

# JON FROEHLICH

101 Paul G. Allen Center  
University of Washington  
Seattle, WA 98195  
jfroehli@cs.washington.edu

## RESEARCH STATEMENT

I am interested in building and studying technology that addresses high value social issues such as computer accessibility, the environment, and personal health and fitness. In the past, I have published work exploring the viability of applying automatic vehicle route prediction algorithms to optimize hybrid vehicle control systems, new touchscreen input techniques for motor impaired users, and using mobile phones to study human behavior through the use of a tool I developed called [MyExperience](#).

For my PhD thesis, my research focuses specifically on how we can use advances in automated sensing methods and novel interactive systems to increase an individual's awareness about how his/her everyday actions in the world impact the environment. For example, the UbiGreen Transportation Display used a combination of wearable sensors and cell tower inference algorithms to semi-automatically sense a person's transportation behavior. Users were rewarded for green transit behaviors with evocative, iconic imagery on the background of their mobile phone. I continued studying transportation in Barcelona, Spain on a research project focused on Bicing, Barcelona's shared bicycling program. There, I explored how shared bicycling patterns revealed information about the underlying makeup of the city and also built prediction models capable of predicting shared bicycling behavioral patterns. Currently, I am investigating how to build low-cost sensing systems for water in the home (HydroSense) and studying the most effective methods to convey water usage information back to members of the household in order to reduce wasteful practices.

## EDUCATION

- Present **PhD Candidate, Computer Science and Engineering**, University of Washington, Seattle  
Area: HCI, UbiComp; Advisor: Professor James Landay  
Thesis Topic: *Sensing and Feedback of Everyday Activities to Promote Environmentally Sustainable Behaviors*
  
- 2006 **MS, Computer Science and Engineering**, University of Washington, Seattle  
GPA: 3.68/4.00; Area: HCI, UbiComp; Advisor: Professor James Landay  
Qualifying Project: *Voting With Your Feet: An Investigative Study of the Relationship Between Place Visit Behavior and Preference*
  
- 2004 **MS, Information and Computer Science**, University of California, Irvine  
GPA: 3.95/4.00; Area: HCI, CSCW; Advisor: Professor Paul Dourish  
MS Thesis: *Unifying Artifacts and Activities in a Visual Tool for Distributed Software Teams*
  
- 2001 **BS with distinction, Computer Engineering**, Iowa State University, Ames  
GPA: 3.82/4.00; Major GPA: 3.87/4.00
  
- 2001 **Study Abroad**, Egerton University, Njoro, Kenya  
GPA: 4.00/4.00; Studied African Arts and East African Literature

## HONORS AND AWARDS

- 2009 Selected as "Outstanding Member of UW Community" for the 2009 University of Washington, College of Engineering Report to Contributors  
The Best Clean-Tech Idea for HydroSense in the University of Washington Business Plan Competition  
3<sup>rd</sup> Place in University of Washington Business Plan Competition for HydroSense  
1<sup>st</sup> Place (Grand Prize) for HydroSense in the UW Environmental Innovation Challenge
  
- 2008 Microsoft Research Graduate Fellowship (2008-2010)  
Precourt Institute for Energy Efficiency Student Scholarship
  
- 2001 Top Computer Science Project Award, 2001, Iowa State University  
Phi Kappa Phi, awarded to top 10% of senior engineering class

- 2000 Eta Kappa Nu, Electrical and Computer Engineering Honor Society  
Tau Beta Pi Engineering Honor Society
- 1999 Arthur A. Collins Engineering Scholarship (1999-2001)  
Mortar Board National Honor Society

## EMPLOYMENT

- 2004 – Present **University of Washington**, *Computer Science and Engineering, Seattle, WA*  
Graduate Researcher
- Summer 2008 **Telefónica Research**, *Barcelona, Spain*  
Research Intern
- Summer 2007 **Microsoft Research**, *Redmond, WA*  
Research Intern
- Summer/Fall 2006 **Intel Research**, *Seattle, WA*  
Research Intern
- Summer 2005 **Intel Research**, *Seattle, WA*  
Research Intern
- 2002 – 2004 **University of California**, *Information and Computer Science, Irvine, CA*  
Graduate Researcher
- 2002 – 2003 **Unisys Corporation**, *Mission Viejo, CA*  
Software Engineer
- Fall 2001 **Iowa State University**, *Computer Engineering, Ames, IA*  
Undergraduate Researcher
- Summer/Fall 2000 **Intel**, *Portland, OR*  
Software Engineering Intern, Motherboard Division
- Winter 2000 **CyberOptics Corporation**, *Minneapolis, MN*  
Summer 1999 Software Engineering Intern
- Summer 1998 **HealthSystem Minnesota**, *Minneapolis, MN*  
Software Engineering Intern

## CONFERENCE PUBLICATIONS

- 2009 **Froehlich, J.** (2009) “Sensing and Feedback of Everyday Activities to Promote Environmentally Sustainable Behaviors” Doctoral Colloquium in the Adjunct Proceedings of UbiComp 2009, Orlando, Florida, USA, September 30<sup>th</sup> – October 3<sup>rd</sup>, 2009, To Appear.

