

Curriculum Vitae for Mariam Kaynia

Contact Information

Name: Mariam Kaynia

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Education

Field of Specialization: Electrical Engineering, Wireless Communications

- PhD. at Norwegian University of Science and Technology (NTNU) 2007 – 2010
Advisor: Professor Geir E. Øien
Thesis topic: “Analysis and improvement of wireless ad hoc network performance through MAC and PHY layer design”
- MSc. at the University of Minnesota (U of M) 2005 – 2007
Advisor: Professor Nihar Jindal
- MSc. and BSc. at NTNU 2002 – 2007
Advisor: Professor Geir E. Øien

Publications

Journal papers

- M. Kaynia, N. Jindal, and G. E. Øien, “Performance analysis and improvement of MAC protocols in wireless ad hoc networks”, in *IEEE Trans. on Wireless Communications*, vol. 10, no. 1, pp. 240-252, Jan. 2011.
- M. Kaynia, F. Fabbri, G. E. Øien, and R. Verdone, “MAC layer outage probability of bounded ad hoc networks”, to be published in *Advances in Electronics and Telecommunications Journal*, June 2011.
- M. Kaynia and G. E. Øien, “Outage probability of fading and non-fading ad hoc networks with bandwidth partitioning”, submitted to *IEEE Trans. on Wireless Communications*, Aug. 2010.
- M. Kaynia and G. E. Øien, “Improving the performance of CSMA with joint transmitter-receiver sensing”, submitted to *IEEE Trans. on Wireless Communications*, Aug. 2010.
- P. H. J. Nardelli, M. Kaynia, P. Cardieri, and M. Latva-aho, “Optimal transmission capacity of ad hoc networks with packet retransmissions”, submitted to *IEEE Trans. on Wireless Communications*, April 2011.

Conference papers

- M. Kaynia, G. Alfano, and D. Gesbert, “Achieving feasibility in interference alignment through binary power control”, in preparation, Jan. 2011.
- M. Kaynia, P. H. J. Nardelli, and M. Latva-aho, “Evaluating the information efficiency of multi-hop networks with carrier sensing capability”, *Proc. International Conference on Communications (ICC)*, Kyoto, Japan, June 2011.
- M. Kaynia, A. J. Goldsmith, D. Gesbert, and G. E. Øien, "On the usage of antennas in MIMO and MISO

interference channels", *Proc. IEEE International Workshop on Signal Processing Advances for Wireless Communications (SPAWC)*, pp. 1-5, June 2010.

- M. Kaynia, P. H. J. Nardelli, P. Cardieri, and M. Latva-aho, "On the optimal design of MAC protocols in multi-hop ad hoc networks", *Proc. IEEE International Symposium of Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)*, pp. 424-429, June 2010.
- P. H. J. Nardelli, M. Kaynia, and M. Latva-aho, "Efficiency of the ALOHA protocol in multi-hop networks", *Proc. IEEE International Workshop on Signal Processing Advances for Wireless Communications (SPAWC)*, pp. 1-5, June 2010.
- M. Kaynia, G. E. Øien, and R. Verdone, "Analytical assessment of the effect of backoff and retransmissions on the performance of ALOHA and CSMA in MANETs", *Proc. IEEE International Conference on Communications (ICC)*, pp. 1-6, May 2010.
- F. Fabbri, M. Kaynia, and R. Verdone, "The impact of edge effects on the performance of MAC protocols in ad hoc networks with fading", *Proc. IEEE International Conference on Communications (ICC)*, pp. 1-5, May 2010.
- M. Kaynia, F. Fabbri, R. Verdone, and G. E. Øien, "The outage probability of MAC protocols in bounded regions", *Proc. European Wireless (EW)*, pp. 544-550, April 2010.
- Z. K. M. Ho, M. Kaynia, and D. Gesbert, "Distributed power control and beamforming on MIMO interference channels", *Proc. European Wireless (EW)*, pp. 654-660, April 2010 (Invited).
- J. E. Corneliussen, M. Kaynia, and G. E. Øien, "Optimal tradeoff between transmission rate and packet duration in wireless ad hoc networks", *Proc. IEEE Wireless Communications and Networking Conference (WCNC)*, pp. 1-6, April 2010.
- M. Kaynia, A. J. Goldsmith, and G. E. Øien, "Performance Evaluation of MIMO Interference Channels", *VERDIKT Programme Conference*, Oslo, Norway, Aug. 2009.
- M. Kaynia, G. E. Øien, and N. Jindal, "Joint Transmitter and Receiver Sensing Capability of CSMA in MANETs", *Proc. IEEE International Conference on Wireless Communications and Signal Processing (IC-WCSP)*, pp. 1-5, Nov. 2009. (**Best paper award**)
- M. Kaynia, G. E. Øien, and N. Jindal, "Impact of Fading on the Performance of ALOHA and CSMA", *Proc. IEEE International Workshop on Signal Processing Advances for Wireless Communications (SPAWC)*, pp. 394-398, June 2009.
- M. Kaynia, G. E. Øien, A. J. Goldsmith, and N. Jindal, "Outage Probability in Wireless Networks", *Proc. IEEE Information Theory Winter School (ITWS)*, Loen, Norway, March 2009.
- M. Kaynia and G. E. Øien, "Understanding and Improving the Performance of MAC Protocols in Wireless Ad Hoc Networks", *Proc. VERDIKT Programme Conference*, Bergen, Norway, Oct. 2008 (**Best poster award**).
- M. Kaynia, G. E. Øien, N. Jindal, and D. Gesbert, "Comparative performance evaluation of MAC protocols in ad hoc networks with bandwidth partitioning", *Proc. IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)*, pp. 1-6, Sept. 2008 (invited).
- M. Kaynia and N. Jindal, "Performance of ALOHA and CSMA in Spatially Distributed Ad Hoc Networks", *Proc. IEEE International Conf. on Communications (ICC)*, pp. 1108-1112, May 2008.
- C.-S. Chen, M. Kaynia, G. E. Øien, and A. Gjendemsjø, "Cooperative multi-cell power control under imperfect channel knowledge: A comparative study", *Proc. 2nd COST2100 Workshop on MIMO and Cooperative Communications*, Trondheim, Norway, June 2008.

