



Eric C. Larson

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SMU®

1. RESEARCH OVERVIEW

Dr. Larson is an Associate Professor in the Department of Computer Science at SMU. He joined SMU in August 2013 after he received his PhD from the University of Washington. He is a fellow of the Hunt Institute for Engineering Humanity, member of the Darwin Deason Institute for Cyber-security, Center for Global Health, and SMU AT&T Center for Virtualization. His research explores the interdisciplinary relationship of machine learning and signal/image processing with the fields of security, mobile health, education, chemistry, psycho-visual psychology, human-computer interaction, and ubiquitous computing. Like most academics, he has a passion for teaching and mentoring, and views research as an ideal opportunity to instruct the next generation of computer scientists and engineers. He has positioned himself (*with plenty of help from others*) in a unique role, supporting different research applications via the integration of machine learning and ubiquitous sensing. He has become increasingly interested in sensing markers of health and context awareness using commonplace sensors. His research supports many healthcare, educational, and security initiatives by creating applications that (1) manage and diagnose chronic/infectious ailments, (2) help learners master educational topics, and (3) investigate information leakage in pervasive and mobile devices.

His work has been published in 42 papers at top journals and conferences, one textbook, and one book chapter, garnering over 3,000 citations (H-index of 20 and i10-index of 31). He has established grant funding for 15 different projects with funding from a variety of sources including private contracts and government agencies, in excess of \$4M.

<https://scholar.google.com/citations?hl=en&user=vThE9GIAAAAJ>

2. RESEARCH INTERESTS

- Machine Learning and Deep Learning [*Sponsored*]
- Cyber Security and Block Chain [*Sponsored*], Mobile Sensor Data Leakage [*Sponsored*], Counterfeit Detection [*Sponsored*]
- Context Aware Computing / Learning in Man-Machine Interfaces [*Sponsored*]
- Mobile Health Computing [*Sponsored*]
- Machine Learning for Virtual Screening [*Sponsored*]

3. EDUCATION

- 2013 **Ph.D. in Electrical Engineering**, University of Washington, Seattle
Area: Signal Processing and Ubiquitous Computing;
Advisor: Dr. Shwetak Patel Co-Advisor: Dr. Les Atlas
Committee: Dr. Mari Ostendorf, Dr. Xiaofeng Ren, Dr. James Fogarty, Dr. Karen Clark
Topic: *Semi-Supervised Training for Infrastructure Mediated Sensing: Disaggregated Hot and Cold Water Sensing with Minimal Calibration*
- 2008 **Master of Science in Electrical Engineering**, Oklahoma State University, Stillwater
Area: Image Processing and Digital Signal Processing
Advisor: Dr. Damon Chandler
Committee: Dr. Keith Teague, Dr. Gary Yen, Dr. Qi Cheng
MS Thesis: *Predictive Image Quality: The Most Apparent Distortion*
- 2006 **Bachelor of Science in Electrical Engineering**, Oklahoma State University, Stillwater
Area: Communications, Signals, and Controls
Summa Cum Laude

4. EMPLOYMENT

- 2019-present **Southern Methodist University**, Dallas, TX
Associate Professor, Department of Computer Science
- 2013-2019 **Southern Methodist University**, Dallas, TX
Assistant Professor, Department of Computer Science and Engineering
- 2012-2015 **Belkin Conserve Unit**, Los Angeles, CA
Systems Consultant: Machine Learning, Cloud Architecture, Firmware Design
- 2012-2013 **Intel Science and Technology Center**, Seattle WA
Research Assistant
- 2009-2013 **University of Washington**, Electrical Engineering, Seattle, WA
Research Assistant
- 2010 Summer **Intel Research**, Seattle, WA
Research Intern with Dr. Beverly Harrison
- 2007-2008 **Oklahoma State University**, Stillwater, OK
Research Assistant with Dr. Damon Chandler
- 2006 Summer **Garmin International**, Olathe, Kansas
Design Engineer Intern for Consumer Electronics
- 2005 Summer **Oklahoma State University**, Stillwater, OK
Undergraduate Researcher (REU) with Dr. Keith Teague

5. POST-DOCTORAL RESEARCHERS

- Feb. 2017- **Pavel Klimovich**, *Cheminformatics tools for Ligand Fingerprinting*
Feb. 2018 *Publications: [J.07]*

6. DOCTORAL STUDENTS

- Current **Yasamin Fouzani**, Topic: *Chemical Spectral Decomposition with low-cost CMOS sensing*
Publications: Forthcoming,
- Current **Raghuram Srinivas**, Topic: *Binding Affinity Prediction with Implicit Descriptors*
Publications: [J.07],
- Current **Xinyi Ding**, Topic: *Machine Learning Methods for Knowledge Tracing in E-Learning*
Publications: [J.06], [J.08], [J.10], [C.30]
- Dec 2017 **Chatchai (Mark) Wangwiwattanna**, Dissertation: *RGB Image-based Pupillary Diameter Tracking with Deep Convolutional Neural Networks*
Publications: [J.06], [C.24], [C.25], Current Position: Professor in School of Science and Technology at UTCC, Thailand
- May 2015 **Sohail Rafiqi**, Dissertation: *PupilWare: Towards Cognitive and Context Aware Computing*
Publications: [C.24], [C.25], Current Position: Researcher at Google, SMU Adjunct Faculty

7. MASTERS' STUDENTS

- Current **Avi Sinha**, Topic: *Unconventional Biometrics*
Publications: Forthcoming
- May 2018 **Travis Siems**, Thesis: *Understanding Natural Keyboard Typing Using Convolutional Neural Networks on Mobile Sensor Data*
Publications: [J.09], Now: Analyst at Toyota Connected
- August 2016 **Spencer Kaiser**, Thesis: *Open Spirometry: portable, low-cost spirometry utilizing 3d-printed vortex whistles and smartphones*
Publications: [B.02], [C.27], Now: Analyst at American Airlines

