

Robert Xiao

CURRICULUM VITAE

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Pittsburgh, Pennsylvania 15213

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EDUCATION

PhD in Human-Computer Interaction **2011 – 2018**

Carnegie Mellon University, Pittsburgh, PA

Thesis Defended: May 30, 2018

On-World Computing: Unleashing Computation on the World Around Us

Bachelor of Mathematics **2007 – 2011**

University of Waterloo, Waterloo, ON

Double Honours in Computer Science and Combinatorics & Optimization

POSITIONS AND APPOINTMENTS HELD

Assistant Professor, University of British Columbia **2019 – Present**

Assistant Professor in the Department of Computer Science. To begin on January 1, 2019.

Vancouver, BC, Canada.

Research Consultant, Microsoft Research **2017**

Mentored by Julia Schwarz and Hrvoje Benko. Work focused on advancing interactions in augmented reality.

Redmond, WA, USA

Research Intern, Microsoft Research **2016**

Mentored by Andy Wilson and Hrvoje Benko. Work focused on advancing interactions in augmented reality.

Redmond, WA, USA

Research Intern, Microsoft Research **2015**

Mentored by Andy Wilson. Work focused on expanding the FoV of VR systems using sparse peripheral displays. Work resulted in the Sparse Peripheral Displays paper, which earned an honorable mention at CHI 2016.

Redmond, WA, USA

- Software Architect, Qeexo, Co.** 2013
Summer internship with CMU spinoff. Work focused on engineering rich multitouch solutions for mobile devices.
Pittsburgh, PA, USA
- Research Intern, Microsoft Research** 2012
Mentored by John Tang. Work focused on in-home physical proxies for video communication. HomeProxy publication resulted from this internship.
Redmond, WA, USA
- Embedded Software Developer, Research in Motion** 2011
Development and validation of embedded radio firmware for 3G modems.
Waterloo, ON, Canada
- Summer Research Student, University of Saskatchewan** 2010
Summer research with the Interaction Lab, Department of Computer Science, mentored by Carl Gutwin. Research funded by NSERC under the Undergraduate Student Research Award program.
Saskatoon, SK, Canada
- Summer Research Student, University of Saskatchewan** 2009
Summer research with the Interaction Lab, Department of Computer Science, mentored by Regan Mandryk and Carl Gutwin. Research funded by NSERC under the Undergraduate Student Research Award program.
Saskatoon, SK, Canada
- Summer Research Student, University of Saskatchewan** 2008
Summer research with the Imaging, Multimedia and Graphics Lab, Department of Computer Science, mentored by Mark Eramian. Research funded by NSERC under the Undergraduate Student Research Award program.
Saskatoon, SK, Canada
- Database Analyst, University of Saskatchewan** 2007
Database analyst with the Centre for Continuing and Distance Education at the University of Saskatchewan.
Saskatoon, SK, Canada

HONOURS AND AWARDS

SCHOLARSHIPS & FELLOWSHIPS

NSERC Postgraduate Scholarship	2013 – 2015
\$63,000 award for three years, awarded to top Canadian graduates in their third year of a graduate program of study	
Qualcomm Innovation Fellowship	2012
\$100,000 award for one year for a team of two students	
NSERC Julie Payette Postgraduate Scholarship	2011
\$25,000 award for one year awarded to top Canadian students in their first year of a graduate program of study	
NSERC Undergraduate Student Research Award	2008 – 2010
Canadian federal fellowships to support academic research as an undergraduate student	
Rene Descartes Scholarship	2007 – 2011
Awarded to students with strong performance on Canadian national mathematics competitions	

SELECTED HONOURS AND AWARDS

Fast Company Innovation by Design Student Award	2016
Awarded for EM-Sense, recognizing an outstanding work of innovation. A total of 15 awards were given out from a pool of 1700 nominations	
Allen Newell Award for Research Excellence	2015
Awarded w/ Scott Hudson to recognize outstanding body of work within the School of Computer Science at Carnegie Mellon University	
Governor General's Silver Medal	2011
Awarded to the individual with the highest academic average over all graduating students	
Rising Stars of Research Honourable Mention	2010
Awarded to outstanding posters in the national Rising Stars of Research Poster Competition	
NSERC USRA Poster Competition First Prize	2009, 2010
Awarded to the top poster presented at the University of Saskatchewan USRA Poster Fair	
Putnam Mathematics Competition	2008
110th place in North America (4th in U of Waterloo)	