Work Experience¹

- McKinsey & Company (Oslo, Norway) *Sept. 2010 – present*
 - Business consultant, working with many major international telecom companies, banks, and materials companies
 - Projects involve growth strategy, pricing, cost cutting, market diagnostics, design of operating model, and other related management consulting.

- NTNU (Trondheim, Norway) *Aug. 2007 – Aug. 2010*
 - Supervisor for graduating students, providing guidance for their Master's thesis work.
 - Lecturing in several classes both at bachelor and master's level.
 - Working as Teaching Assistant in several classes at both Bachelor's and Master's level.
- Politecnico di Torino (Torino, Italy) *April 2010 – May 2010*
 - Short time stay as Invited Researcher, collaborating with Giuseppa Alfano and other researchers.
 - Conducted research on MIMO interference channels and virtual MIMO in clustered ad hoc networks.
- EURECOM Institute (Sophia-Antipolis, France) *Sept. 2009 – March 2010*
 - Working as Visiting Scholar under the guidance of Professor David Gesbert.
 - Conducted research work related to MIMO interference channels, and MAC protocol design.
- Stanford University (Stanford, CA, USA) *Jan. 2009 – Jul. 2009*
 - Working as Visiting Researcher under the guidance of Professor Andrea Goldsmith.
 - Conducted research work related to MAC protocols in ad hoc networks, MIMO interference channels, and cognitive ad hoc networks.
- McKinsey & Company (Oslo, Norway, and Moscow, Russia) *Summer 2006*
 - Worked as junior consultant in the Oslo and Moscow office.
 - Worked on several different projects, related to telecommunications and marketing for an international telecom company and a major telecom company in Eastern Europe.
- Veteran Affairs Medical Center (Minneapolis, USA) *Spring 2006*
 - Worked as research assistant on a project related to signal processing within neuroscience.
 - Performed MEG experiments on control subjects and schizophrenic patients with focus on the storage and processing of data in human memory; used the statistical computer tools BESA to analyze the data.
- Internship at SINTEF (Oslo, Norway) *Summer 2005*
 - Simulated a measurement system for characterization of piezoelectric materials.
 - Used the program Labview to design and simulate the measurement system.
 - Tested the hardware used for measuring properties of piezoelectric elements.
- Internship at Atmel Norway (Trondheim, Norway) *Summer 2005*
 - Designed and programmed a quadrature decoder for Atmel's new AVR-chips, xMega.
 - Used the programming languages Verilog and Assembly for design testing and verification of decoder.
 - Wrote specification and datasheet for the decoder, which was sent out to customers.
- Teaching Assistant at NTNU (Trondheim, Norway) *2003-2005*
 - Worked as teaching assistant for several classes on bachelor and master's level.
 - Had the responsibility for organizing labs, preparing laboratory exercises and helping out both student assistants and students on lab exercises.
 - Took additional responsibility for a 'student assistance program', which involved in-class teaching.
- Internship at Chipcon AS (Oslo, Norway) *Summer 2004*
 - Designed and constructed two RF switchboxes, which are now used regularly at Chipcon for performing tests on several chips simultaneously.
 - Wrote documentation and user manual for the RF switchboxes.
 - Did research on how to optimize the signal-to-noise ratio of Chipcon's chips.
- Internship at Norwegian Geotechnical Institute (Oslo, Norway) *Summer 2003*
 - Designed a program for collecting and representing data using the computer language JAVA.
 - Simulated and tested circuits using PSPICE.

