

Contact Börjegatan 58b
SE-75229 Uppsala
Sweden

Telephone: +46-706-538872
E-mail: erik.nordstrom@gmail.com

Personal Information

Nationality Swedish.
Date of Birth November 1, 1976.
Marital Status Unmarried.

Employment

2008 – present Researcher in the Communications Research group (CoRe) at the Department of Information Technology, Uppsala University. Working on opportunistic and mobile communication within the Hagggle project – a project within the European Union’s Framework Programme 6. Teaching computer networking courses.

2006 – 2007 Six months internship at Thomson Research Lab, Paris.
Hosted by Dr. Christophe Diot.

Education

2002 – 2008 **PhD in Computer Communication, Department of Information Technology, Uppsala University**
Advisor: Prof. Per Gunningberg.
Dissertation: *Challenged Networking: An Experimental Study of New Protocols and Architectures*.
PhD defense opponent: Associate Professor Brian Levine, University of Massachusetts, Amherst.
Grading committee: Prof. Jörg Ott, Helsinki University of Technology, Dr. Cecilia Mascolo, University of Cambridge, and Prof. Andreas Kessler, Karlstad University.

1997 – 2002 **Degree of Master of Science in Engineering, Uppsala University**
Specialized in Information Technology. Masters thesis: *A Large Scale Ad hoc Network Testbed for Reproducible Performance Tests*, Advisor: Prof. Christian Tschudin, University of Basel.

1996 – 1997 **Non-programme Studies, Uppsala University**
Courses in Chemistry, Russian history and Ethnology.

Personal Interests

I enjoy travelling and experiences in nature. In the summers I regularly go fishing with my friends. In everyday life I have a big interest in film and music.

Language Skills

Fluent in Swedish and English. Basic knowledge of French.

Technical Skills

Programming C, C++, C#, Java, Perl, LaTeX, Matlab, Python, ML.

Platforms Unix, Linux, Mac OS X, Windows, Windows Mobile, Android OS, iPhone OS.

Publications

Theses and Articles in Journals

Erik Nordström. *Challenged Networking – An Experimental Study of New Protocols and Architectures*. PhD thesis, Uppsala University, April 2008.

Christian Tschudin, Per Gunningberg, Henrik Lundgren, and Erik Nordström. Lessons from experimental MANET research. *Elsevier Journal on Ad hoc Networks*, 3(2):221–233, March 2005.

Erik Nordström, Per Gunningberg, and Christian Tschudin. Comparison of forwarding strategies in internet connected MANETs. *ACM SIGMOBILE Mobile Computing and Communications Review (MC2R)*, 8(4):72–76, October 2004.

Christian Tschudin, Henrik Lundgren, and Erik Nordström. *Embedding MANETs in the Real World*, volume 2775/2003 of *Lecture Notes in Computer Science*, pages 578–589. Springer Berlin / Heidelberg, 2003.

Erik Nordström. A large scale ad hoc network testbed for reproducible performance tests. Master's thesis, Uppsala University, 2002.

Conference Papers

Erik Nordström, Per Gunningberg, and Christian Rohner. Hagggle: A data-centric network architecture for mobile devices. In *Proceedings of ACM MobiHoc 2009 S³ Workshop*, May 2009.

Erik Nordström, Per Gunningberg, Christian Rohner, and Oskar Wibling. Evaluating wireless multi-hop networks using a combination of simulation, emulation, and real world experiments. In *Proceedings of MobiEval'07*, June 2007.

Erik Nordström, Christophe Diot, Richard Gass, and Per Gunningberg. Experiences of measuring human mobility using bluetooth inquiring devices. In *Proceedings of MobiEval'07*, June 2007.

Christian Rohner, Erik Nordström, Per Gunningberg, and Christian Tschudin. Interactions between TCP, UDP and routing protocols in wireless multi-hop ad hoc networks. In *Proceedings of Realman: IEEE ICPS Workshop on Multi-hop Ad hoc Networks: from theory to reality*, July 2005.

Erik Nordström, Per Gunningberg, and Henrik Lundgren. A testbed and methodology for experimental evaluation of wireless mobile ad hoc networks. In *Proceedings of First International Conference on Testbeds and Research Infrastructures for the DEvelopment of NeTworks and COMMunities (Tridentcom)*, February 2005.

Christian Tschudin, Henrik Lundgren, and Erik Nordström. Embedding MANETs in the real world. In *Personal Wireless Communications (PWC), Venice, Italy*, September 2003.

Henrik Lundgren, Erik Nordström, and Christian Tschudin. Coping with communication gray zones in IEEE 802.11b based ad hoc networks. In *Proceedings of The Fifth ACM International Workshop On Wireless Mobile Multimedia (WoWMoM)*, September 2002.