PUBLICATIONS

27. **Xiao, R.**, Cao, T., Guo, N., Zhuo, J., Zhang, Y. and Harrison, C. (2018). LumiWatch: On-Arm Projected Graphics and Touch Input. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (CHI '18). Paper 95, 11 pages. DOI: <https://doi.org/10.1145/3173574.3173669>
26. **Xiao, R.**, Schwarz, J., Throm, N., Wilson, A. and Benko, H. (2018). MRTouch: Adding Touch Input to Head-Mounted Mixed Reality. In *IEEE Transactions on Visualization and Computer Graphics* (TVCG) Special Issue, Volume 24, Number 4, 1653-1660. DOI: <https://doi.org/10.1109/TVCG.2018.2794222>
25. **Xiao, R.**, Hudson, S.E. and Harrison, C. (2017). Supporting Responsive Cohabitation Between Virtual Interfaces and Physical Objects on Everyday Surfaces. In *Proceedings of the ACM on Human-Computer Interaction, Engineering Interactive Computing Systems* (EICS '17). ACM, New York, NY, USA. Article 12. 17 pages. DOI: <https://doi.org/10.1145/3095814>
24. **Xiao, R.**, Laput, G., Zhang, Y. and Harrison, C. (2017). Deus EM Machina: On-Touch Contextual Functionality for Smart IoT Appliances. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems* (CHI '17). ACM, New York, NY, USA, 4000-4008. DOI: <https://doi.org/10.1145/3025453.3025828>
23. **Xiao, R.**, Hudson, S.E. and Harrison, C. (2016). CapCam: Enabling Quick, Ad-Hoc, Position-Tracked Interactions Between Devices. In *Proceedings of the 2016 International Conference on Interactive Surfaces & Spaces* (ISS '16). ACM, New York, NY, USA, 169-178. DOI: <https://doi.org/10.1145/2992154.2992182>
22. **Xiao, R.**, Hudson, S.E. and Harrison, C. (2016). DIRECT: Making Touch Tracking on Ordinary Surfaces Practical with Hybrid Depth-Infrared Sensing. In *Proceedings of the 2016 International Conference on Interactive Surfaces & Spaces* (ISS '16). ACM, New York, NY, USA, 85-94. DOI: <https://doi.org/10.1145/2992154.2992173>
21. Laput, G., **Xiao, R.** and Harrison, C. (2016). ViBand: High-Fidelity Bio-Acoustic Sensing Using Commodity Smartwatch Accelerometers. In *Proceedings of the 29th Annual Symposium on User Interface Software & Technology* (UIST '16). ACM, New York, NY, USA, 321-333. DOI: <https://doi.org/10.1145/2984511.2984582>.

Best Paper Award

20. Zhang, Y., **Xiao, R.** and Harrison, C. (2016). Advancing Hand Gesture Recognition with High Resolution Electrical Impedance Tomography. In *Proceedings of the 29th Annual Symposium on User Interface Software & Technology (UIST '16)*. ACM, New York, NY, USA, 843-850. DOI: <https://doi.org/10.1145/2984511.2984574>
19. **Xiao, R.**, Benko, H. Augmenting the Field-of-View of Head-Mounted Displays with Sparse Peripheral Displays. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16)*. ACM, New York, NY, USA, 1221-1232. DOI: <https://doi.org/10.1145/2858036.2858212>. **Honourable Mention Award**
18. **Xiao, R.**, Schwarz, J. and Harrison, C. (2015). Estimating 3D Finger Angle on Commodity Touchscreens. In *Proceedings of the 2015 International Conference on Interactive Tabletops & Surfaces (ITS '15)*. ACM, New York, NY, USA, 47-50. DOI: <https://doi.org/10.1145/2817721.2817737>
17. Guo, A., **Xiao, R.** and Harrison, C. (2015). CapAuth: Identifying and Differentiating User Handprints on Commodity Capacitive Touchscreens. In *Proceedings of the 2015 International Conference on Interactive Tabletops & Surfaces (ITS '15)*. ACM, New York, NY, USA, 59-62. DOI: <https://doi.org/10.1145/2817721.2817722>
16. Chatterjee, I., **Xiao, R.** and Harrison, C. (2015). Gaze+Gesture: Expressive, Precise and Targeted Free-Space Interactions. In *Proceedings of the 2015 International Conference on Multimodal Interaction (ICMI '15)*. ACM, New York, NY, USA, 131-138. DOI: <http://dx.doi.org/10.1145/2818346.2820752>. **Best Paper Award**
15. Laput, G., Yang, C., **Xiao, R.**, Sample, A. and Harrison, C. (2015). EM-Sense: Touch Recognition of Uninstrumented, Electrical and Electromechanical Objects. In *Proceedings of the 28th Annual ACM Symposium on User Interface Software & Technology (UIST '15)*. ACM, New York, NY, USA, 157-166. DOI: <https://doi.org/10.1145/2807442.2807481>. **Best Talk Award**
14. Laput, G., Lasecki, W.S., Wiese, J., **Xiao, R.**, Bigham, J.P. and Harrison, C. (2015). Sensors: Adaptive, Rapidly Deployable, Human-Intelligent Sensor Feeds. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI '15)*. ACM, New York, NY, USA. 1935-1944. DOI: <https://doi.org/10.1145/2702123.2702416>
13. Laput, G., **Xiao, R.**, Chen, X., Hudson, S.E., Harrison, C. (2014). Skin Buttons: Cheap, Small, Low-Powered and Clickable Fixed-Icon Laser Projectors. In *Proceedings of the 27th Annual ACM Symposium on User Interface Software and Technology (UIST '14)*. ACM, New York, NY, USA. 389-394. DOI: <https://doi.org/10.1145/2642918.2647356>

