

Kurtis Heimerl

359 CSE2
University of Washington,
Seattle, WA 98115

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

Interests

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

Academic

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| University of Washington Assistant Professor Computer Networks 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. 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.

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.

Ecological Sustainability

Ongoing research into the use of community sensing devices for resilience in Arctic communities.

Awards

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| 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 |

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| 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

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| 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 |
| Powered by the Sun, Telcos Open up Cellphone’s Final Frontier Reuters | 2012 |

Industry Experience

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| 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

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| 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 . <i>The Third ACM Conference on Computing & Sustainable Societies (COMPASS ’20)</i> 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 . <i>Eleventh International Conference on Information and Communication Technologies and Development (ICTD ’20)</i> 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 . <i>Proceedings of the ACM on Human-Computer Interaction: Vol. 3, Issue CSCW, Article 99</i> 2019 | |
| Deep Learning for Automatically Detecting Sidewalk Accessibility Problems Using Streetscape Imagery Galen Weld, Esther Jang, Aileen Zeng, Anthony Li, Kurtis Heimerl , Jon Froehlich. <i>21st International ACM SIGACCESS Conference on Computers and Accessibility(ASSETS)</i> 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 . <i>The 25th Annual International Conference on Mobile Computing and Networking (MobiCom)</i> 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 (ACM 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 '19)* 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 Giotis, **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.

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| University of Washington | Seattle, WA 2016, 2017 |
| Lead instructor of CSE590 and CSEP 590 Information Communication Technologies and Development (ICTD) and CSE590 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

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| 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

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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