8. UNDERGRADUATE RESEARCH STUDENTS (THESIS OR ENGAGED LEARNING)

- May 2016 **Ashley Parks**, *Engaged Learning*, Topic: *Calibration of Vortex Whistles for Ultra Low Cost Spirometry*
Publications: [C.26], Current Position: Analyst at Toyota Connected
- May 2015 **Amanda Doyle**, *Engaged Learning and Undergraduate Honors Thesis*
Honors Thesis: *Overcoming Barriers to Cervical Cancer Screening: Mobile Development*
Publications: [J.10], Current Position: Leadership Program at GE
- May 2015 **Kevin Donahoo**, *Engaged Learning and Undergraduate Honors Thesis*
Honors Thesis: *Overcoming Barriers to Cervical Cancer Screening: Gesture Analytics*
Publications: [J.10], Current Position: Analyst at AT&T
- May 2015 **Nathan Hillis**, *Engaged Learning and Undergraduate Honors Thesis*
Honors Thesis: *Overcoming Barriers to Cervical Cancer Screening: Image Analytics*
Publications: [J.10]

9. HONORS AND AWARDS

- 2017 Fellow, Hunt Institute for Engineering and Humanity
- 2016 CHI 2016 Best Paper Award Nomination (*Supporting Author, as Professor*)
- 2015 SMU HOPE Professor of the Year, Honoring Our Professors of Excellence (HOPE)
- 2014 UbiComp 2014 Best Paper Award Nomination, Seattle, WA (*Senior Author, as Professor*)
- 2012 UW College of Engineering Student Research Innovator
UbiComp 2012 Best Paper Award Nomination (*First Author, as Student*)
Madrona Prize for Research Excellence and Commercial Appeal, UW CSE Affiliates 2012
CHI 2012 Best Paper Award Nomination (*Supporting Author, as Student*)
Intel Science and Technology Fellowship
- 2011 CHI 2011 Best Paper Award Nomination (*First Author, as Student*)
- 2010 Yang Research Award Finalist
Chair's Award for Outstanding Teaching Assistant
Madrona Prize for Research Excellence and Commercial Appeal, UW CSE Affiliates 2010
- 2009 UbiComp 2009 Best Paper Award Nomination (*Supporting Author, as Student*)
- 2008 OSU Distinguished Regents Scholarship
- 2006 President of Eta Kappa Nu Omega Chapter
- 2004 Inducted into Eta Kappa Nu, Electrical Engineering Honor Society
Dowty-Carlson Scholarship Recipient
- 2002 Naeter Scholarship Recipient

10. EXTERNAL FUNDING AND SPONSORED RESEARCH

***WARNING** - This section contains funding descriptions that are restricted by the International Traffic in Arms Regulations (ITAR). As such, further information about the research may not be available.

Funding Summary:

Assistant Professor (2013-2019): \$2.5M (6 Agencies including Dept. Homeland Security)
Associate Professor (2019-pres.): \$1.5M (NSF)

- 2019 [EF.15] National Science Foundation
PI: Corey Clark
Co-PIs: **Eric C. Larson**, Leanne Ketterlin-Geller
Title: "STEM+C: Teaching Computer Science and Computational Thinking with Community Gaming"
Amount: \$1,521,616
Duration: September 2019—August 2023

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- 2019 [EF.14] *Raytheon Information and Intelligence Systems (Private Sponsored)
PI: Mitch Thornton
Co-PIs: **Eric C. Larson**
Title: "Cyber Security Research Projects"
Amount: \$40,000
Duration: August 2019—March 2020
- [EF.13] *Amida Technologies (Private Sponsored)
PI: **Eric C. Larson**
Co-PIs: Jennifer Dworak
Title: "Trojan Placement through Estimation of Criticality and Observability with Recurrent Neural Networks"
Amount: \$60,000
Duration: June 2019—March 2020
- 2018 [EF.12] *Raytheon Information and Intelligence Systems (Private Sponsored)
PI: Mitch Thornton
Co-PIs: **Eric C. Larson**
Title: "Third-Party Data Supply Chain Integrity Enhancement"
Amount: \$75,000
Duration: December 2018—December 2019
- [EF.11] *Raytheon Information and Intelligence Systems (Private Sponsored)
PI: **Eric C. Larson**
Co-PIs: Mitch Thornton
Title: "Investigation of Unconventional Biometrics with Mobile Devices "
Amount: \$75,000
Duration: December 2018—December 2019
- [EF.10] Department of Homeland Security
PI: Bruce Gnade
Co-PIs: **Eric C. Larson**, Joseph Camp, Manuel Quevedo
Title: "Radiation Background Characterization for Enhanced Anomaly Detection"
Yearly Amount: \$305,690, *Incrementally Awarded up to:* \$1,505,787
Duration: September 2018—August 2023
- [EF.09] *L3 Link (Private Sponsored)
PI: **Eric C. Larson**
Co-PIs: Suku Nair
Title: "Human Performance Optimization using Biometric Indices: Validation for Targeted Pilot Population"
Amount: \$187,352
Duration: September 2018—December 2019
- [EF.08] *Raytheon Information and Intelligence Systems (Private Sponsored)
PI: **Eric C. Larson**
Co-PIs: Mitch Thornton, Fred Chang
Title: "Unconventional Biometrics with Mobile Devices and Machine Learning"
Amount: \$100,000
Duration: May 2018—May 2019