12. **Xiao, R.**, Lew, G., Marsanico, J., Hariharan, D., Hudson, S.E., Harrison, C. (2014). Toffee: Enabling Ad Hoc, Around-Device Interaction with Acoustic Time-of-Arrival Correlation. In *Proceedings of the 16th International Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI '14)*. ACM, New York, NY, USA. 67-76. DOI: <http://dx.doi.org/10.1145/2628363.2628383>
11. **Xiao, R.**, Laput, G., Harrison, C. (2014). Expanding the Input Expressivity of Smartwatches with Physical Pan, Twist, Tilt and Click. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 2014 (CHI '14)*. ACM, New York, NY, USA. 193-196. DOI: <https://doi.org/10.1145/2556288.2557017>
10. Schwarz, J., **Xiao, R.**, Mankoff, J., Hudson, S.E., Harrison, C. (2014). Probabilistic Palm Rejection Using Spatiotemporal Touch Features and Iterative Classification. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 2014 (CHI '14)*. ACM, New York, NY, USA. 2009-2012. DOI: <https://doi.org/10.1145/2556288.2557056>
9. Harrison, C., **Xiao, R.**, Schwarz, J., Hudson, S.E. (2014). TouchTools: Leveraging Familiarity and Skill with Physical Tools to Augment Touch Interaction. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 2014 (CHI '14)*. ACM, New York, NY, USA. 2913-2916. DOI: <https://doi.org/10.1145/2556288.2557012>
8. **Xiao, R.**, Harrison, C., Hudson, S.E. (2013). Lumitrack: High Speed, High Precision, Low-Cost Tracking with Projected m-Sequences. In *Proceedings of the 26th Annual ACM Symposium on User Interface Software and Technology (UIST '13)*. ACM, New York, NY, USA. 3-12. DOI: <http://dx.doi.org/10.1145/2501988.2502022>
7. **Xiao, R.**, Harrison, C., Hudson, S.E. (2013). WorldKit: Rapid and Easy Creation of Ad-hoc Interactive Applications on Everyday Surfaces. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 2013 (CHI '13)*. ACM, New York, NY, USA. 879-888. DOI: <https://doi.org/10.1145/2470654.2466113>
6. Tang, J., **Xiao, R.**, Hoff, A., Venolia, G., Therien, P., Roseway, A. (2013). HomeProxy: Exploring a Physical Proxy for Video Communication in the Home. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, 2013 (CHI '13)*. ACM, New York, NY, USA. 1339-1342. DOI: <https://doi.org/10.1145/2470654.2466175>
5. Bateman, S., Mandryk, R.L., Gutwin, C., **Xiao, R.** (2013). Analysis and Comparison of Target Assistance Techniques for Relative Ray-Cast Pointing. In *International Journal of Human-Computer Studies (IJHCS)*, Volume 71, Issue 5, 511-532. DOI: <http://dx.doi.org/10.1016/j.ijhcs.2012.12.006>

