Shwetak N. Patel, Ph.D

Computer Science & Engineering
Electrical Engineering
University of Washington
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EDUCATION

Georgia Institute of Technology   **8/2003 – 8/2008**
Ph.D., Computer Science
Area: Human-Computer Interaction, Mobile and Ubiquitous Computing
Thesis Title: *Infrastructure Mediated Sensing (Nominated for ACM Dissertation Award)*
Advisor: Dr. Gregory D. Abowd
GPA: 4.0/4.0

Georgia Institute of Technology   **8/2000 – 5/2003**
Bachelors of Computer Science
Area: Human-Computer Interaction, Mobile and Ubiquitous Computing
Advisor: Dr. Gregory D. Abowd
GPA: 4.0/4.0 (Highest Honors)

Jefferson County International Baccalaureate High School , Alabama   **8/1996 – 5/2000**
International Baccalaureate Diploma
GPA: 4.0/4.0

HONORS AND AWARDS

- Microsoft Research New Faculty Fellowship (2011)
- College of Engineering Community of Innovators Junior Faculty Innovator Award (2011)
- Outstanding Research Advisor Award in Electrical Engineering (2011)
- Outstanding Teaching Award Finalist in Electrical Engineering (2011)
- Wired Magazine Cover Story – July (2011)
- 2010 Newsmakers of the Year by TechFlash and Seattle Business Journal (2010)
- 2010 Top Innovator by Seattle Business Magazine – Featured on Magazine Cover (2010)
- Outstanding Research Advisor Award Finalist in Electrical Engineering (2010)
- TR-35 Award Recipient: MIT Technology Review's Top Young Innovator under the age of 35 (2009)

- HydroSense: Best Clean-Tech Idea at 2009 Washington BPC (2009)
- Nominated by Georgia Tech for the ACM doctoral dissertation award (2008)
- College of Computing Top Graduate Research Assistant Award (2007)
- Georgia Tech Graduate Symposium, College Top Award (2007)
- Top Technology Idea from New York Times Magazine, awarded to Capture Resistant Environment (2005)
- National Science Foundation Graduate Research Fellowship Recipient (2004-2007)
- National Science Foundation East Asia Pacific Summer Program Fellowship Recipient (2005)
- Georgia Tech Presidential Award and Fellowship Recipient (2003-2007)
- Finalist for Undergraduate Research Award at Georgia Tech (2003)
- Faculty Honors and Dean's List at Georgia Tech (2000-2003)
- Intel/Westinghouse National Science Award Finalist (2000)
- Received International Baccalaureate Diploma (2000)

PAPER AND CONFERENCE AWARDS

- Best Paper Award at the 29th ACM Conference on Human Factors in Computing Systems (CHI) 2011.
- Best Paper Award (a 2nd paper) at the 29th ACM Conference on Human Factors in Computing Systems (CHI) 2011.
- Best Paper Award Honorable Mention (a 3rd paper) at the 29th ACM Conference on Human Factors in Computing Systems (CHI) 2011.
- Best Paper Award at the 12th ACM International Conference on Ubiquitous Computing (2010).
- Best Paper Award Honorable Mention (a 2nd paper) at the 12th ACM International Conference on Ubiquitous Computing (2010).
- Best Paper Award Honorable Mention at the 28th ACM Conference on Human Factors in Computing Systems (CHI) 2010.
- Best Paper Award at the International Conference on Pervasive Computing Technologies for Healthcare 2010.
- Best Paper Award Nomination at The 11th International Conference on Ubiquitous Computing (2009)
- Best Paper Award at The 6th International Conference on Pervasive Computing (2008)
- Best Paper Award at The 9th International Conference on Ubiquitous Computing (2007)
- Best Presentation Award at The 9th International Conference on Ubiquitous Computing (2007)
- Best Paper Award Nomination at The 4th International Conference on Pervasive Computing (2006)

CURRENT APPOINTMENT

Assistant Professor, University of Washington   **9/2008 – Present**
Departments of Computer Science & Engineering and Electrical Engineering
Seattle, WA

RESEARCH EXPERIENCE

Assistant Professor, University of Washington   **9/2008 – Present**
Research in cost-effective and easy-to-deploy sensing technologies for high-value applications such as demand-side energy monitoring, home safety, and elder care. Also exploring novel low-power and power harvesting technologies for practical ubiquitous sensing. Research in novel interaction techniques and assistive technology devices and software.

Graduate Research Assistant, Georgia Institute of Technology   **8/2003 – 8/2008**
Advisor: Dr. Gregory D. Abowd
Research in cost-effective and easy-to-deploy sensing technologies in the home for supporting studies in natural settings. Research in context-aware mobile computing and exploring compelling applications that extend beyond normal telephony on the mobile phone platform. Research in systems that facilitate the automated tagging of large quantities of videos using both predictive models and real world sensing technologies.

Graduate Research Intern, Sony Computer Science Laboratory, Japan   **6/2005 – 8/2005**
Advisor: Dr. Jun Rekimoto
Research in developing sensing systems and augmented reality techniques for interacting with the physical environment.

