tacoma	\$75000 2020
NSF: Exploring The Benefits and Challenges of Community-Powered Connectivity In The New Arctic Navigating the New Arctic (NNA) planning grant to assist the Internet Society in the deployment of a Community Network among an Inuvialuit community in Canada’s Northwest Territories.	\$250000 2020
NSF: Building a Partnership with Grab for Cross-ASEAN Regional Urban Insights Smart and Connected Communities (S&CC) EAGER grant to support the development of a data science for social good initiative with Grab, the largest ride-sharing company in South-East Asia.	\$250000 2020
Facebook: Access, Relevance, and Perception of Internet-based Technologies among Rural and Urban Americans Partner with Co-PI Katharina Reinecke on a Lab-in-the-Wild study on urban and rural experiences with common mobile applications.	\$50000 2019
Anonymous: Individual Donations Catch-all for anonymous donations by individuals, companies, and others.	\$800000 2016-

Industry Experience

Facebook Endaga team and IP joined Facebook to continue their rural access initiatives.	Menlo Park, CA 2015-2017
Endaga, Inc 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.	Oakland, CA 2014-2015
Range Networks Community Manager/Developer for open-source OpenBTS release.	San Francisco, CA 2011-2014
Microsoft Research India Intern assisting with SMS and voice technologies for the Digital Study Hall distance learning project.	Bangalore, India 2007
Google.com Intern developing additions to the Hadoop map-reduce framework.	Mountain View, CA 2007
Amazon.com Intern creating scalable, secure, and extensible service-oriented architecture components.	Seattle, WA 2005,2006

Peer-reviewed Conference or Journal Publications

[Accept the Risk and Continue: Measuring the Long Tail of Government https Adoption](#)

Sudheesh Singanamalla, Esther Jang, Richard Anderson, Tadayoshi Kohno, **Kurtis Heimerl**. *The 20th ACM Internet Measurement Conference (IMC)* 2020

[Can Phones Build Relationships? A Case Study of a Kenyan Wildlife Conservancy's Community Development](#)

Matt Ziegler, Morgan Wack, Nancy Ingutia, Ian Muiruri, Nicholas Njogu, Kennedy Muriithi, William Njoroge, James Long, and **Kurtis Heimerl**. *The Third ACM Conference on Computing & Sustainable Societies (COMPASS)* 2020 (**Best Paper**)

[Connecting Isolated Communities: Quantitative Evidence on the Adoption of Community Cellular Networks in the Philippines](#)

Niall Keleher, Mary Claire Barela, Joshua Blumenstock, Cedric Festin, Matthew Podolsky, Erin Troland, Arman Rezaee, and **Kurtis Heimerl**. *Eleventh International Conference on Information and Communication Technologies and Development (ICTD)* 2020

[Trust and Technology Repair Infrastructures in the Remote Rural Philippines: Navigating Urban-Rural Seams](#)

Esther Han Beol Jang, Philip Garrison, Ronel Vincent Vistal, Maria Theresa D. Cunanan, Mia Theresa Perez, Philip Martinez, Matthew William Johnson, John Andrew Evangelista, Syed Ishtiaque Ahmed, Josephine Dionisio, Mary Claire Aguilar Barela, **Kurtis Heimerl**. *Proceedings of the ACM on Human-Computer Interaction: Vol. 3, Issue CSCW, Article 99* 2019

[Deep Learning for Automatically Detecting Sidewalk Accessibility Problems Using Streetscape Imagery](#)

Galen Weld, Esther Jang, Aileen Zeng, Anthony Li, **Kurtis Heimerl**, Jon Froehlich. *21st International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS)* 2019 (**Best Student Paper**)

[Experiences: Design, Implementation, and Deployment of CoLTE, a Community LTE Solution](#)

Spencer Sevilla, Matthew Johnson, Pathirat Kosakanchit, Jenny Ting Liang, **Kurtis Heimerl**. *The 25th Annual International Conference on Mobile Computing and Networking (MobiCom)* 2019

[An Assessment of SMS Fraud in Pakistan](#)

Fahad Pervaiz, Rai Shah Nawaz, Muhammad Umer Ramzan, Maryem Zafar Usmani, Shirrang Mare, **Kurtis Heimerl**, Faisal Kamiran, Richard Anderson, Lubna Razaq. *The Second ACM Conference on Computing & Sustainable Societies (COMPASS)* 2019

[Scaling Community Cellular Networks with CommunityCellularManager](#)

Shaddi Hasan, Mary Claire Barela, Matthew Johnson, Eric Brewer, **Kurtis Heimerl**. *16th USENIX Symposium on Networked Systems Design and Implementation (NSDI)* 2019 (**Community Award**)

[Fresh Insights: User Research Towards a Market Information Service for Bihari Vegetable Farmers](#)

Matthew Ziegler, Lokesh Garg, Shailesh Tiwary, Aditya Vashistha, **Kurtis Heimerl**. *Tenth International Conference on Information and Communication Technologies and Development (ICTD)* 2019

[Designing Sustainable Rural Infrastructure Through the Lens of OpenCellular](#)

Kashif Ali, **Kurtis Heimerl**. *Communications of the ACM*, August 2018

[ThinSIM-based Attacks on Mobile Money Systems](#)

Rowan Phipps, Shirrang Mare, Peter Ney, Jennifer Rose Webster, **Kurtis Heimerl**. *First ACM conference on Computing & Sustainable Societies (COMPASS)* 2018

[Crowdsourcing Rural Network Maintenance and Repair via Network Messaging](#)

