

Konrad Lorincz

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Education

Harvard University **Cambridge, MA**
Doctor of Philosophy in Computer Science
November 2009
Thesis advisor: Dr. Matt Welsh.
Ph.D. Thesis title: "Resource Aware Programming in Sensor Networks"
Oral qualification exam title: "MoteTrack: A Robust, Decentralized Approach to RF-Based Location Tracking".

Harvard University **Cambridge, MA**
Master of Science in Computer Science
May 2004
Advisor: Dr. Matt Welsh.

University of Virginia **Charlottesville, VA**
Bachelor of Science in Computer Science
May 2001
Major1: Computer Science; Major 2: Computer Engineering; Minor: Physics
Cumulative GPA: 3.7; Computer Science GPA: 3.9
Thesis advisor: Dr. Jorg Liebeherr.
Thesis title: "HyperCast: Super-Scalable Many-to-Many Multicast Protocol".

Selected Research Projects

Mercury **Harvard University**
Developed a wearable, wireless sensor platform for motion analysis of patients being treated for neuromotor disorders, such as Parkinson's Disease, epilepsy, and stroke. An earlier version of Mercury is currently being used in several patient studies at the Motion Analysis Laboratory at Spaulding Rehabilitation Hospital in Boston, MA.

Pixie **Harvard University**
Led the design of Pixie, a new resource-aware OS for sensor networks in which resources are treated as a first-class entity. In Pixie, applications receive feedback on, and have explicit control over resource usage.

Volcano monitoring **Harvard University**
Was involved in the design and second deployment which took place at Vulcan Reventador, Ecuador, in July/August 2005. We deployed 16 nodes over a span of 3 km on the upper part of the volcano for a duration of 19 days. Our goal was to demonstrate that WSN are an effective scientific instrument for volcanic studies, which we published in OSDI'06.

CodeBlue **Harvard University**
Helped design, build, and deploy CodeBlue, a wireless sensor network platform for medical applications, including pre-hospital, in-hospital, and disaster response. Took part in a deployment of a disaster drill in Baltimore, MD and in a pilot study at Washington Hospital Center Burn Unit.

MoteTrack**Harvard University**

Designed, implemented and deployed a robust, decentralized RF-based location tracking system for motes. With just 25 beacon nodes deployed throughout one floor, the system achieves a 50th-percentile and 80th-percentile location-tracking accuracy of 1 meters and 1.7 meters respectively when diversifying the radio signal over 16 frequencies. MoteTrack is used by several institutions including: Boston University, Crossbow, and Antotech.

HyperCast: Super-Scalable Many-to-Many Multicast Protocol**University of Virginia**

Was part of the HyperCast Design Team, took part in the designed and implementation of an application layer multicast protocol in Java using good OO techniques. HyperCast is a very modular protocol, achieved through the heavy use of inheritance and interfaces. To evaluate the system, I performed large-scale experiments on a distributed system composed of over 100 computers and successfully scaled the protocol to multicast groups with 10,000 nodes.

Journal Articles

“The Advanced Health and Disaster Aid Network: A Light-weight Wireless Medical System for Triage.” Tia Gao, Tammara Massey, Leo Selavo, David Crawford, Bor-rong Chen, Konrad Lorincz, Victor Shnayder, Logan Hauenstein, Foad Dabiri, James Jeng, Arjun Channugam, David White, Majid Sarrafzadeh, Matt Welsh, In *IEEE Transactions on Biomedical Circuits and Systems*, 2007.

“Deploying a Wireless Sensor Network on an Active Volcano.” Geoff Werner-Allen, Konrad Lorincz, Mario Ruiz, Omar Marcillo, Jeff Johnson, Jonathan Lees, and Matt Welsh. In *IEEE Internet Computing*, Special Issue on Data-Driven Applications in Sensor Networks, March/April 2006.

“MoteTrack: A Robust, Decentralized Approach to RF-Based Location Tracking.” Konrad Lorincz and Matt Welsh. In *Personal and Ubiquitous Computing*, Special Issue on Location and Context-Awareness, October 2006. ISSN: 1617-4909 (print) 1617-4917 (online), DOI: 10.1007/s00779-006-0095-2

“Sensor Networks for Emergency Response: Challenges and Opportunities.” Konrad Lorincz, David J. Malan, Thaddeus R. F. Fulford-Jones, Alan Nawoj, Antony Clavel, Victor Shnayder, Geoff Mainland, Steve Moulton, and Matt Welsh. In *IEEE Pervasive Computing*, Special Issue on Pervasive Computing for First Response, Oct-Dec 2004.