Graduate Research Intern, Intel Research Berkeley   **5/2004 – 8/2004**
Advisor: Dr. Anind K. Dey
Research in developing technologies for smart homes. Designed and implemented data, programming, and technology architectures for the Digital Home Project at Intel.

Undergraduate Research, Georgia Institute of Technology   **1/2002 – 8/2003**
Advisor: Dr. Gregory D. Abowd
Performed research in home automation infrastructures for the Aware Home at Georgia Tech. Also researched context awareness using mobile devices for the home, such as universal remotes.

Research Intern, Southern Research Institute, Birmingham AL   **8/1999 – 5/2000**
Supervisor/Manager: James Tucker
Designed and developed a computerized digital microscopy system that can automatically perform various material analyses like fiber and porosity counts. The R&D departments at Mercedes Benz and Boeing have used this system to perform a variety of their material analyses.

Research Intern, University of Alabama at Birmingham, Birmingham AL   **6/1999 – 8/2000**
Supervisor: Dr. David Green
Developed a high-level automated website generator called GenPage.

ACADEMIC TEACHING EXPERIENCE

Assistant Professor, University of Washington   **9/2008 – Present**
Course: CSE 477 (SP2011): Hardware Capstone (top rated class in the COE)
Course: CSE 477 (SP2010): Hardware Capstone (nominated for ACM teaching award)

Course: CSE 599U (AU2010): Advanced Topics in Ubiquitous Computing (top rated class in the COE)
Course: CSE 599U (WI2010): Advanced Topics in Ubiquitous Computing (top rated class in the COE)
Course: CSE 599U (WI2009): Advanced Topics in Ubiquitous Computing

Course: EE 472 (WI2011): Embedded Systems (top rated class in the COE)

Course: EE 472 (AU2010): Embedded Systems
Course: EE 472 (SP2009): Embedded Systems

Seminar: CSE 590U (WI2009): Readings in Ubiquitous Computing
Seminar: CSE 590U (AU2009): Readings in Ubiquitous Computing

Co-Instructor, Georgia Institute of Technology   **8/2007 – 12/2007**
Co-Instructor: Dr. W. Keith Edwards
Course: CS6456, Principles of UI Software

Co-Instructor, Georgia Institute of Technology   **8/2004 – 12/2004**
Course: CS4801, Building Ubiquitous Computing Software and Systems

Teaching Assistant, Georgia Institute of Technology   **1/2002 – 5/2002**
Supervisor: Bill Leahy
Course: CS1322, Object Oriented Programming and Software Data Structur*es*

STUDENTS ADVISED

Graduate Research Advisor (Ph.D.), University of Washington   **9/2008 – Present**

- Eric Larson
- Jon Froehlich (received Microsoft Research Graduate Fellowship)
- Sidhant Gupta
- Gabe Cohn (received NSF Graduate Fellowship)
- Francis Iannacci
- Sean Liu
- Ke-Yu Chen
- Matthew Kay

Undergraduate Research Advisor, University of Washington   **9/2008 – Present**

- Julia Schwarz (now a PhD student at CMU, received NSF Graduate Fellowship)
- Sunil Garg (now a PhD student at Georgia Tech)
- Clint Tseng
- Erik Turnquist
- Milda Zizyte
- Tim Campbell (received WA Research Foundation undergraduate fellowship)
- Alex Horton
- Michael Chou
- Tom Sommerville
- Stefan Kristjansson
- Jonas Michel (now a PhD student at UT Austin)
- Ramses Alcaide (now a MD/PhD student at Michigan, received McNair Scholarship)

Graduate Research Supervisor, Georgia Institute of Technology   **8/2005 – 8/2008**

- Moritz Köhler (now a PhD student at ETH Zurich)
- Mayank Goel (now a PhD students at University of Washington)

Undergraduate Research Supervisor, Georgia Institute of Technology   9/2003 – 8/2007

- John A. Bunch
- Kyle D. Forkner
- Logan W. Johnson
- Tiffany M. Johnson
- Michael N. Rosack
- Rob Farmer
- Trevor Bentley
- Tejesh Patel

Awards and Honors Received by Supervised Students

- College of Engineering's Kumar and Robert A. Bhasin Endowed Fellowship – Sidhant Gupta (2011)

- Top Research Assistant Award Finalist in Electrical Engineering – Gabe Cohn (2011)

- Madrona Venture Group Research Prize Runner Up at UW CSE Affiliates Day – Gabe Cohn (2010)

- UW College of Engineering Top Student Innovator Award - Jon Froehlich (2010)

- Yang Award (Outstanding Graduate Student) finalist in Electrical Engineering – Eric Larson (2010)

- NSF Graduate Research Fellowship – Gabe Cohn (2010)

- Outstanding Member of UW Community by the UW College of Engineering - Jon Froehlich (2009)

- Top Research Prize from Madrona Venture Group at UW CSE Affiliates Day – Jon Froehlich, Eric Larson, Sidhant Gupta, Gabe Cohn (2009)

- Washington Research Foundation Fellowships for Advanced Undergraduates – Tim Campbell (2009)

- Ronald E.McNair Scholar – Ramses Alcaide (2009)

- Precourt Center Fellow at the Behavior, Energy and Climate Change Conference - Jon Froehlich (2009)

- Selected as Outstanding Member of UW Community by the UW College of Engineering - Jon Froehlich (2009)

- 1st Place (Grand Prize) in the 2009 UW Environmental Innovation Challenge - Jon Froehlich (2009)

- 3rd Place, University of Washington Business Plan Competition - Jon Froehlich (2009)

- NSF Graduate Research Fellowship – Julia Schwarz (2009)

BOOK CHAPTERS (Peer-reviewed)

[B.3]   Varshavsky, A and Patel, S.N.. *Location Systems*. Ubiquitous Computing Fundamentals. Ed. Krumm, J. CRC Press. ISBN: 1420093606. pp. 286-319. 2009.