4. Harrison, C., **Xiao, R.**, Hudson, S.E. (2012). Acoustic Barcodes: Passive, Durable and Inexpensive Notched Identification Tags. In *Proceedings of the 25th Annual ACM Symposium on User Interface Software and Technology (UIST '12)*. ACM, New York, NY, USA, 563-568. DOI: <https://doi.org/10.1145/2380116.2380187>
3. **Xiao, R.**, Nacenta, M., Mandryk, R.L., Cockburn, A., Gutwin, C. (2011). Ubiquitous Cursor: A Comparison of Direct and Indirect Pointing Feedback in Multi-Display Environments. In *Proceedings of Graphics Interface 2011 (GI '11)*. Canadian Human-Computer Communications Society, Waterloo, Ontario, Canada, 135-142.
Best Student Paper Award
2. Bateman, S., Doucette, A., **Xiao, R.**, Gutwin, C., Mandryk, R.L., Cockburn, A. (2011). Effects of view, input device, and track width on video gamedriving. In *Proceedings of Graphics Interface 2011 (GI '11)*. Canadian Human-Computer Communications Society, Waterloo, Ontario, Canada, 207-214.
1. Gutwin, C., Schneider, O., and **Xiao, R.** (2011). Chalk Sounds: Using Synthesized Audio to Improve Workspace Awareness in Distributed Groupware. In *Proceedings of the 2011 Conference on Computer Supported Cooperative Work (CSCW '11)*. ACM, New York, NY, USA, 85-94. DOI: <https://doi.org/10.1145/1958824.1958838>

PATENTS

14. Benko, H., **Xiao, R.B.** (2016). Peripheral display for head mounted display device. US Patent Application 20170285344A1, filed March 29, 2016. Patent pending.
13. Yang, C., Laput, G., **Xiao, R.**, Harrison, C., Sample, A. (2015). Automatic object detection and state estimation via electronic emissions sensing. **US Patent** 9881273, filed October 28, 2015 and granted January 30, 2018.
12. Harrison, C., Schwarz, J., **Xiao, R.B.** (2015). Determining pitch for proximity sensitive interactions. US Patent Application 20170024892A1, filed July 1, 2015. Patent pending.
11. Laput, G., Harrison, C., Bigham, J.P., Lasecki, W.S., **Xiao, R.B.**, Wiese, J. System and method for adaptive, rapidly deployable, human-intelligent sensor feeds. US Patent Application US20180107879A1, filed March 25, 2015. Patent pending.
10. Harrison, C., Schwarz, J., **Xiao, R.** (2015). Method and apparatus for classifying finger touch events on a touchscreen. **US Patent** 9864454, filed February 2, 2015 and granted January 9, 2018.

9. Schwarz, J., **Xiao, R.B.**, Harrison, C. (2014). Method and apparatus for classifying contacts with a touch sensitive device. US Patent Application 20160299515A1, filed September 25, 2014. Patent pending.
8. Harrison, C., **Xiao, R.B.**, Hudson, S.E., Poupyrev, I., Willis, K.D.D. (2014). System and method for tracking objects with projected m-sequences. US Patent Application 20160084960A1, filed September 19, 2014. Patent pending.
7. Harrison, C., Schwarz, J., **Xiao, R.B.** (2014). Method and apparatus for resolving touch screen ambiguities. US Patent Application 20160077664A1, filed September 15, 2014. Patent pending.
6. **Xiao, R.B.**, Lew, G., Schwarz, J., Harrison, C. (2014). Using Capacitive Images for Touch Type Classification. US Patent Application 20150242009, filed February 26, 2014. Patent pending.
5. Harrison, C., Schwarz, J., **Xiao, R.B.** (2014). Determining pitch and yaw for touchscreen interactions. **US Patent** 9778783, filed February 12, 2014 and granted October 3, 2017.
4. Harrison, C., Schwarz, J., **Xiao, R.B.** (2013). Capture of Vibro-Acoustic Data Used to Determine Touch Types. US Patent Application 20150035759, filed August 2, 2013. Patent pending.
3. Harrison, C., Schwarz, J., **Xiao, R.B.** (2013). Using Finger Touch Types to Interact with Electronic Devices. US Patent Application 20140327626, filed May 6, 2013. Patent pending.
2. Harrison, C., Schwarz, J., **Xiao, R.B.**, Hudson, S.E. (2013). Virtual Tools for Use with Touch-Sensitive Surfaces. US Patent Application 20140310631, filed April 15, 2013. Patent pending.
1. Harrison, C., Schwarz, J., **Xiao, R.B.** (2013). Method and system for activating different interactive functions using different types of finger contacts. **US Patent** 9013452, filed March 25, 2013 and granted April 21, 2015.