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- [EF.07] *Raytheon Information and Intelligence Systems (Private Sponsored)
PI: Mitch Thornton
Co-PIs: **Eric C. Larson**
Title: "IoT Device Sensor Arrays"
Amount: \$130,000
Duration: Jun. 2018—Mar. 2019
- [EF.06] *Raytheon Information and Intelligence Systems (Private Sponsored)
PI: Mitch Thornton
Co-PIs: **Eric C. Larson**
Title: "Network Discovery Research"
Amount: \$100,000
Duration: May 2018—May 2019
- 2017 [EF.05] *Raytheon Information and Intelligence Systems (Private Sponsored)
PI: Mitch Thornton
Co-PIs: **Eric C. Larson**, Fred Chang
Title: "IoT Distributed Sensors Research"
Amount: \$100,000
Duration: Sep. 2017—May. 2018
- [EF.04] DigiDoc Technologies (Private Sponsored)
PI: **Eric C. Larson** (100%)
Title: "Data collections and algorithmic development for blood oxygenation measurement using commodity smartphone cameras"
Amount: \$29,110
Duration: Jun. 2017—Jun. 2018
- 2017 [EF.03] *Raytheon Information and Intelligence Systems (Private Sponsored)
PI: **Eric C. Larson**
Co-PIs: Mitch Thornton, Fred Chang
Title: "Mission Value Calculus Engine in Support of Decision Making and Asset Allocation"
Amount: \$100,000
Duration: Sep. 2017—May. 2018
- 2016 [EF.02] DigiDoc Technologies (Private Sponsored), Undergraduate Fellowship
PI: **Eric C. Larson**
Title: "DigiDoc Undergraduate Fellowship in CSE with Specialization in Asthma Management using Smartphones "
Amount: \$10,000
Duration: Jan. 2016—May 2016
- 2015 [EF.01] National Institutes of Health (NIH), Exploratory/Developmental Bioengineering Research Grants (EBRG) [R21]
PI: James Taylor
SMU Co-PI: **Eric C. Larson**
Other Personnel: James Stout, Shwetak Patel
Title: "An Evaluation of a Novel Technology to Assess Neonatal Jaundice"
Total Amount: \$428,315.30 *SMU Amount:* \$26,743
Duration: Apr. 2015—Mar. 2018

11. INTERNAL FUNDING

- 2019 [IF.06] Lyle School of Engineering Research Seed Funding
PI: Bruce Gnade
Co-PIs: **Eric C. Larson**
Title: "Development of CMOS-based Rotational Spectroscopy"
Amount: \$30,900
Duration: April 2019—Dec. 2019
- 2018 [IF.05] Lyle School of Engineering Research Seed Funding
PI: **Eric C. Larson**
Co-PIs: Eli Olinick, Michael Hahsler, Paul Kruger
Title: "Deep Convolutional Networks for Forgery Classification and Anomaly Detection "
Amount: \$21,120
Duration: May 2018—Dec. 2018
- 2017 [IF.04] Office of Provost Special Seed Funding
PI: **Eric C. Larson**
Co-PIs: Pavel Klimovich
Title: "Binding Affinity Prediction via Collaborative Filtering with Latent Factors"
Amount: \$30,000
Duration: Aug. 2017—Feb. 2018
- [IF.03] Just-in-Time Teaching and Technology Grants
PI: **Eric C. Larson**
Title: "Augmented Reality with CoreML iOS Development for CSE5323/CSE7323"
Amount: \$1,000
Duration: Aug. 2017—Dec. 2017
- 2014 [IF.02] Lyle School of Engineering Research Seed Funding
PI: **Eric C. Larson**
PI: Joseph Camp
Title: "Phone-as-a-Sensor Health Monitoring with Body Area Networks"
Amount: \$20,608
Duration: May 2014—Dec. 2014
- 2013 [IF.01] SMU Laboratory Upgrade Grant
PI: **Eric C. Larson**
Title: "Laboratory Upgrades in Mobile Application Development, Embedded Mobile Sensing, and Peripheral Communication on a Mobile Device "
Amount: \$14,632
Duration: Dec. 2013—May 2014

12. BOOKS AND BOOK CHAPTERS

*Refers to SMU Student Authors or SMU Post-doctoral Researchers in my Research Lab

- 2016 [B.02] **E. C. Larson**, E. Saba, S. Kaiser*, M. Goel, S. Patel (2016). Pulmonary Monitoring Using Smartphones. *Mobile Health: Sensors, Analytic Methods, and Applications*, editors James M. Rehg, Susan A. Murphy, & Santosh Kumar. Book Chapter.
- 2014 [B.01] M. Stiber, B. Stiber, and **E.C. Larson** (2014). Signal Computing: Digital Signals in the Software Domain. [Open Access Book](#). Textbook.

13. REFEREED JOURNAL PUBLICATIONS

* Refers to SMU Student Authors or SMU Post-doctoral Researchers in my Research Lab