[B.2]   Patel, S.N., Summet, J.W., Truong, K.N. *BlindSpot: Creating Capture-Resistant Spaces*. Protecting Privacy in Video Surveillance. Ed. Andrew Senior. 2009.

[B.1]   Patel, S.N., Truong, K.N., Hayes, G.R., Iachello, G., Kientz, J.A., Abowd, G.D. *The Personal Audio Loop: A Ubiquitous Audio-Based Memory Aid*. Handbook of Research on User Interface Design and Evaluation for Mobile Technology. 2008.

JOURNAL ARTICLES (Peer-reviewed)

[J.8]   Yun, J., Patel, S.N., Reynolds, M.S., Abowd, G.D. *Design and Performance of an Optimal Inertial Power Harvester for Human-powered Devices*. IEEE Transactions on Mobile Computing. 10(5). pp. 669-684. May 2011.

[J.7]   Larson, E., Froehlich, J., Campbell, T., Haggerty, C., Fogarty, J., and Patel, S. N. *HydroSense: Disaggregated Water Usage Sensing from a Single, Non-Intrusive Sensor*. The Pervasive and Mobile Computing (PMC) Journal. 2011. To appear.

[J.6]   Everitt, K., Oven, P., Patel, S.N., Landay, J.A. *GroupEnergyTable: Reducing Consumption through Shared Tabletops*. IEEE Pervasive Computing, IEEE Press. 2011. To appear.

[J.5]   Thielke, S., Harniss, M., Thompson, H., *Patel, S.N.,* Demiris, G., Johnson, K. *Maslow's Hierarchy of Human Needs and the Adoption 4 of Health-Related Technologies for Older Adults*. Ageing International Journal. 2011. To Appear.

[J.4]   Froehlich, J., Larson, E., Gupta, S., Cohn, G., Reynolds, M.S., Patel, S.N. *Disaggregated End-Use Energy Data for the Smart Grid*. IEEE Pervasive Computing, 10(1). IEEE Press. pp. 28-39. 2011.

[J.3]   Huang, E. M., Yatani, K., Truong, K.N., Kientz, J,A., Patel, S.N. *Understanding Mobile Phone Situated Sustainability: The Influence of Local Constraints and Practices on Transferability*. IEEE Pervasive Computing, 8(1), IEEE Press. pp.46-53. 2009.

[J.2]   Hayes, G.R., Shehan, E., Iachello, G., Patel, S.N., Grimes, A., Abowd, G.D., and Truong, K.N. *Physical, Social, and Experiential Knowledge of Privacy and Security in a Pervasive Computing Environment*. IEEE Pervasive Computing, Oct-Dec 2007, IEEE Press. 2007.

[J.1]   Abowd, G.D., Hayes, G.R., Iachello, G., Kientz, J.A., Patel, S.N., Stevens, M., Truong, K.N. *Prototypes and Paratypes: Mixed Methods for Designing Mobile and Ubiquitous Computing Applications*, IEEE Pervasive Computing, 4(4), IEEE Press, 67-73. 2007.

MAJOR CONFERENCE PUBLICATIONS (Peer-reviewed)

[C. 38]   Enev, M., Gupta, G., Kohno, T., and Patel, S.N. *Televisions, Video Privacy, and Powerline Electromagnetic Interference*. 18th ACM Conference on Computer and Communications Security (CCS 2011). To appear. (Acceptance rate: 14%).

[C. 37]   Gupta, S., Chen, K., Reynolds, M.S., Patel, S.N. *LightWave: Using Compact Fluorescent Lights as Sensors*. In the Proceedings of the ACM International Conference on Ubiquitous Computing (Ubicomp 2011). To appear. (Acceptance Rate: 16%)

[C. 36]   Larson, E.C., Lee, T., Liu, S., Rosenfeld, M., Patel, S.N. *Accurate and Privacy Preserving Cough Sensing using a Low-Cost Microphone*. In the Proceedings of the ACM International Conference on Ubiquitous Computing (Ubicomp 2011). To appear. (Acceptance Rate: 16%)

[C. 35]   Badshah, A., Gupta, S., Cohn, G., Villar, N., Hodges, S., Patel, S.N. *Interactive Generator: A Self-*

Powered Haptic Feedback Device. ACM Conference on Human Factors in Computing Systems (CHI 2011). pp. 2051-2054. 2011. (Acceptance Rate: 25%) **(Received Best Paper Award)**

[C. 34]   Larson, E., Cohn, G., Gupta, S., Ren, X., Harrison, B., Fox, D., Patel, S.N. *HeatWave: Thermal Imaging for Surface User Interaction*. ACM Conference on Human Factors in Computing Systems (CHI 2011). 2011. pp. 2565-2574. 2011**.** (Acceptance Rate: 25%) **(Best Paper Award Honorable Mention)**

[C. 33]   Iannacci, F., Turnquist, E., Avrahami, D., and Patel, S.N. *The Haptic Laser: Multi-Sensation Tactile Feedback for At-a-Distance Physical Space Perception and Interaction*. ACM Conference on Human Factors in Computing Systems (CHI 2011). (Acceptance Rate: 25%) pp. 2047-2050. 2011.