Esther Jang, Mary Claire Barela, Matt Johnson, Philip Martinez, Cedric Festin, Maragaret Lynn, Josephine Dionisio, **Kurtis Heimerl**. *ACM SIGCHI Conference on Human Factors in Computing Systems (CHI)* 2018

[An Investigation of Phone Upgrades in Remote Community Cellular Networks](#)

Kushal Shah, Philip Martinez, Emre Tepedelenlioglu, Shaddi Hasan, Cedric Angelo Festin, Joshua Blumenstock, Jo Dionisio, **Kurtis Heimerl**. *International Conference on Information and Communication Technologies and Development (ICTD)* 2017

[Towards Building a Community Cellular Network in the Philippines: Initial Site Survey Observations](#)

Mary Claire Barela, Mae Sincere Blanco, Philip Martinez, Miguel Carlo Purisima, **Kurtis Heimerl**, Matthew Podolsky, Eric Brewer, Cedric Angelo Festin. *International Conference on Information and Communication Technologies and Development (ICTD)* 2016

[A Longitudinal Study of Local, Sustainable, Small-Scale Cellular Networks](#)

Kurtis Heimerl, Shaddi Hasan, Kashif Ali, Eric Brewer, Tapan Parikh. *Information Technologies & International Development (ITID)* 2015

[Analysis of Smartphone Adoption and Usage in a Rural Community Cellular Network](#)

Kurtis Heimerl, Anuvind Menon, Shaddi Hasan, Kashif Ali, Eric Brewer, Tapan Parikh. *International Conference on Information and Communication Technologies and Development (ICTD)* 2015

[Rescue Base Station](#)

Ibrahim Ghaznavi, **Kurtis Heimerl**, Umar Muneer, Abdullah Hamid, Kashif Ali, Tapan Parikh, Umar Saif. *5th Annual ACM Symposium on Computing for Development (DEV)* 2014

[GSM Whitespaces: An Opportunity for Rural Cellular Service](#)

Shaddi Hasan, **Kurtis Heimerl**, Kate Harrison, Kashif Ali, Anant Sahai, Eric Brewer. *IEEE Dynamic Spectrum Access Networks (DySPAN)* 2014 (**Best Paper Award**)

[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

Book Chapters

Connecting Communities through Mobile Networks: The VBTS-CoCoMoNets Project

Mary Claire Barela, Josephine Dionisio, **Kurtis Heimerl**, Manuel Victor Sapitula, and Cedric Angelo Festin. *Global Information Society Watch 2018: Community Networks* 2018

Building Community LTE Networks with CoLTE

Spencer Sevilla, Pathirat Kosakanchit, Matthew Johnson, **Kurtis Heimerl**. *The community network manual : how to build the Internet yourself* 2018

Workshop Papers

Title: Hanging Gardens of Babylon: Reframing Urban Agriculture as an Opportunity for Social Engagement

Joseph Breda, Esther Jang, **Kurtis Heimerl**, and Shwetak Patel. *Self-Sustainable CHI* 2020

dLTE: Building a more WiFi-like Cellular Network (Instead of the Other Way Around)

Matthew Johnson, Spencer Sevilla, Esther Jang, **Kurtis Heimerl**. *HotNets 2018: Seventeenth ACM Workshop on Hot Topics in Networks* 2018

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

DEMO: CoLTE, An All-in-One Community LTE Network

Spencer Sevilla, Matthew Johnson, Pathirat Kosakanchit, Jenny Ting Liang, **Kurtis Heimerl**. *The 25th Annual International Conference on Mobile Computing and Networking (MobiCom)* 2019

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, 2019

Lead instructor of CSE461 and CSEP 561 Computer Networks. Led classes of over eighty students and developed new course content.

University of Washington

Seattle, WA 2016, 2017, 2020

Lead instructor of CSE599 and CSEP 599 Information Communication Technologies and Development (ICTD) and CSE599 Computing for Social Good. 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

2019

Notes Chair: ACM COMPASS

2018

Program Committee: ACM MobiSYS

2020

Program Committee: ACM CHI

2020

Program Committee: ACM COMPASS

2018,2019,2020

Program Committee: ICTD

2013, 2015, 2016, 2017,2019,2020

Program Committee: ACM/IEEE Symposium on Edge Computing

2019, 2020

Program Committee: ACM DEV

2014,5

Program Committee: HotMobile

2016

Program Committee: CHI Work-in-Progress

2013, 2014

Selected Presentations

A Conversation on Networking for the Social Good

SIGCOMM, August 2020, New York, New York, USA

Technologies for Decentralized Urban Community Cellular Networks

IETF Global Alliance For Internet For All (GALA) Working Group, July 2019, Montreal, Quebec, Canada

Community Networking @ UW

ISAT SNAP DARPA Workshop, April 2019, Berkeley, California, 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 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

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

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

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

Community Cellular Networks

Google, October 2013, Mountain View, CA, USA

Community Cellular Networks

Facebook, October 2013, Menlo Park, CA, USA

The Village Base Station: Community Cellular Radio

Pakistan-ICTD Workshop, Lahore University of Management Sciences, January 2013, Lahore, Pakistan

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

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 the Sharing of Existing Applications

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

References

Eric Brewer

Professor, Computer Science, University of California, Berkeley

brewer@eecs.berkeley.edu

Tapan Parikh

Associate Professor, Cornell Tech

tapan@represent.org

Richard Anderson

Professor, Computer Science, University of Washington

anderson@cs.washington.edu

Bill Thies

Researcher, Microsoft Research India

thies@microsoft.com

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