POSTERS

3. **Xiao, R.**, Bateman, S., Mandryk, R., Gutwin, C. (2009). Enhancing the Effectiveness of Remote Pointing. Presented at the University of Saskatchewan USRA Poster Fair, August 2009.

2. **Xiao, R.**, Nacenta, M., Cockburn, A., Mandryk, R., Gutwin, C. (2010). Ubiquitous Cursor: Filling in the Space Between Displays. Presented at the University of Saskatchewan USRA Poster Fair, August 2010.
1. **Xiao, R.**, Harrison, C. (2012). Synthetic Sensors and Displays. Presented at the Qualcomm Innovation Winner's Day, September 2012.

SELECTED INVITED PRESENTATIONS

6. "MRTouch: Adding Touch Input to Head-Mounted Mixed Reality." SIGGRAPH. Vancouver, Canada, August 12, 2018.
5. UMN CSE Colloquium. Minnesota, USA, April 9, 2018.
4. MIT CSAIL HCI Seminar Series. Boston, USA, March 19, 2018.
3. UCSB Computer Science. Santa Barbara, USA, January 18, 2018.
2. "CapCam: Enabling Quick, Ad-Hoc, Position-Tracked Interactions Between Devices." Engadget Live. New York City, USA, October 29, 2015.
1. "Evolving the Human-Computer Interface." Co-Keynote presentation with Sir Tim Berners Lee. "WE: Way to Evolve" summit. Tencent. Shenzhen, China, November 10, 2013.

SELECTED PRESS COVERAGE

LocationSmart, 2018

In May of 2018, I discovered a significant security vulnerability which disclosed real-time location data for a majority of mobile phone subscribers in North America.

Original coverage:

- <https://apnews.com/a60b6c98a1ff434883313469f4487639> "Website flaw exposes real-time locations of US cellphones" (May 17, 2018; syndicated to NYTimes, Washington Post, and 300 other news outlets)
- <https://www.zdnet.com/article/cell-phone-tracking-firm-exposed-millions-of-americans-real-time-locations/>
- <http://money.cnn.com/2018/05/18/technology/cell-phone-location-data-breach-locationsmart/index.html>
- Interviewed for WTAE evening broadcast TV news, May 19, 2018.
- Interviewed for "This Week in IT" radio show, June 8, 2018.

Follow-up coverage:

- <https://www.reuters.com/article/us-usa-mobile-privacy/fcc-investigating-website-flaw-that-exposed-mobile-phone-locations-idUSKCN1IJ2F0>
- <http://triblive.com/business/technology/13777194-74/verizon-to-end-some-sale-of-phone-location-data-in-wake-of-cmu> "Verizon, AT&T to end location data sales to brokers in wake of

CMU hack”

- <https://www.wsj.com/articles/verizon-to-cut-off-data-providers-that-gave-up-customer-locations-1529423758> “Verizon, AT&T, Sprint to Cut Off Data Providers After Customer Locations Were Revealed”

LumiWatch, 2018

<https://www.cnet.com/news/lumiwatch-projector-smartwatch-turns-your-arm-into-a-touchscreen/>
<https://gizmodo.com/the-worlds-first-working-projector-smartwatch-turns-you-1825518454>

MRTouch, 2018

<https://www.tomshardware.com/news/mrtouch-hololens-tactive-touch-interaction,36956.html>
<https://www.digitaltrends.com/computing/microsoft-research-hololens-virtual-touchscreen-mrtouch/>

Desktopography, 2017

<http://www.dailymail.co.uk/sciencetech/article-4650346/Fancy-turning-DESK-touchscreen.html>
<http://www.popularmechanics.com/technology/gadgets/a27124/desk-touchscreen-projector/>

Deus EM Machina, 2017

<https://www.engadget.com/2017/05/09/deus-em-machina-electromagnetic-emissions-sensing/>
<https://techcrunch.com/2017/05/09/how-a-tap-could-tame-the-smart-home/>