**Froehlich, J.**, Larson, E., Campbell, T., Haggerty, C., Fogarty, J., and Patel, S. (2009) “HydroSense: Infrastructure-Mediated Single-Point Sensing of Whole-Home Water Activity” Proceedings of UbiComp 2009, Orlando, Florida, USA, September 30<sup>th</sup> – October 3<sup>rd</sup>, 2009, To Appear.

**Froehlich, J.**, Neumann, J., and Oliver, N. (2009) “Sensing and Predicting the Pulse of the City through Shared Bicycling” Twenty-First International Joint Conference on Artificial Intelligence (IJCAI-09), Pasadena, California, USA, July 11 – 17, 2009.

**Froehlich, J.**, Consolvo, S., Dillahunt, T., Harrison, B., Klasnja, P., Mankoff, J., Landay, J. “UbiGreen: Investigating a Mobile Tool for Tracking and Supporting Green Transportation Habits” Proceedings of CHI2009, Boston, MA, USA, April 4 – 9, 2009.

- 2008 Consolvo, S., Klasnja, P., Avrahami, D., Legrand, L., Libby, R., Mosher, K., **Froehlich, J.**, McDonald, D., and Landay, J. (2008) "Flowers or a Robot Army? Encouraging Awareness & Activity with Personal, Mobile Displays" Proceedings of UbiComp 2008, Seoul, South Korea, Sept 21-24, 2008.
- Klasnja, P., Harrison, B., **Froehlich, J.**, Hudson, S., LaMarca, A., and LeGrand, L. (2008) "Using Wearable Sensors and Real Time Inference to Understand Human Recall of Routine Activities" Proceedings of UbiComp 2008, COEX, Seoul, South Korea, September 21-24, 2008.
- Froehlich, J.** and Krumm, J. (2008) "Route Prediction from Trip Observations" Intelligent Vehicle Initiative (IVI) Technology Advanced Controls and Navigation Systems, SAE World Congress & Exhibition, Detroit, Michigan, April 14-17, 2008.
- Consolvo, S., **Froehlich, J.**, Harrison, B., Klasnja, P., LaMarca, A., Landay, J., Legrand, L., Libby, R., McDonald, D., Smith, I., and Toscos, T. (2008) "Activity Sensing in the Wild: A Field Trial of UbiFit Garden" Proc. Of CHI2008, Italy, April 5-10, 2008.
- 2007 **Froehlich, J.**, Wobbrock, J., & Kane, S. (2007) "Barrier Pointing: Using Physical Edges to Assist Target Acquisition on Mobile Device Touch Screens" Proceedings of ASSETS 2007, Tempe, AZ, October 14-17, 2007.
- Froehlich, J.**, Chen, M., Consolvo, S., Harrison, B., & Landay, J. (2007) "MyExperience: A System for In Situ Tracing and Capturing of User Feedback on Mobile Phones" Proceedings of MobiSys 2007, San Juan, Puerto Rico, June 11-14, 2007.
- 2006 **Froehlich, J.**, Chen, M., Smith, I., & Potter, F. (2006) "Voting With Your Feet: An Investigative Study of the Relationship Between Place Visit Behavior and Preference" Proceedings of UbiComp 2006, Orange County, CA, September 17-21, 2006.
- 2005 de Souza, C., **Froehlich, J.**, and Dourish, P. (2005). "Seeking the Source: Software Source Code as a Social and Technical Artifact" Proceedings ACM Conference Supporting Group Work GROUP 2005, Sanibel Island, FL, November 6-9, 2005.
- 2004 **Froehlich, J.** and Dourish, P. (2004). "Unifying Artifacts and Activities in a Visual Tool for Distributed Software Development Teams." Proceedings of International Conference on Software Engineering ICSE 2004, Edinburgh, UK, 387-396, May 23-28, 2004.

## JOURNAL PUBLICATIONS

- 2006 Consolvo, S., Harrison, B., Smith, I., Chen, M., Everitt, K., **Froehlich, J.**, and Landay, J. (2006). "Conducting In Situ Evaluations for and with Ubiquitous Technologies" International Journal of HCI 2007, Vol. 22, No. 1-2, Pages 103-118.