Henrik Lundgren, David Lundberg, Johan Nielsen, Erik Nordström, and Christian Tschudin. A large-scale testbed for reproducible ad hoc protocol evaluations. In *Proceedings of IEEE Wireless Communications and Networking Conference 2002 (WCNC'02)*, March 2002.

Posters and Demos

Erik Nordström, Daniel Aldman, Fredrik Bjurefors, and Christian Rohner. Demo: Using search to enhance picture sharing with mobile phones. MobiSys 2009, Kraków, Poland, June 2009.

Erik Nordström, Daniel Aldman, Fredrik Bjurefors, and Christian Rohner. Demo: Hagggle - a search-based data dissemination architecture for mobile devices. MobiHoc 2009, New Orleans, USA, May 2009.

Christian Rohner, Erik Nordström, and Henrik Lundgren. Using ad hoc networking in orienteering. Demo at the 10th Annual International Conference on Mobile Computing and Networking (MobiCom), Philadelphia, USA, September 2004.

Erik Nordström, Per Gunningberg, and Christian Tschudin. Poster: Comparison of forwarding strategies in internet connected manets. MobiHoc 2004, Tokyo, Japan, May 2004.

Erik Nordström. Listen yourself to AODV, OLSR and LUNAR. Demo at Adhoc'02 Workshop, Johannesberg, Sweden, March 2002.

Technical Reports

Erik Nordström, Per Gunningberg, and Christian Rohner. A search-based network architecture for mobile devices. Technical Report Technical Report 2009-003, Department of Information Technology, Uppsala University, January 2009.

Erik Nordström, Per Gunningberg, Christian Rohner, and Oskar Wibling. A cross-environment study of routing protocols for wireless multi-hop networks. Technical Report Technical Report 2007-016, Department of Information Technology, Uppsala University, April 2007.

Erik Nordström, Richard Gold, and Per Gunningberg. Mythbusters: Whatever you thought about manet routing, think again... Technical Report Technical Report 2005-039, Department of Information Technology, Uppsala University, November 2005.

Henrik Lundgren, David Lundberg, Johan Nielsen, Erik Nordström, and Christian Tschudin. A large-scale testbed for reproducible ad hoc protocol evaluations. Technical report, Department of Information Technology, Uppsala University, November 2001.

Presentations and Talks

May, 2009 *"The Hagggle Architecture"*, ACM MobiHoc 2009 S³ Workshop, New Orleans, USA. Awarded *Best Presentation*.

March, 2009 *"Evolution of the Hagggle Architecture and Reference Implementation"*, Hagggle EU Project Review, Venice, Italy.

November, 2008 *"Technology Adoption in the Internet – A Study of IPv6 Deployment Issues"*, Mälardalen University, Sweden.

- September, 2008 *"The Hagggle Architecture and Reference Implementation"*, Hagggle meeting, Uppsala University, Sweden.
- July, 2008 *"The Hagggle Architecture"*, University of Basel, Switzerland.
- June, 2008 *"Challenged Networking - An Experimental Study of New Protocols and Architectures"*, PhD dissertation, Uppsala University, Sweden.
- March, 2008 *"The Hagggle Architecture"*, Ericsson Research, Kista, Sweden.
- March, 2008 *"The Hagggle Architecture"*, Hagggle EU Project Review, Turin, Italy.
- June, 2007 *"A Cross-Environment Study of Routing Protocols for Wireless Multi-hop Networks"*, Intimate workshop, Paris, France.
- June, 2007 *"Experiences of Measuring Human Mobility using Bluetooth Inquiring Devices"*, MobiEval 2007, San Juan, Puerto Rico.
- December, 2006 *"The Hagggle Project"*, Thomson Research Lab Open House, Paris, France.
- May, 2006 *"Comparing Simulation, Emulation, and Real-World Experimental Results in Mobile Ad hoc Networks"* Adhoc'06 Workshop, Johannesburg, Sweden.
- September, 2005 *"A Testbed and Methodology for Experimental Evaluation of Wireless Mobile Ad hoc Networks"* IEEE Tridentcom 2005, Trento, Italy.
- May, 2005 *"TCP Greediness towards UDP streams in Wireless Multihop Ad hoc Networks"* Adhoc'05 Workshop, Johannesburg, Sweden.
- May, 2004 *"Gateway Forwarding Strategies in Ad hoc Networks"* Adhoc'04 Workshop, Johannesburg, Sweden.

Research Experience

Graduate Work

My graduate work is systems oriented and focuses on the development and evaluation of new network protocols and architectures for wireless and mobile networks. I have designed and built a network testbed, called APE (Ad hoc Protocol Evaluation), which allows repeatable evaluations of networking protocols for wireless and mobile networks. As part of this work I have created two well-known implementations of the ad hoc routing protocols AODV and DSR.