ViBand, 2016

<https://techcrunch.com/2016/11/21/overclocked-smartwatch-sensor-uses-vibrations-to-sense-gestures-objects-and-locations/>
<https://www.theverge.com/circuitbreaker/2016/11/2/13463312/carnegie-mellon-lg-smartwatch-hack-gesture-accelerometer-viband-project>

SparseLight, 2016

<https://www.theverge.com/2016/4/26/11512820/sparselight-ar-vr-led-hack-microsoft-hololens>
<https://arstechnica.com/gaming/2016/05/how-side-mounted-leds-can-help-fix-vrs-tunnel-vision-and-nausea-problems/>

EM-Sense, 2015

<http://www.wired.com/2015/11/em-sense-enabled-smartwatch-can-detect-when-you-touch-a-doorknob/>
<http://www.nbcnews.com/tech/innovation/disney-smartwatch-knows-what-youre-touching-tells-you-what-do-n461741>
<https://www.fastcodesign.com/product/em-sense>

Zensors, 2015

<http://www.pcworld.com/article/2914552/zensors-app-lets-you-crowdsource-live.html>
<http://gizmodo.com/one-old-android-phone-could-make-all-your-dumb-things-s-1699362305>

3D Finger Angle, 2015

<http://gizmodo.com/a-touchscreen-that-knows-the-angle-of-your-finger-is-wa-1742667522>
<http://www.digitaltrends.com/mobile/qeexo-fingerangle-news/>

Skin Buttons, 2014

<http://phys.org/news/2014-10-skin-icons-smartwatch.html>
<http://www.fastcodesign.com/3036985/this-smartwatch-projects-laser-buttons-onto-your-skin>
<https://www.nytimes.com/2014/11/21/style/international/researchers-look-at-ways-to-fit->

[technology-in-confined-spaces.html](#)

Interview on CBC Radio “Misener on Tech”, October 21, 2014.

TouchTools, 2014

<http://gizmodo.com/what-life-would-be-like-if-skeuomorphism-ruled-our-ipad-1570806039>

<http://www.engadget.com/2014/05/01/touchtools-user-interface-manipulating-objects/>

6DOF Physical Smartwatch, 2014

<http://www.newscientist.com/article/dn25482-tilting-smartwatch>

<http://www.engadget.com/2014/04/30/concept-smartwatch-joystick/>

WorldKit, 2013

Work featured as segment on “Stephen Hawking’s Science of the Future”, Episode 4, December 6, 2013

<http://www.reuters.com/video/2013/06/12/researcher-gives-new-meaning?videoid=243310701>

<http://www.foxnews.com/tech/2013/07/08/projector-turns-everything-into-touchscreen/>

TEACHING EXPERIENCE

Lab Instructor

2014

Lab Instructor for the Programming Usable Interfaces Prototype Lab, in the Human-Computer Interaction Institute at Carnegie Mellon University, during the September-December 2014 academic term.

Teaching Assistant

2014

Teaching Assistant for an introductory course on Applied Gadgets, Sensors and Activity Recognition, taught by Scott E. Hudson, in the Human-Computer Interaction Institute at Carnegie Mellon University, during the January-April 2014 academic term.

Tutoring and TAing

2008-2010

Various tutoring and TA positions with the Tutorial Center and Tutoring in Residence programs (four semester-long appointments total), Faculty of Mathematics, University of Waterloo

MATH 227 TA (Calculus 3 for Honours Physics)

2009

Received outstanding evaluation from MATH 227 professor for TA work

MATH 146 TA (Advanced Linear Algebra)

2009

Received outstanding evaluation from MATH 146 professor for TA work

CS 116 Tutor (Intro to Computer Science 2)

2009

Developed and maintained entirely new version of the automatic grading system (used by nearly 1000 students per semester). Department of Computer Science, University of Waterloo, Waterloo, ON, Canada.

COMMUNITY SERVICE

Program Committee Member, CHI 2019 **2019**

Invited program committee member for the 37th Annual ACM Conference on Human Factors in Computing Systems (CHI 2019) conference held in Glasgow, United Kingdom.

Program Committee Member, VRST 2018 **2018**

Invited program committee member for the 2018 ACM Symposium on Virtual Reality Software and Technology (VRST 2018) conference held in Tokyo, Japan.

Program Committee Member, CHI 2018 **2017**

Invited program committee member for the 36th Annual ACM Conference on Human Factors in Computing Systems (CHI 2018) conference held in Montreal, Canada.