[C. 32]   Cohn, G., Morris, D., Patel, S.N., Tan, D.S. *Your Noise is My Command: Sensing Gestures Using the Body as an Antenna*. CHI 2011. ACM Conference on Human Factors in Computing Systems (CHI 2011). pp. 791-800. 2011. (Acceptance Rate: 25%) **(Received Best Paper Award)**

[C. 31]   Froehlich, J., Larson, E., Saba, E., Campbell, T., Atlas, L., Fogarty, J., Patel, S.N. *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). pp. 50-69. 2011. (Acceptance Rate: 23%)

[C. 30]   Gupta, S., Reynolds, M.S., Patel, S.N. ElectriSense: *Single-Point Sensing Using EMI for Electrical Event Detection and Classification in the Home*. In the Proceedings of the ACM International Conference on Ubiquitous Computing (Ubicomp 2010). pp. 139-148. 2010. (Acceptance Rate: 19%) **(Received Best Paper Award)**

[C. 29]   Cohn, G., Stuntebeck, E., Pandey, J., Otis., B., Abowd, G.D., Patel, S.N. SNUPI: *Sensor Nodes Utilizing Powerline Infrastructure*. In the Proceedings of the International Conference on Ubiquitous Computing (Ubicomp 2010). pp. 159-168. 2010. (Acceptance Rate: 19%) **(Best Paper Award Honorable Mention)**

[C. 28]   Campbell, T., Alcaide, R., Larson, E., Patel, S.N *WATTR: A method for self-powered wireless sensing of water activity in the home*. In the Proceedings of the International Conference on Ubiquitous Computing (Ubicomp 2010). pp. 169-172. 2010. (Acceptance Rate: 19%)

[C. 27]   Gupta, S., Campbell, T., Hightower, J., Patel, S.N. *SqueezeBlock: Using Virtual Springs in Mobile Devices for Eyes-Free Interaction*. In the Proceedings of the ACM Symposium on User Interface Software and Technology (UIST 2010). Pp. 101-104. 2010. (Acceptance Rate: 18%)

[C. 26]   Lester, J., Brush, A.J., Tan, D., Patel, S.N. Automatic *Classification of Daily Fluid Intake*. In the Proceedings of the International Conference on Pervasive Computing Technologies for Healthcare 2010. **(Received Best Paper Award)**

[C. 25]   Koscher, K., Czeskis, A., Roesner, F., Patel, S., Kohno, T., Checkoway, S., McCoy, D., Kantor, B., Anderson, D., Shacham, H., Savage, S. Experimental Security Analysis of a Modern Automobile. In the Proceedings of the 31st IEEE Symposium on Security and Privacy. pp. 447-462. 2010. (Acceptance Rate: 17%)

[C.24]   Cohn, G., Gupta, S., Froehlich, J., Larson, E., and Patel, S N. *GasSense: Appliance-Level, Single-Point Sensing of Gas Activity in the Home*. In the Proceedings of the International Conference on Pervasive Computing (Pervasive 2010). pp. 265-282. 2010. (Acceptance Rate: 17%)

[C.23]   Patel, S.N., Kientz, J.A., Gupta, S. *Studying the Use and Utility of an Indoor Location Tracking System for Non-Experts*. In the Proceedings of the International Conference on Pervasive Computing (Pervasive 2010). pp. 228-245. 2010. (Acceptance Rate: 17%)

[C.22]   Patel, S.N, Gupta, S., Reynolds, M. *The Design and Evaluation of an End-User-Deployable, Whole House, Contactless Power Consumption Sensor*. ACM Conference on Human Factors in Computing Systems (CHI 2010). pp. 2471-2480. 2010. (Acceptance Rate: 22%) **(Best Paper Award Honorable Mention)**

[C.21]   Froehlich, J. Larson, E., Campbell, T., Haggerty, C., Fogarty, J., and Patel, S.N. *HydroSense: Infrastructure-Mediated Single-Point Sensing of Whole-Home Water Activity*. In the Proceedings of UbiComp 2009. pp. 235-244. (Acceptance Rate: 12%) **(Nominated for Best Paper Award)**

[C.20]   Patel, S.N., Stuntebeck, E.P., Robertson, T. *PL-Tags: Detecting Batteryless Tags through the Power Lines in a Building*. In the Proceedings of Pervasive 2009. pp. 256-273. (Acceptance Rate: 18%)