.X Refers to papers that are not yet accepted for publication

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- 2019 [J.X] R. Mundada*, L. Nibhrat*, A. McCarthy*, R. Howell*, and **E.C. Larson**. AirWare: Utilizing Convolutional Architectures for In-Air Hand-Gesture Recognition with Multi-modal Audio Doppler and Infrared Signals. *IEEE Transactions on Mobile Computing*. *In Submission*.
- [J.11] F. Chang, **E.C. Larson**, and M. Fontenot (2019). "Computer Science Education: Fueling Tomorrow's Technology Growth." *Georgetown Journal of International Affairs*. <https://www.georgetownjournalofinternationalaffairs.org/?category=Science+%26+Technology>
- [J.10] X. Ding*, A. Doyle*, K. Donahoo*, E. Bing, R. Rajgopal, and **E.C. Larson** (2019). "EduAware: Using Tablet-Based Navigation Gestures to Predict Learning Module Performance." *Journal of Interactive Learning Environments*. <https://www.tandfonline.com/doi/abs/10.1080/10494820.2019.1609524>
- [J.09] T. Giallanza*, T. Siems*, E. Sharp*, I. Johnson*, E. Gabrielsen*, M. Thornton, and **E.C. Larson** (June 2019). Keyboard Snooping via Mobile Phones: Threats of Device Arrays. *Journal of Interactive, Wearable, and Ubiquitous Technology (IMWUT)*.
- 2018 [J.08] X. Ding*, D. Nassehi, and **E.C. Larson**. Measuring Oxygen Saturation using Convolutional Neural Networks on Smartphones. *IEEE Journal of Biomedical and Health Informatics, JBHI* (2018).
- [J.07] R. Srinivas*, P. Klimovich*, and **E.C. Larson**. Implicit-descriptor ligand-based virtual screening by means of collaborative filtering. *Journal of Cheminformatics*. 10, no. 1 (2018): 56.
- 2017 [J.06] C. Wangwiwattanna*, X. Ding*, and **E.C. Larson**. PupilNet, Measuring Task Evoked Pupillary Response using Commodity RGB Tablet Cameras: Comparison to Mobile, Infrared Gaze Trackers for Inferring Cognitive Load (Dec. 2017). *Journal of Interactive, Wearable, and Ubiquitous Technology (IMWUT)*.
- [J.05] J. Taylor, J. Stout, L. deGreef, M. Goel, S.N. Patel, E. Chung, A. Koduri, S. McMahon, J. Dickerson, E. Simpson, and **E. C. Larson** (2017). Use of a Smartphone App to Assess Neonatal Jaundice. *Journal of Pediatrics*. August 2017: p.e20170312.
- 2011 [J.04] **E. C. Larson**, J. Froehlich, T. Campbell, C. Haggerty, L. Atlas, J. Fogarty, and S. N. Patel, (2011). "Disaggregated Water Usage Sensing from a Single, Non-Intrusive Sensor: an Extended Analysis of HydroSense using Staged Experiments." *The Pervasive and Mobile Computing Journal (PMC)*. 8(1):82-102.
- [J.03] J. Froehlich, **E.C. Larson**, S. Gupta, G. Cohn, M. Reynolds, S.N. Patel (2011). "Disaggregated End-Use Energy Sensing for the Smart Grid" *IEEE Pervasive Computing, Special Issue on Smart Energy Systems*. 10(1):28-39.
- 2010 [J.02] **E. C. Larson** and D. M. Chandler (2010). "The Role of Strategy in Image Quality: The Most Apparent Distortion," *Journal of Electronic Imaging*, 19(1), 011006, January-March 2010. **Featured on Cover, Most Cited Article in JEI**
- 2010 [J.01] **E. C. Larson** and G. Yen (2010). "Facial Feature Tracking via Evolutionary Multi-objective Optimization," *International Journal of Applied Evolutionary Computation (IJAEC)*, 1(1):57-71, 2010.

14. REFEREED CONFERENCE PUBLICATIONS

* Refers to SMU Student Authors or SMU Post-doctoral Researchers in my Research Lab

.X Refers to papers that are not yet accepted for publication

My research is often interdisciplinary, attracting readers with various backgrounds. It is worth noting that unlike in many academic fields, premiere conferences (such as CHI, UIST, and UbiComp) are highly selective venues intended for archival papers only. These conferences exceed many IEEE journals in their selectivity, visibility, and impact. For a study of the impact of ACM conference proceedings, see [Conference Paper Selectivity and Impact](#) by Jilin Chen and Joseph Konstan.

- 2019 [C.X] C. Wangwiwattana*, S. Agarwal*, and **E. C. Larson** (2019). "The Effectiveness of Notification Types to Initiate Aversive Action in Writing Procrastination." International Conference on Pervasive Computing (PerCom). 2019. *In Preparation*.
- [C.X] R. Oshanna, **E.C. Larson**, and M. Thornton (2019). "Detection of SPECTRE Exploitation using Machine Learning and Processor Core Events." IEEE International Symposium on Hardware Oriented Security and Trust (HOST). *In Preparation*.
- [C.31] X. Qu*, M. El-Saied*, J. Gahan, R. Steinberg, and **E.C. Larson** (2019). "Machine Learning using a Multi-task Convolutional Neural Networks Can Accurately Provide Robotic Skills Assessment." 2019 World Congress of Endourology. October 2019, Abu Dhabi.
- [C.30] X. Ding* and **E.C. Larson** (2019). "Why Deep Knowledge Tracing has less Depth than Anticipated." 2019 Conference on Educational Data Mining.
- [C.29] T. Giallanza*, E. Gabrielsen*, M. Taylor*, **E.C. Larson**, and M. Thornton (2019). "Task Value Calculus: Fast Adaptive Optimization of Tasks for Multi-objective Diagrams." International Symposium on Multi-Valued Calculus. May 2019, Alberta, CA.
- [C.28] S. Douglas and **E.C. Larson** (2019). Relationships Between Deep Learning and Linear Adaptive Systems. ICASSP 2019. **Invited Paper**.
- 2016 [C.27] S. Kaiser*, A. Parks*, P. Leopard*, C. Albright*, J. Carlson*, M. Goel, D. Nassehi, **E.C. Larson**. (2016). Design and learnability of vortex whistles for managing chronic lung function via smartphones. In Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp 2016). Heidleberg, Germany. September 2016.
Acceptance Rate: 26% (101/389)
- [C.26] M. Goel, E. Saba, M. Stiber, E. Whitmire, J. Fromm, **E.C. Larson**, G. Borriello, S. Patel (2016). Spirocall: Measuring lung function over a phone call. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems 2016 May 7 (CHI 2016).
Nominated for Best Paper
Acceptance Rate: 23% (565/2435)
- 2015 [C.25] S. Rafiqi*, C. Wangwiwattana*, E. Fernandez, S. Nair, and **E. C. Larson** (2015). "Work-in-progress, PupilWare-M: Cognitive Load Estimation Using Unmodified Smartphone Cameras." 12th Annual IEEE International Conference on Mobile Ad hoc and Sensor Systems (MASS 2015). Dallas, TX. October 2015.
- [C.24] S. Rafiqi*, C. Wangwiwattana*, J. Kim*, E. Fernandez, S. Nair, and **E. C. Larson** (2015). "PupilWare: Towards Pervasive Cognitive Load Measurement using Commodity Devices." 8th International Conference on Pervasive Technology Related to Assistive Environments (PETRA 2015). Corfu, Greece. July 2015.
- [C.23] K. Chen, S. Gupta, **E. C. Larson**, S. Patel (2015). "DOSE: Detecting User-Driven Operating States of Electronic Devices from a Single Sensing Point." Proceedings of the International Conference on Pervasive Computing (PerCom 2015). Saint Louis, Missouri. January 2015.