Contributing Writer, Crash Course Computer Science **2017**

Invited contributing writer for 19 episodes of the Complexly & PBS Digital Studios “Crash Course Computer Science” educational video series.

Program Committee Member, IUI 2018 **2017**

Invited program committee member for the 22nd ACM International Conference on Intelligent User Interfaces (IUI 2018).

Student Volunteer, UIST 2017 **2017**

Student volunteer at the program committee meeting and main conference for the 30th Annual ACM Symposium on User Interface Software & Technology (UIST 2017).

Session Chair, UIST 2015 **2015**

Chair of the “Hands and Fingers” papers session at the 28th Annual ACM Symposium on User Interface Software & Technology (UIST 2015).

Regular Conference Paper Reviewer

Reviewer for over 50 submitted papers across several conferences, including CHI, UIST, UbiComp, DIS, CSCW, ITS/ISS and MobileHCI. Annual reviewer for CHI and UIST since 2013.

3 “*Excellent Reviewer*” distinctions received at CHI (2016, 2017, 2017).

Journal Paper Reviewer

Reviewer for over 10 journal articles, including articles submitted to IJHCS, IEEE Computer and IEEE Photonics.

ADDITIONAL HONORS AND AWARDS

First place, Google Capture the Flag Quals Online team computer security competition; qualified to final competition held at Google.	June 2018
Second place, NSA Codebreaker Challenge 2017 Individual cryptography/reverse engineering competition held online with over 3000 participating students.	September 2017
First place, DEFCON 25 CTF Competed with the CMU PPP team at annual DEFCON CTF in Las Vegas.	July 2017
First place individual, Cambridge 2 Cambridge Challenge In-person computer security competition held in Cambridge, UK, among over 100 prequalified contestants. £3000 prize for first place individual.	July 2017
First place team, Cambridge 2 Cambridge Challenge In-person computer security competition held in Cambridge, UK, among 22 teams of 5 prequalified people each. £9000 prize for first place team.	July 2017
First place, DEFCON Quals CTF Online team computer security competition; qualified to final competition in Las Vegas, NV.	May 2017
First place, NSA Codebreaker Challenge 2016 Individual cryptography/reverse engineering competition held online with over 3000 participating students.	December 2016
First place, DEFCON 24 CTF Competed with the CMU PPP team at annual DEFCON CTF in Las Vegas.	August 2016
First place, Codegate CTF Four-person team, computer security competition held in Seoul, S. Korea. 50,000,000 KRW (\$45000 USD) prize.	May 2016
Second place, OCTF Finals Four-person team, attack-defense style computer security competition held in Shanghai, China. 20000 RMB (\$3000 USD) prize.	April 2016
Fifth place, Microsoft College Puzzle Challenge Four-person team, ranked fifth nationally and first at CMU.	April 2016
First place, Microsoft Build the Shield Competition Four-person team computer security competition held in Seattle, Washington with over 40 participating teams.	March 2016

First place, Codegate Quals CTF Online team computer security competition; qualified to final round in Seoul, S. Korea.	March 2016
First place, Tsinghua University BCTF Online team computer security and cryptography competition, over 500 participating teams.	March 2016
Fourth place, OCTF Qualification Round Online team computer security competition with over 800 participating teams; qualified to final round in Shanghai, China.	March 2016
Third place, Boston Key Party CTF Online team computer security and cryptography competition, over 750 participating teams.	March 2016
Top 25, NSA Codebreaker Challenge 2015 Individual cryptography/reverse engineering competition held online.	December 2015
Fifth place, HITCON 2015 Final CTF Four-person team computer security competition held in Taipei, Taiwan.	December 2015
First place, HITCON 2015 Quals CTF Online team computer security competition, qualification for final round.	October 2015
Second place, DEFCON 23 CTF Participated in this team computer security competition in Las Vegas.	August 2015
First place, Microsoft Code Hunt Individual programming competition held on the Microsoft campus and open to all employees.	August 2015
Third place, SECCON 2014 Final CTF Four-person team computer security competition held in Tokyo, Japan.	February 2015
First place, CMU-Citadel Programming Challenge Individual competition hosted by Citadel LLC.	January 2015
Third place, Microsoft College Puzzle Challenge Four-person team, ranked third in national standings.	April 2014
Invited participant of the USA Mathematics Olympiad	2007
Pythagoras Contest Canadian Champion	2001

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