## WORKSHOP PAPERS

- 2009 Hofte, H., Jensen, K., Nurmi, P., **Froehlich, J.** "Mobile Living Labs 09: Methods and Tools for Evaluation in the Wild" MobileHCI09 Workshop: Mobile Living Labs 09: Methods and Tools for Evaluation in the Wild
- Froehlich, J.**, Everitt, K., Fogarty, J., and Landay, J. "Sensing Opportunities for Personalized Feedback Technology to Reduce Consumption" CHI09 Workshop: Defining the Role of HCI in the Challenges of Sustainability, Boston, MA, USA, April 4 – 9, 2009. Also released as a University of Washington CSE Tech Report UW-CSE-09-03-01. March 10, 2009.
- Froehlich, J.**, "Promoting Energy Efficient Behaviors in the Home through Feedback: The Role of Human-Computer Interaction" HCIC 2009 Winter Workshop Boaster Paper, Snow Mountain Ranch, Fraser, Colorado, February 4 – 8<sup>th</sup>, 2009. Also released as a University of Washington CSE Tech Report UW-CSE-09-02-01. February 20, 2009.

- 2008 **Froehlich, J.**, Neumann, J., and Oliver, N. (2008) "Measuring the Pulse of the City through Shared Bicycle Programs" International Workshop on Urban, Community, and Social Applications of Networked Sensing Systems – UrbanSense08, Raleigh, North Carolina, USA, November 4, 2008.
- 2006 Varshavsky, A., Chen, M., de Lara, E., **Froehlich, J.**, Haehnel, D., Hightower, J., LaMarca, L., Potter, F., Sohn, T., Tang, K., & Smith, I. (2006). "Are GSM phones THE solution for localization?" IEEE Workshop on Mobile Computing Systems and Applications (WMCSA), Semiahmoo Resort, Washington, USA, April 6-7, 2006.

## POSTERS

- 2007 **Froehlich, J.**, Chen, M., Consolvo, S., Harrison, B., & Landay, J. (2007) "Sensors and Surveys: Collecting Qualitative and Quantitative Data on Human Attitudes, Behaviors, and Activities via Mobile Phones" New Paradigms in Using Computers (NPUC), The Healthcare Interface, July 9<sup>th</sup>, 2007 IBM Almaden, California

## THESIS

- 2004 **Froehlich, J.** (2004) "Unifying Artifacts and Activities in a Visual Tool for Distributed Software Teams." Masters Thesis, University of California, Irvine (Irvine, CA), LD 791.8 .I5 2004 F76.

## INVITED TALKS

- 2009 **Froehlich, J.** (2009). "Reflecting on a Technological Mirror: How Computerized Feedback May Change the Way You Think, Feel and Act About the Environment", Technology and Society, UW Department of Educational Outreach, August 26, 2009.
- Froehlich, J.** (2009). "Feeding Back Consumption in the Home: The Role of Human-Computer Interaction", Technical Communications 505, Computer Mediated Communications, April 22, 2009
- 2008 **Froehlich, J.**, Consolvo, S., Dillahunt, T., Harrison, B., Klasnja, P., Mankoff, J., Landay, J. (2008) "UbiGreen: Using Mobile Phones as a Persuasive Technology to Affect Daily Transportation Practices" Behavior, Energy and Climate Change, Sacramento, CA, November 16-19, 2008.
- 2007 **Froehlich, J.** (2007) "The Mobile Phone as a (Massive) Data Collection Platform" Cornell SIGCHI Distinguished Lectureship Series, November 14th, 2007 Ithaca, New York.
- Froehlich, J.**, Chen, M., Consolvo, S., Harrison, B., & Landay, J. (2007) "Increasing the Breadth: Applying Sensors, Inference and Self-Report in Field Studies with the MyExperience Tool" MobiEval: System Evaluation for Mobile Platforms - Metrics, Methods, Tools and Platforms, June 11th, 2007 San Juan, Puerto Rico.

## PATENTS

- 2009 Patel, S., Fogarty, J., Froehlich, J., Larson, E. (2009) Sensing Events Affecting Liquid Flow in a Liquid Distribution System. US Patent Pending.