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- 2014 [C.22] L. DeGreef, M. Goel, M. Seo, J. Stout, J. Taylor, **E.C. Larson**, and S. Patel (2014). "BiliCam: Using Mobile Phones to Measure Newborn Jaundice." Proceedings of the 16th International Conference on Ubiquitous Computing. (UbiComp 2014). Seattle, WA. September 2014.
Nominated for Best Paper
Acceptance Rate: 21% (94/454)
- [C.21] **E.C. Larson** (2014). "Consumer Centered Calibration for End-use Water Monitoring." Proceedings of the Workshop on Non-intrusive Load Monitoring 2014.
Acceptance Rate: 30% (7/23)
- 2013 [C.20] J. Lindsay, I. Jiang, **E.C. Larson**, R. Adams, S.N. Patel, & B. Hannaford (2013). "Good Vibrations: An Evaluation of Vibro-tactile Impedance Matching for Low Power Wearable Applications." Proceedings of UIST 2013. St. Andrews, UK, October 8-11, 2013.
Acceptance Rate: 19% (60/317)
- [C.19] M. Aumi, S. Gupta, M. Goel, **E.C. Larson**, and S.N. Patel (2013). "DopLink: Using the Doppler Effect for Multi-Device Interaction." Proceedings of the 15th International Conference on Ubiquitous Computing. (UbiComp 2013). Zurich Switzerland. September 8-12, 2013.
Acceptance Rate: 23% (92/394)
- [C.18] **E.C. Larson**, M. Goel, M. Redfield, G. Boriello, M. Rosenfeld, and S.N. Patel (2013). Tracking lung function on any phone. Proceedings of the 3rd ACM Symposium on Computing for Development, 29:1-29:2. 10.1145/2442882.2442917
- 2012 [C.17] **E.C. Larson**, M. Goel, G. Boriello, S. Heltshe, M. Rosenfeld, and S.N. Patel (2012). "SpiroSmart: Using a Microphone to Measure Lung Function on a Mobile Phone." Proceedings of the 14th International Conference on Ubiquitous Computing (UbiComp 2012), Pittsburgh, USA, Sep 5-8, 2012.
Nominated for Best Paper
Acceptance Rate: 19% (58/301)
- [C.16] J. Froehlich, L. Findlater, M. Ostergren, S. Ramanathan, J. Peterson, I. Wragg, **E.C. Larson**, F. Fu, M. Bai, S.N. Patel, J. Landay (2012). "The Design and Evaluation of Prototype Eco-Feedback Displays for Fixture-Level Water Usage Data." Proceedings of the 2012 ACM Annual Conference on Human Factors in Computing Systems (CHI 2012), 2367-2376, Austin, TX May 2012.
Best Paper Honorable Mention
Acceptance Rate: 23% (363/1577)
- [C.15] T. Phan, **E.C. Larson**, S. Sohoni, and D. Chandler (2012). "Performance-Analysis-Based Acceleration of Image Quality Assessment." IEEE Southwest Symposium on Image Analysis and Interpretation (SSIAI 2012), 81-84, April 2012.
- [C.14] E. Saba, **E. C. Larson**, and S. N. Patel (2012). "DANTE Vision: In-Air and Touch Gesture Sensing for Natural Surface Interaction with Combined Depth and Thermal Cameras." First Annual Conference on Emerging Signal Processing Applications (ESPA 2012), 167-170, January 2012.
Acceptance Rate: 38% (52/137)
- 2011 [C.13] **E. C. Larson** T. Lee, S. Liu, M. Rosenfeld, and S. N. Patel (2011). "Accurate and Privacy Preserving Cough Sensing from a Low Cost Microphone." Proceedings of the 13th International Conference on Ubiquitous Computing (UbiComp 2011), 375-384, Beijing, China, September 2011.
Acceptance Rate 16.6% (50/302)