Conference Papers

“Mercury: A Wearable Sensor Network Platform for High-Fidelity Motion Analysis.” Konrad Lorincz, Bor-rong Chen, Geoffrey Werner Challen, Atanu Roy Chowdhury, Shyamal Patel, Paolo Bonato, and Matt Welsh. In *Proceedings of the 7th ACM Conference on Embedded Networked Sensor Systems (SenSys'09)*, November 2009.

“Resource Aware Programming in the Pixie OS.” Konrad Lorincz, Bor-rong Chen, Jason Waterman, Geoff Werner-Allen, and Matt Welsh. In *Proceedings of the 6th ACM Conference on Embedded Networked Sensor Systems (SenSys'08)*, November 2008.

“Pixie: An Operating System for Resource-Aware Programming of Embedded Sensors.” Konrad Lorincz, Bor-rong Chen, Jason Waterman, Geoff Werner-Allen, and Matt Welsh. In *Proceedings of The Fifth Workshop on Embedded Networked Sensors (HotEmNets'08)*, 2008.

“Wireless Medical Sensor Networks in Emergency Response: Implementation and Pilot Results.” Tia Gao, Christopher Pesto, Leo Selavo, Yin Chen, JeongGil Ko, JongHyun Lim, Andreas Terzis, Andrew Watt, James Jeng, Bor-rong Chen, Konrad Lorincz, Matt Welsh. In

Proceedings of the 2008 IEEE International Conference on Technologies for Homeland Security, May, 2008.

“Analysis of Feature Space for Monitoring Persons with Parkinson's Disease With Application to a Wireless Wearable Sensor System.” Shyamal Patel, Konrad Lorincz, Richard Hughes, Nancy Huggins, John H. Growdon, Matt Welsh, and Paolo Bonato. In *Proceedings of the 29th IEEE EMBS Annual International Conference*, Lyon, France, August 2007.

“Fidelity and Yield in a Volcano Monitoring Sensor Network.” Geoff Werner-Allen, Konrad Lorincz, Jeff Johnson, Jonathan Lees, and Matt Welsh. In *Proceedings of the 7th USENIX Symposium on Operating Systems Design and Implementation (OSDI 2006)*, Seattle, November 2006.

“MoteTrack: A Robust, Decentralized Approach to RF-Based Location Tracking.” Konrad Lorincz and Matt Welsh. In *Proceedings of the International Workshop on Location and Context-Awareness (LoCA 2005)* at Pervasive 2005, May 2005.

Technical Reports

“Sensor Networks for Medical Care.” Victor Shnayder, Bor-rong Chen, Konrad Lorincz, Thaddeus R. F. Fulford-Jones, and Matt Welsh. Harvard University Technical Report TR-08-05, April 2005.

“A Robust, Decentralized Approach to RF-Based Location Tracking.” Konrad Lorincz and Matt Welsh. Technical Report TR-19-04, Harvard University, 2004.

“HyperCast: A Super-Scalable Many-to-Many Multicast Protocol for Distributed Internet Applications.” Konrad Lorincz. School of Engineering and Applied Science, University of Virginia (Undergraduate Thesis), May 2001.

Posters, Talks, and Abstracts

“Mercury: A Wearable Sensor Network Platform for High-Fidelity Motion Analysis.” Konrad Lorincz, Bor-rong Chen, Geoffrey Werner Challen, Atanu Roy Chowdhury, Shyamal Patel, Paolo Bonato, and Matt Welsh. Talk presented at Proceedings of the 7th ACM Conference on Embedded Networked Sensor Systems (SenSys'09), November 2009.

“Mercury: Monitoring Patients with Parkinson's Disease using Wearable Wireless Sensors.” Konrad Lorincz, Bor-rong Chen, Geoff Werner-Allen, Atanu Roy Chowdhury, Benjamin Kuris, Steve M. Ayer, Shyamal Patel, Paolo Bonato and Matt Welsh. Poster presented at MTL Workshop on Next Generation Medical Electronic Systems. MIT, Cambridge MA, December 2008.

“Wearable Wireless Sensor Network to Assess Clinical Status in Patients with Neurological Disorders.” Konrad Lorincz, Benjamin Kuris, Steven M. Ayer, Shyamal Patel, Paolo Bonato, Matt Welsh. Poster presented at IPSN'07 SPOTS track. Cambridge, MA.