[C.19]   Wyche, S.P., Caine, K., Davison, B., Artega, M., Patel, S.N., Grinter, R.E. *Sacred Imagery in Techno-Spiritual Design*. In the Proceedings of CHI 2009. (Acceptance Rate: 24%)

[C.18]   Stuntebeck, E.P., Patel, S.N., Robertson, T., Reynolds, M.S., Abowd, G.D. *Wideband powerline positioning for indoor localization*. In the Proceedings of Ubicomp 2008. pp 94-103. (Acceptance Rate: 19%)

[C.17]   Yun, J., Patel, S.N., Reynolds, M.S., Abowd, G.D. *A quantitative investigation of inertial power harvesting for human-powered devices*. In the Proceedings of Ubicomp 2008. pp 74-83. 2008. (Acceptance Rate: 19%)

[C.16]   Kim, S., J.A. Kientz, S.N. Patel, and G.D. Abowd. *Are You Sleeping? Sharing Portrayed Sleeping Status within a Social Network*. In the Proceedings of the 21st Conference on Computer Supported Cooperative Work (CSCW 2008). San Diego, California, USA. 2008. pp 619-628. (Acceptance Rate: 23%)

[C.15]   Patel, S.N., Reynolds, M.S., Abowd, G.D. *Detecting Human Movement by Differential Air Pressure Sensing in HVAC System Ductwork: An Exploration in Infrastructure Mediated Sensing*. In the Proceedings of Pervasive 2008. Sydney, Australia. 2008. pp 1-18. (Acceptance Rate: 15%) **(Received Best Paper Award)**

[C.14]   Patel, S.N. and Abowd, G.D. *BLUI: Low-cost Localized Blowable User Interfaces*. In the Proceedings of the ACM Symposium on User Interface Software and Technology (UIST 2007). Newport, RI. 2007. (Acceptance Rate: 14%)

[C.13]   Patel, S.N., Robertson, T., Kientz, J.A., Reynolds, M.S., Abowd, G.D. *At the Flick of a Switch: Detecting and Classifying Unique Electrical Events on the Residential Power Line*. In the Proceedings of Ubicomp 2007. Innsbuck, Austria. 2007. (Acceptance Rate: 19%) **(Received Best Paper Award and Best Presentation Award)**

[C.12]   Kientz, J.A., Arriaga, R.I., Chetty, M., Hayes, G.R., Richardson, J., Patel, S.N., Abowd, G.D. *Grow and Know: Understanding Record-Keeping Needs for the Development of Young Children*. In the Proceedings of CHI 2007. 2007. (Acceptance Rate: 25%)

[C.11]   Köhler, M., Patel, S.N., Summet, J.W., Stuntebeck, E.P., Abowd, G.D. *TrackSense: Infrastructure Free Precise Indoor Positioning using Projected Patterns*. In the Proceedings of the Fifth International Conference on Pervasive Computing (Pervasive 2007) Toronto, Ontario, Canada. 2007. (Acceptance Rate: 16%)

[C.10]   Kientz, J.A., Patel, S.N., Tyebkhan, A.T., Gane, B., Wiley, J., Abowd, G.D. *Where's My Stuff? Design and Evaluation of a Mobile System for Locating Lost Items for the Visually Impaired. In the proceedings of ASSETS 2006*. Portland, Oregon, USA. 2006.

[C.9]   Patel, S.N., Kientz, J.A., Hayes, G.R., Bhat, S., Abowd, G.D. *Farther Than You May Think: An Empirical Investigation of the Proximity of Users to their Mobile Phones*. In the Proceedings of Ubicomp 2006, Orange County, California, 2006. (Acceptance Rate: 13%)

[C.8]   Patel, S.N., Truong, K.N., Abowd, G.D. *PowerLine Positioning: A Practical Sub-Room-Level Indoor Location System for Domestic Use*. In the Proceedings of Ubicomp 2006, Orange County, California, 2006. (Acceptance Rate: 13%)

[C.7]   Patel, S.N., Rekimoto, J., Abowd, G.D. *iCam: Precise at-a-distance Interaction in the Physical Environment*. In the Proceedings of Pervasive 2006: The 4th International Conference on Pervasive Computing. Dublin, Ireland. 2006. (Acceptance Rate: 13%)
(Nominated for Best Paper Award)

[C.6]   Truong, K.N., Patel, S.N., Summet, J.W., and Abowd, G.D. *Preventing Camera Recording by Designing a Capture-Resistant Environment*. In the Proceedings of Ubicomp 2005, September, Tokyo, Japan, 2005. (Acceptance Rate: 9%)

[C.5]   Patel, S.N., Pierce, J. and Abowd, G.D. *A Gesture-based Authentication Scheme for Untrusted Public Terminals*. In the Proceedings of the ACM Symposium on User Interface Software and Technology (UIST 2004). October, Sante Fe, NM, 2004. (Acceptance Rate: 23%)

[C.4]   Patel, S.N. and Abowd, G.D. *The ContextCam: Automated Point of Capture Video Annotation*. In the Proceedings of Ubicomp 2004, September, Nottingham, England, 2004. (Acceptance Rate: 18%)

[C.3]   Hayes, G.R., Patel, S.N., Truong, K.N., Iachello, G., Kientz, J.A., Farmer, R., Abowd, G.D. *The Personal Audio Loop: Designing a Ubiquitous Audio-Based Memory Aid*. In the Proceedings of Mobile HCI 2004, September, Glasgow, Scotland, 2004.