Achievements

- Best Paper Award: at the IEEE International Conference on Wireless Communications and Signal Processing (IC-WCSP) in Nanjing, China, Nov. 2009.
- Best Poster Award: at VERDIKT Programme Conference in Bergen, Norway, Oct. 2008.

- “Best IT Student of the Year”: Won the “Best IT student of the Year” award on a national basis in Norway in 2007, and was among the top three in Norway in the “Top Technology Student of the year” category. These recognitions were based on nominations and several rounds of evaluation.
- Torske Klubben Fellowship: Received the Torske Klubben Fellowship for my studies at the U of M for academic year 2006/2007.
- Fulbright Scholarship: Received the Fulbright Scholarship for my studies at the U of M for academic year 2005/2006.
- Diploma for Teaching and Leading: Selected as representative for the NTNU in an educational exhibition in 2004. Attended an intensive course and qualified to receive a diploma.
- Young Scientists Competition: Won two prizes for my research paper about bridges and their nature, “How is a Bridge’s Strength in Connection to It’s Design?” (2002).
- Physics Olympiad: Qualified to the Norwegian Championship. I was among the top 20 in Norway. The prize was one-week intensive physics course at the University of Oslo (2001/2002).
- ABEL mathematics competition: Participated in mathematics competitions with high scores. Advanced to the top 10% in Norway in years 2000, 2001 and 2002.
- Norwegian Champion in Taekwondo: Won the Norwegian Championship in Taekwondo (Korean martial art) in the junior-class in 1998.

Outreach Experience

- Treasurer in IEEE Norway: Serving as Treasurer in the steering committee of IEEE Norway since Jan. 2008.
- Chair of IEEE Norway Student Branch. Serving as Chair since Jan. 2008.
- Selected into the steering committee of the Department of Electronics and Telecommunications at NTNU as a representative for PhD-students at the department.
- Administrator of NTNU Alumni, which is a group for all Electrical Engineering graduates from NTNU, with the purpose of establishing a link between the university and the industry.
- Representative for the Association of Norwegian Students Abroad (ANSA) program, which is led by the Norwegian government, at the University of Minnesota during 2005/2007.
- Teaching Norwegian to adults at a language school in Minneapolis.
- Selected as student representative at an education exhibition in Oslo and Trondheim, Norway in 2005. Guided high school and university students about Electrical Engineering and obtaining higher education.
- Selected as contact person and class-representative in the NTNU classes ‘Control Engineering’, ‘Electronic Circuits’, ‘Design of Integrated Circuits’ and ‘Information and Signal Theory’ for 3 semesters.
- Volunteered as organizer for arranging and running an ‘Astrofestival’ in Oslo, Norway in 2001.
- Taught English in a language School, for both beginner and advanced groups in 2001.
- Volunteered in teaching basic computer skills to adults in Oslo, Norway in 1999.

Language Skills

Norwegian (fluent)

English (fluent)

Persian (fluent)

French (intermediate)

Spanish (basic)

Swedish (can read and understand quite well)

Danish (can read and understand quite well)

Computer Skills

- *Computer languages:* MATLAB, JAVA, Assembly, Verilog, and HTML.
- *Electronics-related languages and programs:* Labview, Cadence, PSpice, AimSpice, VHDL, Xilinx Foundation, Advanced Design System.
- *Statistical computer tools:* BESA (Brain Electrical Source Analysis).
- *Computer tools:* mySQL, Access-database, PowerPoint, Advanced Excel, Word, etc.
- *Operative systems:* Windows, MAC, and UNIX/Linux.

Hobbies

Sports: Taekwondo (advanced red belt; Norwegian Champion in 1998), swimming (certified as a lifeguard), snowboarding, downhill skiing, cross country skiing, hockey, tennis, and soccer.

Dance: Salsa, Bachata, Cha Cha, Merengue, and Hip-Hop.

¹ References will be provided upon request.