“A Wireless Seismoacoustic Sensor Network for Monitoring Activity at Volcán Reventador, Ecuador.” Matt Welsh, Geoff Werner-Allen, Konrad Lorincz, Omar Marcillo, Mario Ruiz, Jeff Johnson, and Jonathan Lees. Cities On Volcanoes 4 Conference, Quito, January 23-27, 2006 (abstract). Also, Eos Trans. AGU, 86(52), Fall Meet. Suppl., Abstract V21C-0612 (abstract).

“MoteTrack: Robust, Decentralized Approach to RF-Based Location Tracking.” Konrad Lorincz and Matt Welsh. Poster presented at the Harvard Industrial Partnership (HIP), October 2004.

“MoteTrack: A Robust, Decentralized Approach to RF-Based Location Tracking.” Konrad Lorincz and Matt Welsh. Presented at Boston University Computer Science Seminar, September 10, 2004. Also presented at the Crossbow Workshop. Cambridge, MA, December 14, 2004.

Experience and Appointments

Intel Research Berkeley <i>Research Intern – Developed camera for the iMote2</i>	Berkeley, CA <i>Summer 2005</i>
Harvard University <i>Graduate Research Assistant</i>	Cambridge, MA <i>2003 – Present</i>
Harvard University <i>Teaching Fellow – Computer Networks, CS 143</i>	Cambridge, MA <i>Fall 2003</i>
University of Washington <i>Teaching Assistant – Computer Programming I, CSE 141</i>	Seattle, WA <i>Spring 2002</i>
University of Washington <i>Teaching Assistant – Software Engineering, CSE 403</i>	Seattle, WA <i>Winter 2002</i>
University of Washington <i>Teaching Assistant – Computer Programming II, CSE 142</i>	Seattle, WA <i>Fall 2001</i>
University of Virginia <i>Research Assistant – HyperCast project</i>	Charlottesville, VA <i>Summer 2000</i>
University of Virginia <i>Software Developer – CiteMaker Bibliography Generator</i>	Charlottesville, VA <i>1999 – 2000</i>
University of Virginia <i>Teaching Assistant – Introduction to Computer Science, CS 101</i>	Charlottesville, VA <i>Fall 1998 and Spring 1999</i>

Computer Skills

Programming Languages and Operating Systems

Java, Python, NesC, C/C++ (Visual C++/ MFC), Perl, Pascal, SQL.
Windows, UNIX, Linux, TinyOS.

Networking Experience

TCP/IP, UDP, Ethernet, Multicast, XML, Socket Level Programming,
Zigbee, 802.15.4.

Awards and Honors

Louis T. Rader Award – Best undergraduate research in Computer Science for the 2000-2001 academic year

Intermediate Honors – recognized for outstanding academic achievement

Golden Key National Honor Society

National Society of Collegiate Scholars

Winner of the 1995 Ethel B. Collins Memorial Trophy – Best High School Chess Player
(NJ vs. NY Invitational Scholastic Match)

Obtained 14th place at the 1989 National Chess Tournament in Romania

Other

Citizenship: United States.

Please see <http://www.eecs.harvard.edu/~konrad/> for additional information, including complete application materials.

References

Dr. Matt Welsh: Associate Professor in Computer Science and Thomas D. Cabot Associate Professor of Applied Science, School of Engineering and Applied Sciences, Harvard University. 33 Oxford St., 233 Maxwell Dworkin, Harvard University, Cambridge, MA 02138.
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Dr. Margo Seltzer: Herchel Smith Professor of Computer Science and Harvard College Professor, School of Engineering and Applied Sciences, Harvard University. 33 Oxford St., 241 Maxwell Dworkin, Harvard University, Cambridge, MA 02138.
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Dr. John A. Stankovic: Professor in Computer Science and BP American Professor, Department of Computer Science, School of Engineering and Applied Sciences, University of Virginia. 151 Engineer's Way, P.O. Box 400740, Charlottesville, Virginia 22904-4740.
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Dr. Paolo Bonato: Director, Motion Analysis Laboratory, Spaulding Rehabilitation Hospital, Boston MA. Assistant Professor, Department of Physical Medicine and Rehabilitation, Harvard Medical School. Affiliated Faculty Member, Harvard-MIT Division of Health Sciences & Technology. 125 Nashua Street, Boston, MA, 02114.
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