[C.2]   Patel, S.N., Bunch, J.A., Forkner, K.D., Johnson, L.W., Johnson, T.M., Rosack, M.N. and Abowd, G.D. *The Design and Implementation of Multi-player Card Games on Multi-user Interactive Tabletop Surfaces*. In the Proceedings of International Conference on Entertainment Computing (ICEC) 2004, September, Eindhoven, The Netherlands, 2004.

[C.1]   Patel, S.N. and Abowd, G.D. *A 2-way Laser-assisted Selection Scheme for Handhelds in a Physical Environment*. In the Proceedings of Ubicomp 2003, October, Seattle, WA, 2003. (Acceptance Rate: 14%)

CONFERENCE ADJUNCT PUBLICATIONS (Peer-reviewed)

[c. 4]   Froehlich, J., Larson, E., Campbell, T., Haggerty, C., Fogarty, J., Patel, S. *Where Does Your Water Go? HydroSense Knows*. Behavior, Energy, and Climate Change Conference, Washington, D.C., November 15 - 18, 2009.

[c. 3]   Froehlich, J., Everitt, K., Fogarty, J., Patel, S.N., Landay, J. *Sensing Opportunities for Personalized Feedback Technology to Reduce Consumption*. CHI Sustainability Workshop. In the extended proceedings of CHI 2009. 2009.

[c.2]   Kientz, J.A., Patel, S.N., Jones, B., Price, E., Mynatt, E.D., Abowd, G.D. *The Georgia Tech aware*

home. CHI 2008 Extended Abstracts. pp 3675-3680. 2008.

[c.1]   Patel, S. N. *Supporting Location and Proximity-Based Studies in Natural Settings*. Doctoral Colloquium. In the Adjunct Proceedings of Pervasive 2007. 2007.

INVITED PAPERS

[IP.2]   Patel, S. N., Kientz, J.A., Jones, B., Price, E., Mynatt, E.D., and Abowd, G.D. *An Overview of the Aware Home Research Initiative at the Georgia Institute of Technology.* In the Proceedings of the International Future Design Conference on Global Innovations in Marco- and Micro-Environments for the Future, Seoul, Korea. pp. 169-181. 2007.

[IP.1]   Kientz, J.A., Patel, S. N., Jones, B., Price, E., Mynatt, E.D., and Abowd, G.D. *IT Systems to Support Aging in Place: Aware Home Research Initiative at the Georgia Institute of Technology.* In the Proceedings of the International Future Design Conference on Global Innovations in Marco- and Micro-Environments for the Future, Seoul, Korea. pp. 276-286. 2007.

PATENTS (FULL UTILITY)

[P.8]   Stuntebeck, E., Robertson, T., Abowd, G.D., Patel, S.N. *Method and Apparatus for using in-home power line to support low power wireless sensor and to extend the range of low power wireless devices.* US Patent Pending. 2011.

[P.7]   Patel, S.N., Abowd, G.D., Zeira, O., Kim, R.Y., Reynolds, M., Seal, J., Chatteriji, V. *Bluetooth Proxmity Detection System and Method of Interacting with One or More Bluetooth Devices.* US Patent Pending. 2010.

[P.6]   Patel, S.N., Gupta, S., Reynolds, M.S., Abowd, G.D. Apparatus Configured to Detect Gas Usage, Method of Providing Same, and Method of Detecting Gas Usage. US Patent Pending. 2010.

[P.5]   Patel, S.N. *Contact-less Whole-House Power Consumption Sensing*. US Patent Pending. 2009. (Licensed to Belkin International, Inc.)

[P.4]   Patel, S.N., Froehlich, J., Fogarty, J., Larson, E. *Sensing Events Affecting Liquid Flow in a Liquid Distribution System*. US Patent Pending (12/483,041). 2009. (Licensed to Belkin International, Inc.)

[P.3]   Patel, S.N., Robertson, T., Reynolds, M.S., Abowd, G.D. *Powerline Event Detection*. US Patent Pending (60/973,188). 2008. (Licensed to Belkin International, Inc.)

[P.2]   Patel, S.N., Robertson, T., Truong, K.N., Reynolds, M.S., Abowd, G.D. *Sub-room-level Indoor Location System using Power Line Positioning*. US Patent Pending (60/817,225). 2007. (Licensed to Belkin International, Inc.)

[P.1]   Patel, S.N., Truong, K.N., Summet, J.W. and Abowd, G.D. *Systems and Methods for Disabling Recording Features of Cameras.* US Patent Pending (062012-1090/3588PR). 2005. (Licensed to Domininc, Inc.)