## MEDIA COVERAGE

- July 24, 2009 **Watch Your Water**, Living on Earth, National Public Radio
- June 30, 2009 **Sensors for Tracking Home Water Use**, MIT Technology Review
- May 22, 2009 **UW Business Plan Competitions Yields \$25K**, Xconomy.com
- May 21, 2009 **Clean tech shines at annual UW Business Plan Competition**, TechFlash.com
- April 9, 2009 **Student teams win cash for finding solutions to real-world environmental problems**, UW News
- April 3, 2009 **HydroSense Wins Environmental Innovation Challenge at the UW**, TechFlash.com

- April 2, 2009 **HydroSense, With Plan to Conserve Water, Wins UW Environmental Competition**, Xconomy.com
- April 2, 2009 **Competition Sparks Environmental Innovation**, The Daily, University of Washington
- Dec/Jan 2008 **From the Drawing Board: UbiGreen**, Plenty Magazine, Issue 19
- Nov 26, 2008 **Centerpiece of High End Computing: Cell Phones**, ABC News
- Nov 21, 2008 **UbiGreen: Not Just Another Carbon Footprint Phone App (Honest!)**, TreeHugger.com
- Nov 21, 2008 **UbiGreen Cell Phone App Keeps Track of Your Carbon Footprint**, CleanTechnica.com
- Nov 19, 2008 **Track your fitness, environmental impact with new cell phone applications**, UW News
- Nov 19, 2008 **UbiGreen, A Cell Phone App that Knows if You're in a Plane, Train, or Automobile**, dvice.com
- Nov 19, 2008 **UbiFit and UbiGreen: Mobile applications for health and the environment**, King 5 Television
- Apr 11, 2008 **Telefonica investiga soluciones para el Bicing**, El Pais Newspaper.
- Apr 11, 2008 **Telefonica se conecta al video en 3D a las compras**, El Pais Newspaper.
- Apr 11, 2008 **Telefonica augura que el movil se usara para realizar compras sociales**, El Pais Newspaper.
- Sep 20, 2007 **UbiGreen, I Be Green, We All Be Green**, Ecotality.com
- Sep 18, 2007 **Intel plans for green tracking device**, ZDNet

## GRANTS

- 2009 **Collaborative Research: Mobilizing Information Technology Systems to Motivate Reduced Energy Consumption and Greenhouse Gas Emissions**, NSF, CBET-0854445, \$160,879 / 3 yrs. Co-written with Professor James Landay and Professor Jennifer Mankoff (CMU).
- Application for Prototype Funds for HydroSense**, University of Washington, College of Engineering, \$5,900. Co-written with Shwetak Patel and James Fogarty.
- 2007 **Context-Aware Mobile Phones: Design, Prototyping, and Evaluation**, Yahoo Research, \$25,000 / 1yr. Co-written with Professor James Landay.

## TEACHING

- Winter 2007 **User Interface Design, Prototyping, and Evaluation Part II**, CSE490f, 14 students  
University of Washington, Computer Science and Engineering  
Teaching Assistant for Professor James Landay
- Winter 2005 **Intro to Digital Design**, CSE370, 57 students  
University of Washington, Computer Science and Engineering  
Teaching /LabAssistant for Professor Gaetano Borriello.
- Fall 2004 **Intro to Digital Design**, CSE370, 44 students  
University of Washington, Computer Science and Engineering  
Teaching/Lab Assistant for Lecturer Bruce Hemingway.
- Fall 2001 **Intro to Digital Design**, CPRE210, 40 students  
Iowa State University, Computer and Electrical Engineering  
Teaching/Lab Assistant Professor Diane Rover.

## PROFESSIONAL ACTIVITIES

- Program Committee ACM Human Factors in Computing Systems (CHI), 2008
- Workshop Organizer Mobile Living Labs 2009: Methods and Tools for Evaluation in the Wild at MobileHCI2009
- Reviewer ACM Human Factors in Computing Systems (CHI) 2004 – 2009  
ACM User Interface Software and Technology (UIST), 2007  
ACM Ubiquitous Computing (UbiComp), 2005 – 2009  
ACM Computer Supported Cooperative Work (CSCW), 2008  
ACM Transactions on the Web, 2009  
IEEE USENIX, 2006  
IEEE Pervasive Computing Magazine, 2008 – 2009
- University of Washington Student coordinator and founding member of Design Use Build (DUB) group, 2006 – Present  
Co-organizer of HCI Seminar (CSE590h), UW CSE Department, Fall 2006, Winter 2007  
Prospective Student Committee Member, UW CSE Department, Winter 2005
- Student Volunteer ACM Human Factors in Computing Systems (CHI) 2005, 2007, 2008  
Pervasive 2007

## REFERENCES

James Landay, Ph.D.  
Associate Professor  
Computer Science and Engineering  
University of Washington, Seattle  
Paul Allen Center 101  
Box 352350  
Seattle, WA 98195-2350  
landay@cs.washington.edu

Shwetak N. Patel, Ph. D.  
Assistant Professor  
Computer Science and Engineering  
University of Washington, Seattle  
Paul Allen Center 101  
Box 352350  
Seattle, WA 98195-2350  
shwetak@u.washington.edu

Other references available upon request.