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- [C.12] **E.C. Larson**, J. Froehlich, E. Saba, T. Campbell, L. Atlas, J. Fogarty, S.N. Patel (2011). "A Longitudinal Study of Pressure Sensing to Infer Real-World Water Usage Events in the Home." Proceedings of the Ninth International Conference on Pervasive Computing (Pervasive 2011). 50-69, San Francisco, CA, June 12-15, 2011.
Acceptance Rate: 23.6% (22/93)
- [C.11] **E.C. Larson**, G. Cohn, S. Gupta, X. Ren, B. Harrison, D. Fox, S.N. Patel (2011) "HeatWave: Thermal Imaging for Surface user Interaction." Proceedings of the 2011 ACM Annual Conference on Human Factors in Computing Systems (CHI 2011), 2565-2574, Vancouver, Canada, May 7 - 12, 2011.
Best Paper Honorable Mention
Acceptance Rate: 25%
- 2010 [C.10] T. Campbell, **E.C. Larson**, G. Cohn, J. Froehlich, R. Alcaide and S.N. Patel (2010). "WATTR: A Method for Self-Powered Wireless Sensing of Water Activity in the Home." In Proceedings of the 12th ACM International Conference on Ubiquitous Computing (UbiComp 2010). 169-172, Copenhagen, Denmark, September 2010.
Acceptance Rate: 19% (39/202)
- [C.09] G. Cohn, S. Gupta, J. Froehlich, **E. C. Larson**, and S. Patel (2010). "GasSense: Appliance-Level, Single-Point Sensing of Gas Activity in the Home" Proceedings of the Eighth International Conference on Pervasive Computing (Pervasive 2010), 265-282, Helsinki, Finland, May 17-20.
Acceptance Rate: 17%
- 2009 [C.08] J. Froehlich, **E. C. Larson**, C. Haggerty, T. Campbell, S. Patel, and J. Fogarty (2009). "HydroSense: Infrastructure-Mediated Single-Point Sensing of Whole Water Home Activity In Proceedings of the 11th ACM International Conference on Ubiquitous Computing (UbiComp 2009), Orlando, FL, September 2009.
Nominated for Best Paper
Acceptance Rate: 12.4%
- [C.07] **E. C. Larson** and D. M. Chandler (2009). "The Most Apparent Distortion: A Dual Strategy for Full Reference Image Quality," Proc. SPIE Image Quality and System Performance, 7242, January 2009.
- 2008 [C.06] **E. C. Larson** and D. Chandler (2008). "Unveiling relationships between regions of interest and image fidelity metrics." Visual Communications and Image Processing 2008 (VCIP 2008), 6822, 2008,
- [C.05] **E. C. Larson** and G. Yen (2008). "Facial feature tracking in dynamic bandwidth environments: a genetic approach," IEEE World Congress on Computational Intelligence (CEC 2008), 2819-2826, June 2008.
- [C.04] V. Kadiyala, S. Pinneli, **E. C. Larson**, and D. M. Chandler (2008). "Quantifying the Perceived Interest of Objects in Images: Effects of Size, Location, Blur, and Contrast," Proc. Human Vision and Electronic Imaging 2008 (HVEI 2008), San Jose, CA, January 2008.
- [C.03] **E. C. Larson**, C. Vu, and D. Chandler (2008). "Can Visual Fixation Patterns Improve Image Fidelity Assessment?," Proc. of the International Conference on Image Processing (ICIP 2008), 2572-2575, 2008.
- [C.02] C. Vu, **E.C. Larson**, and D.M. Chandler (2008). Visual fixation patterns when judging image quality: Effects of distortion type, amount, and subject experience. In *Image Analysis and Interpretation, 2008. SSIAI 2008. IEEE Southwest Symposium on* (pp. 73-76). IEEE.

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- 2007 [C.01] **E. C. Larson** and D. Chandler (2007). "Explaining Crypsis and Information Content in the Mammalian Visual Pathway using Statistical Measures of Animal Camouflage," OSA Fall Vision Meeting 2007, January 2007.

15. PATENTS

- 2018 [P.08] **E.C. Larson**, M. Thornton, I. Johnson*, E. Gabrielsen*, and T. Siems*. Method and System for Increasing the Effective Sample Rate of a Sampled Signal. *Provisional Patent Filed*.
- 2017 [P.07] **E.C. Larson**, Spencer Kaiser*, Ashley Parks*, Patrick Leopard*, and Damoun Nassehi (2017). Vortex Whistle Devices and Systems and Methods for Spirometry Measurements. App No. 15/702351. US Patent Pending.
[License Agreement with DigiDoc Technologies](#)
- 2014 [P.06] **E.C. Larson**, M. Goel, L. DeGreef, S. Patel, J. Stout, and J. Taylor (2014). "Devices, Systems and Methods for Estimating Bilirubin Levels." App No. PCT/US2014/024761. US Patent Pending
[License Agreement with Google](#)
- [P.05] **E.C. Larson**, M. Goel, and S.N. Patel (2014). "Sound-Based Spirometric Devices, Systems and Methods." App. No. 14/400,064. US Patent Pending
[License Agreement with Google](#)
- 2013 [P.04] T. Campbell, **E.C. Larson**, G. Cohn, S.N. Patel (2013). "Automatic Valve Shutoff Device and Methods." WO Patent 2,013,106,690. US Patent Pending.
[License Agreement with Allstate Insurance](#)
- 2012 [P.03] S. Patel, **E.C. Larson**, T. Lee, S. Liu (2012). "Cough Detecting Methods and Devices for Detecting Coughs." WO Patent 2,013,040,485. US Patent Pending.
[License Agreement with Google](#)
- [P.02] T. Campbell, **E. C. Larson**, G. Cohn, R. Alcaide, J. Froehlich, S. Patel (2012). "Systems and Methods for Energy Harvesting in a Contained Fluid Circuit." WO Patent 2,012,021,551. US Patent Pending.
- 2009 [P.01] S. Patel, J. Fogarty, J. Froehlich, **E. C. Larson**. "Sensing Events Affecting Liquid Flow in a Liquid Distribution System." EP Patent 2,440,901.
[License Agreement with Phin Technologies and Belkin Technologies](#)

16. OTHER PUBLICATIONS

These publications refer to publications resulting from student projects in the SMU Master of Science in Data Science which are **internally reviewed at SMU**, or other sources with only minimal peer review. While these publications represent excellent projects from students, they **do not count toward scholarly citations**.