TECH TRANSFER AND COMMERCIALIZATION ACTIVITIES

Founder of Usenso, Inc. aka Zensi, Inc.   **4/2008 – 4/2010**

- Demand-side energy monitoring company
- Acquired by Belkin™ International, Inc. in 2010
- Licensed [P.2], [P.3], [P.4], [P.5], [C.24], [Shwetak Patel's Ph.D. Thesis]
- UW's return of XXXXX in licensing fees and royalties.
- Top 10 Startup in 2010 by TechFlash

TECHNICAL REPORTS

[TR.2]   Clarkson, E.C., <u>Patel, S. N</u>., Pierce, J.S., Abowd, G.D. *Exploring Continuous Pressure Input for Mobile Phones*. GVU Tech Report. GIT-GVU-06-20. 2006.

[TR.1]   <u>Patel, S. N.</u>, J.A. Kientz, J.P. Zagal. *LoCoL: Encouraging Social Interaction and Exploration Through a Distributed, Multi-Media, Location-Based Mobile Game*. GVU Tech Report. GIT-GVU-04-17. 2004.

MEDIA COVERAGE (SELECT ARTICLES)

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SERVICE AND OUTREACH

Director Roles
- Assistant Director of the Aware Home Research Initiative at Georgia Tech (January 2007- August 2008)

Program Committee Member
- UIST 2011 Program Committee, Twenty Fourth ACM Symposium on User Interface Software and Technology

- Ubicomp 2011 Program Committee, Eleventh International Conference on Ubiquitous Computing
- Pervasive 2011 Program Committee, Eighth International Conference on Pervasive Computing
- Ubicomp 2010 Program Committee, Eleventh International Conference on Ubiquitous Computing
- Pervasive 2010 Program Committee, Seventh International Conference on Pervasive Computing
- IUI 2010 Program Committee, International Conference on Intelligent User Interfaces
- Ubicomp 2009 Program Committee, Eleventh International Conference on Ubiquitous Computing
- Pervasive 2009 Program Committee, Seventh International Conference on Pervasive Computing
- IUI 2009 Program Committee, International Conference on Intelligent User Interfaces
- LoCA 2009 Program Committee, Fourth International Symposium on Location and Context-Awareness
- Ubicomp 2008 Program Committee, Tenth International Conference on Ubiquitous Computing
- LoCA 2007 Program Committee, Third International Symposium on Location and Context-Awareness
- Pervasive 2007 Video Program Committee, Fifth International Conference on Pervasive Computing
- UIST 2007 Poster Program Committee, Twentieth ACM Symposium on User Interface Software and Technology

Conference Committee Member
- ISWC 2007 Publications Chair, Eleventh International Symposium on Wearable Computers
- ISWC 2007 Print Proceedings and Videos Chair, Eleventh International Symposium on Wearable Computers

Workshop Organizer
- Pervasive @ Home, Pervasive 2008, Sixth International Conference on Pervasive Computing
- Ubicomp 2008 Doctoral Consortium
- Ubicomp 2010 Doctoral Consortium

Workshop Invitations
- Microsoft Research Faculty Summit – 2011
- NSF Workshop on IT and Sustainability - 2011
- NSF Workshop on Pervasive Computing at Scale (PeCS) – 2011
- CRA Computer Science Chairs/Deans Conference - 2010
- Microsoft Research Faculty Summit – 2010
- The National Academies Workshop on Innovation in Computing and Information Technology for Sustainability - 2010
- Microsoft Research Faculty Summit – 2009
- Microsoft/UW Summer Institute – 2009
- Workshop on Ubiquitous Computing Education: Ubicomp 2009 - 2009
- NSF Workshop on Sensor Networks – 2009

Reviewer
- ISCAS 2009
- CSCW 2008, 2009
- CHI 2006, 2007, 2008, 2009, 2010, 2011

- Pervasive 2006, 2007, 2008
- Ubicomp 2005, 2006, 2007
- UIST 2006, 2007, 2008, 2009, 2010
- Mobisys 2004
- ISWC 2007, 2010
- Interact 2007
- TEI 2010
- IEEE Pervasive Computing 2005, 2007, 2009, 2010, 2011
- Smart Environments (SmartE) 2010
- IEEE Computer (2005, 2008, 2011)
- Handbook of Research on User Interface Design and Evaluation for Mobile Technology 2006

University and Department Service
- UW Green IT Certificate Program Advisory Board (2011)
- HKN EE/CSE Honor Society Advisor (2011)
- Electrical Engineering Undergraduate Research Committee (2009-2010)
- Computer Science & Engineering Undergraduate Research Night (2009)
- Advisor for UW Smart Grid Initiative (2010)

Graduate Thesis Committees
- Jonathan Lester – UW EE Ph.D. Thesis Committee Member
- Kate Everitt – UW CSE Ph.D. Thesis Committee Member
- Erich Stuntebeck – Georgia Tech ECE External Ph.D. Thesis Committee Member
- Rohit Chaudhri – UW CSE Ph.D. Qualifier Committee Member
- Sidharth Nabar – UW EE Ph.D. Thesis Committee Member
- Alanson Sample - UW EE Ph.D. Thesis Committee Member

Federal and State Government
- Briefed Department of Energy Agency Directors on Residential Energy Monitoring (2010-2011)
- Briefed and advised Chairman Jon Wellinghoff of the Federal Energy Regulatory Commission (August 2009)
- Briefed and advised Seattle City Light and Seattle Public Utilities on Clean Technology