My research involves not only the systematic evaluation of protocols, but also the design of radically new communication architectures. I am one of the principle designers and implementers of the Hagggle architecture, which is a data-centric network architecture for opportunistic mobile communication. Hagggle runs on mobile devices, such as mobile phones, and allows users to easily engage in opportunistic device-to-device communication.

Software and Prototypes

APE

APE is the Ad hoc Protocol Evaluation testbed. APE fills the experimental gap in evaluations that target fully realistic environments with mobility and wireless communication. It is a self-contained Linux system that typically runs on laptops, and comes pre-configured with everything needed to run experiments. APE is free software and has been downloaded over 8500

times.

Source code: <http://sourceforge.net/projects/apetestbed>

AODV-UU

AODV-UU is one of the first implementations of the Ad hoc On-demand Distance Vector (AODV) routing protocol. AODV-UU has been interoperability tested in the first AODV interop at the University California Santa Barbara. It has also been officially recommended by the authors of AODV. AODV-UU is free software and is downloaded around 150-200 times each month. It runs on Linux and in the ns-2 simulator.

Source code: <http://sourceforge.net/projects/aodvuu>

DSR-UU

DSR-UU is one of the few implementations of the Dynamic Source Routing (DSR) protocol. DSR-UU is free software and is downloaded around 50-100 times each month. It runs on Linux and in the ns-2 simulator.

Source code: <http://sourceforge.net/projects/dsruu>

Haggle

I am one of the principal designers and implementers of the Haggle architecture and reference implementation. Haggle is implemented in C++ and targets mainly mobile phones, but runs on most platforms, including Windows Mobile, iPhone OS, Android OS, Symbian, Windows, Linux and Mac OS X. The source code for Haggle is free software and is currently available on request.

Opportunistic Network Simulator

As part of my graduate work I have implemented a trace-driven simulator for opportunistic networks.

Awards and Grants

- | | |
|------|---|
| 2009 | Best presentation award for "Haggle - A Data-centric Network Architecture for Mobile Devices", ACM MobiHoc 2009 <i>S</i> ³ Workshop, New Orleans, USA. |
| 2009 | Second place for "Haggle - A Search-Based Data Dissemination Architecture for Mobile Devices" at ACM MobiHoc 2009 demo session, New Orleans, USA. |
| 2006 | Student grant, BICI SWING summer school, Bertinoro, Italy. |
| 2004 | Student travel grant, ACM SIGCOMM 2004, Portland, USA. |

Teaching Experience

- | | |
|-------------|---|
| Spring 2009 | Assistant teacher in Computer Networks II, Uppsala University |
|-------------|---|

Fall 2008	Lecturer and assistant teacher in Computer Networks I, Uppsala University
Spring 2008	Assistant teacher in Computer Networks II, Uppsala University
Fall 2007	Main teacher in Computer Networks I, Uppsala University. This is an introductory course in computer networking for third year students. Course book: Kurose/Ross <i>Computer Networking – A Top-Down Approach</i> .
Spring 2006	Assistant teacher and lecturer in Computer Networks II, Uppsala University.
Spring 2005	Assistant teacher and lecturer in Computer Networks II, Uppsala University.
Spring 2004	Assistant teacher in Computer Networks I, Uppsala University.
Fall 2003	Assistant teacher in Computer Networks I, Uppsala University.
Spring 2003	Assistant teacher in Computer Networks I, Uppsala University.

Student Advising

I have advised the following students in their masters thesis projects:

January, 2008	<i>Mobile Groups in Ad-hoc Networks</i> , Kristoffer Kobosko and Henrik Wallentin, Department of Information Technology, Uppsala University, 2007.
January, 2007	<i>SNR and Route Analysis of Experiments from 802.11 based MANETs</i> , Jonas Västibacken, Department of Information Technology, Uppsala University, 2007.

Professional Services

2009	Program Committee member, ACM HotPlanet 2009.
2008	Reviewer: IEEE International Conference on Communications (ICC).
2007	Shadow Technical Program Committee: The 3rd ACM International Conference on emerging Networking EXperiments and Technologies (CoNEXT).
2007	Reviewer: International Conference on Embedded Software (EMSOFT).
2007	Reviewer: 10th International Symposium on Component-based Software Engineering.
2007	Reviewer: IEEE Communications Magazine.
2006	Reviewer: IEEE Globecom - Wireless Communications and Networking.
2006	Reviewer: IEEE Communications Magazine.
2006	Reviewer: IEEE Transactions on Vehicular Technology.
2005	Reviewer: Swedish National Computer Networking Workshop (SNCNW).
2004	Reviewer: ACM SIGMOBILE Mobile Computing and Communications Review (MC2R).

2002

Reviewer: IEEE International Conference on Communications (ICC).