- 2018 [OP.05] Z. Raziei, X. Ding*, **E.C. Larson**, M. Hahsler, P. Krueger, and E. Olinick. "Deep Convolutional Networks for Forgery Classification and Anomaly Detection." INFORMS 2018.
- [OP.04] Jessica Wheeler*, Jean Jecha*, Manjula Kottegoda*, Sharon Teo*, Julie Fast and **E.C. Larson** (2018). "Bipolar Mania Eye Image Classification." SMU Data Science Review, Vol. 1. March 2018. <https://scholar.smu.edu/datasciencereview/vol1/iss1/1>
- [OP.03] Karen Clark*, Mridul Jain*, Araya Messa*, Vinh Le*, and **E.C. Larson** (2018). "Open Cycle: Forecasting Ovulation for Family Planning." SMU Data Science Review, Vol. 1. March 2018. <https://scholar.smu.edu/datasciencereview/vol1/iss1/2>
- [OP.02] Claire Chu*, Bill Kerneckel*, Nathan Mowat*, Christopher Woodard*, and **E.C. Larson** (2018). "Comparative Study: Reducing Cost to Manage Accessibility with Existing Data." SMU Data Science Review, Vol. 1. March 2018.
<https://scholar.smu.edu/datasciencereview/vol1/iss1/5>

[OP.01] Andrew Abbott*, Alex Deshowitz*, Dennis Murray*, and **E.C. Larson** (2018). "WalkNet: A Deep Learning Approach to Improving Sidewalk Quality and Accessibility." SMU Data Science Review, Vol. 1. March 2018.
<https://scholar.smu.edu/datasciencereview/vol1/iss1/7>

17. TEACHING

Teaching Awards **2016 Professor of the Year**, Honoring Our Professors of Excellence (HOPE) College-wide Award Given Annually to One SMU Professor

Courses Redesigned **CSE8321 Neural Networks and Machine Learning**

Lecture Course on Contemporary Research in Neural Networks including Generative Models, Transfer Learning, Neural Visualization, and Reinforcement Learning. First Offering in Spring 2019.

Teaching Format: Interactive Lectures with Demonstration Code built into Lecture Slides.

Courses Created **CSE5324/7324 Machine Learning in Python**

Lecture Course on Machine Learning Methods, with Emphasis on Neural Networks and Deep Learning. Uses Flipped Modules for five lectures, with emphasis on projects related to data classification and regression. Offered once every semester to accommodate demand for course. Enrollment consistently exceeds 50 students.

Teaching Format: Traditional Lecture, Live Coding Demonstrations, Live Polling, Flipped Lecture Format with In-Class Assignments

CSE5323/7323 Mobile Sensing, and Learning in iOS

Lecture and Lab Course for Accessing, Processing, and Learning from Sensors on Mobile Devices. Five flipped modules with emphasis on design of iOS applications. Seven apps dues during the semester, including final project app. Usage of CoreML in iOS for local machine learning as well as RESTful API for cloud processing. Offered every other semester. Enrollment consistently stays at 24 students (maximum that lab can accommodate).

Teaching Format: Traditional Lecture, Live Coding Demonstrations, Flipped Lecture Format with In-Class Assignments

CSE5325/7325 Ubiquitous Computing

Lecture Course on Human-Computer Interaction Methods for Wearables and Ubiquitous Technology. Seven flipped modules and ten lectures discussing various papers published in the field. Emphasis on creating of technology and evaluation of technology for final project. Offered every other semester. Enrollment consistently exceeds 20 students.

Teaching Format: Traditional Lecture, Student Led Paper Discussions, Flipped Lecture Format with In-Class Assignments

	MSDS7331 Data Mining for Data Scientists
	Flipped Lecture Format Course, Specialized for Master in Data Science. Course was created and filmed by Professor Larson, including design of all live format curriculum and projects. Emphasis on breadth of data mining concepts including visualization, regression, classification, clustering, association mining, and collaborative filtering. Twelve sections offered yearly with 10-15 students per section (with adjunct lecturers in MSDS program). One of the highest rated courses in the MSDS program.
	<i>Teaching Format:</i> Online Format Class with Video Lectures Each Week and One Live Lecture Period, Live Coding Demonstrations, Flipped Lecture Format with In-Class Assignments (Virtual Student Groups)
Other Courses Taught at SMU	CSE8098 Computer Science Seminar. Offered every semester. Serves as orientation to graduate students. Professor Larson has manipulated this course to include instruction on giving technical presentations, writing papers, and generally navigating graduate life during first three weeks of course. Remainder of course is reserved for research talks from various speakers, mostly external to SMU.
	CSE5331/7331 EMIS5332/7332 Introduction to Data Mining
	CSE7331 Data Mining, SMU-Raytheon Garland Program
Student Comments	<i>"...all of the notebooks that Dr. Larson provided were incredibly helpful. He provides the best resources by far in the program. He is an accomplished coder and you can tell by the way that he explains the code as he works through the problems. His videos are extremely professional..."</i>
	<i>"Eric Larson is a fantastic and gifted teacher and does not need to change anything at all about his teaching style. He is excellent at engaging the class, is knowledgeable and passionate about the subject, and willing to help students at any time outside of class."</i>
	<i>"One of my favorite instructors at SMU"</i>
	<i>"Professor Larson is by far one of, if not the best professor I have ever had. He is able to teach complicated topics in an extremely approachable way."</i>
Other Courses Offered at Outside Universities	CSS457 Multimedia and Signal Computing (UW Bothell)
	EE518 Advanced Digital Signal Processing (UW Seattle) Lecturer for Recitation, Professional Master's Program
	EE233 Circuit Analysis II (UW Seattle) Lab Manager, Lecturer for Recitation
	ECEN 3714 Network Analysis (OSU Stillwater) Lab Manager, Lecturer for Recitation
	ECEN 3021 Experimental Methods II (OSU Stillwater) Lab Manager, Lecturer for Recitation