K-12 Outreach
- Day of Exploring Computer Science – 24 6th Grade, University Prep, Seattle WA (2010)
- Day of Exploring Ubiquitous Computing – 25 8th Grade Students (2010)
- Washington Aerospace Scholars Host – 80 students (2009)
- Founded "Start Early" – Research Opportunities for High School Students (2009-Present)

INVITED TALKS

- Pacific Northwest Sustainability Conference. Seattle, WA. "Energy and Water Sensing in the Home" May 2011.
- Washington State University, Pullman, WA. NSF Distinguished Speaker Series. "Energy Monitoring and Low-Power Sensing in the Home" April 2011.
- Case Western Reserve University, Cleveland, OH. Computer Science Colloquium. "Energy Monitoring and Low-Power Sensing in the Home" February 2011.
- Innovation Showcase. Seattle, WA. "Low-Power Sensing in the Home." February 2011.
- Carnegie Mellon University, Pittsburg, PA. Computer Science Series. "Energy Monitoring and Low-Power Sensing in the Home" January 2011.
- NSF Workshop – Pervasive Computing at Scale, Seattle, WA. Keynote. "Energy Monitoring and Low-Power Sensing in the Home" January 2011.
- Technology Alliance, Seattle, WA. Science and Technology Discovery Series "Energy Monitoring and Low-Power Sensing in the Home" November 2010.
- The College of William and Mary, Williamsburg, VA. Computer Science Colloquium "Energy Monitoring and Low-Power Sensing in the Home" November 2010.
- The College of William and Mary, Williamsburg, VA. Dean of Arts and Science Lecture Series Campus Wide Talk. "Sustainability Sensing" November 2010.
- Department of Energy, Washington D.C. "Methods for Easy-to-Deploy Energy Disaggregation in the Home" September 2010.
- CRA Computer Science Chairs/Deans Conference, Snowbird, UT. "Residential Energy Monitoring and Sensing" July 2010.
- The National Academies Workshop on Innovation in Computing and Information Technology for Sustainability, Washington, DC. "Residential Energy Monitoring and Sensing" May 2010.
- UW Board of Regents Meeting, Seattle, WA. "Sustainability Sensing" May 2010.
- MS Rehabilitation Research and Training Center Advisory Board Meeting. Seattle, WA. "Applications of Infrastructure-Mediated Sensing to Health" April 2010.
- The Northwest Energy System Symposium, Seattle, WA. "Smart Home Sensing" February 2010.
- Seattle City Light, Seattle, WA. "Sustainability Sensing" January 2010.
- Stanford University, Stanford, CA. "Enabling Practical Ubiquity of Sustainability Sensing." November 2009.
- University of Washington, Seattle, WA. College of Engineering Campus Wide Lecture. "Energy Crisis, Smart Solutions." November 2009.
- Harvard, Cambridge, MA. (also with MIT). "Enabling Practical Ubiquity of Sustainability Sensing" October 2009.
- Microsoft, Seattle, WA. "Practical Ubiquity: Bringing Sensing to the Masses" June 2009.
- Intel Research, Seattle, WA. "Practical Ubiquity: Bringing Sensing to the Masses" June 2009.
- University of Washington, Seattle, WA. Dub Seminar. "Practical Ubiquity: Bringing Sensing to the Masses" January 2009.

- Northeastern University, Boston, MA. Computer Science Colloquium. "An Exploration in Infrastructure-Mediated Sensing." May 2008.
- Intel Research, Seattle, WA. "An Exploration in Infrastructure-Mediated Sensing." April 2008.
- University of Calgary, Calgary, Alberta. Computer Science Colloquium. "An Exploration in Infrastructure-Mediated Sensing." April 2008.
- University of Washington, Seattle, WA. Computer Science Colloquium. "An Exploration in Infrastructure-Mediated Sensing." April 2008.
- PARC, Palo Alto, CA. "An Exploration in Infrastructure-Mediated Sensing." April 2008.
- Georgia Institute of Technology, Atlanta, GA. "An Exploration in Infrastructure-Mediated Sensing." April 2008.
- University of Wisconsin-Madison, Madison, WI. Computer Science Colloquium. . "An Exploration in Infrastructure-Mediated Sensing." March 2008.
- Sony Computer Science Laboratory, Tokyo, Japan. "An Exploration in Infrastructure-Mediated Sensing." November 2007.
- LG Electronics, Seoul, South Korea. "An Exploration in Infrastructure-Mediated Sensing." November 2007
- Korea Advanced Institute of Science and Technology (KAIST), Computer Science Seminar, Daejeon, South Korea. "An Exploration in Infrastructure-Mediated Sensing." November 2007.
- Korea Advanced Institute of Science and Technology (KAIST), Computer Science Seminar, Daejeon, South Korea. "Introduction to Human-Computer Interaction." November 2007.
- International Future Design Conference on Global Innovations in Marco- and Micro-Environments for the Future, Seoul, South Korea. "Research at the Aware Home." October 2007.
- GVU Seminar, Georgia Institute of Technology, "PowerLine Positioning: A Practical Sub-Room-Level Indoor Location System for Domestic Use." September 2006.