18. INVITED AND SELECTED TECHNICAL TALKS

2019	[V.36]	Evaluating Robotic Surgery with Deep Learning Techniques, <i>Dallas, TX</i> , UTSW Special Presentation, May 2019
	[V.35]	Anomaly Detection in Spectral Processing, SWRI Collaboration Meeting, <i>San Antonio TX</i> , May 2019
	[V.34]	Smartphone Side Channels for Keystroke Identification, Raytheon Research Symposium 2019, <i>Garland TX</i> , April 2019
	[V.33]	Data Forensics with Machine Learning, <i>Dallas, TX</i> , SEED Funding Delivery, March 2019
	[V.32]	Using Machine Learning for Smartphone Based Health Sensing, <i>Dallas, TX</i> , UTSW Artificial Intelligence Seminar, March 2019

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- [V.31] Research Overview of Deason Institute, *Dallas, TX*, Special Presentation, February 2019
 - [V.30] Side Channel Sensing. *Dulles, VA*. Special Presentation, January 2019
 - 2018 [V.29] Mobile Phone Array Sensing. *Dulles, VA*. Special Presentation. October 2018.
 - [V.28] Flipping the Clinic with Mobile Machine Learning. *Dallas, TX*, IEEE / CIE Technical Symposium, March 2018
 - 2017 [V.27] Natural Keyboard Sensing. *Dulles, VA*. Special Presentation. December 2017.
 - [V.26] Context Aware Computing with Embedded Sensing. *Dallas, TX*. SMU Research Seminar. October 2017.
 - 2016 [V.25] Design and Learnability of Vortex Whistles, *Heidelberg, Germany*, UbiComp 2016, September 2016
 - 2015 [V.24] PupilWare: Towards Pervasive Cognitive Load Measurement Using Commodity Devices, *Corfu, Greece*
International Conference on Pervasive Technology Related to Assistive Environments 2015, July
 - [V.23] Human Activity Recognition Through IMS: The Case for Active Learning, *Dallas, TX*
NSF CRI Workshop, May 1, 2015
 - [V.22] Mobile Health for the Masses, *Dallas, TX*
Lyle Download Series Southern Methodist University, Mar 25, 2015
 - 2014 [V.21] Consumer Centered Calibration for End-Use Water Monitoring, *Austin, TX*
University of Texas, Jun 3, 2014
 - [V.20] Big Data, Small Data: The Future of Sensing in Sustainability and Health, *Dallas, TX*
University of Texas at Dallas, Feb 15, 2014
 - [V.19] Phone as a Sensor Technology: mHealth and Chronic Disease, *Dallas, TX*
University of Texas at Arlington, Jan 31, 2014
 - 2013 [V.18] Mirroring Research Through Commercial Development, *Dallas, TX*
Southern Methodist University, Industrial Affiliates Meeting, Nov 1, 2013 |
 - [V.17] Creating the Dots: Computer Science and Engineering for Good, *Dallas, TX*
Southern Methodist University, Undecided Majors Forum, Oct 2, 2013
 - [V.16] Mobilizing mHealth: Interdisciplinary Computer Science and Engineering, *Dallas, TX*
Southern Methodist University, CSE Seminar, Sep 11, 2013
 - [V.15] Semi-Supervised Training for Infrastructure Mediated Sensing: Disaggregated Hot and Cold Water Sensing With Minimal Calibration, *Seattle, WA*
Dissertation Defense, Jun 10, 2013
 - [V.14] BreatheSuite: A Medical Device in Your Pocket, *Seattle WA*
Global Social Entrepreneurship Competition, Mar 15, 2013
 - [V.13] Linear Predictive Coding, Applications and Derivation, *Indiana*
Rose Hulman Institute of Technology, Feb 23, 2013
 - [V.12] Indirect, Ubiquitous Sensing, *Various Universities*
Research Talk, Various Dates

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- 2012 [V.11] Sensing for Sustainability: Disaggregated Sensing of Electricity, Water, and Gas, *Berkeley, CA*
Invited Talk, i4Energy CITRIS Fall Seminar, 2012
- [V.10] SpiroSmart: Measuring Lung Function from a Mobile Phone, *Pittsburg, PA*
International Conference on Ubiquitous Computing 2012
- [V.09] Indirect Water End-Use Sensing: Consumption, Disaggregation, and Feedback, *Berkeley, CA*
Invited Talk, 2012 ACEEE Hot Water Forum
- [V.08] OpenCV for Ubiquitous Computing. *Seattle, WA*
Invited Lecture, CSE599 - Ubiquitous Computing
- 2011 [V.07] Accurate and Privacy Preserving Cough Sensing. *Beijing, China*
International Conference on Ubiquitous Computing 2011
- [V.06] A longitudinal Study of Pressure in the Home, *San Francisco, CA*
International Conference on Pervasive Computing 2011
- [V.05] Where Ubiquitous Computing Meets Signal Processing. *Atlanta, GA*
Invited Talk, Georgia Institute of Technology
- [V.04] HeatWave: Thermal Imaging for Surface Interaction. *Vancouver, Canada*
International Conference on Human-Computer Interaction 2010
- 2010 [V.03] Disaggregated Water Sensing from a Single Sensor. *Berkeley, CA*
Invited Talk, 2010 ACEEE Hot Water Forum,
- [V.02] Machine Learning Toolkits. *Seattle, WA*
Invited Lecture, CSE599 - Ubiquitous Computing, November
- 2009 [V.01] The Most Apparent Distortion: A Dual Strategy for Image Quality, *San Francisco, CA*
SPIE Image Quality and System Performance, January

19. SERVICE

- 2018 Committee Member for 10 Year Impact Award Paper in Ubiquitous Computing
- 2017-present Associate Editor for Journal of Interactive, Mobile, Wearable, and Ubiquitous Technology
- 2016-present Member of SMU Human Subjects Board and IRB
- 2016 Committee Member on Taskforce to Review Lyle Engineering Senior Design
- 2015-2016 Program Committee Member for International Conference on Ubiquitous Computing and Best Paper Selection Committee
- 2014-present Faculty in Charge for Computer Science Research Seminar