Christian Häger

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Current Occupation and Work Address

Ph.D. Student in Electrical Engineering
Chalmers University of Technology (Sweden) *Sep. 2011–present*
Communication Systems Group
Department of Signals and Systems
SE-41296 Gothenburg
Topic: Coding and Modulation for Coherent Fiber Optical Channels
Thesis Advisor: Prof. Alexandre Graell i Amat

Education

Licentiate of Engineering (Teknologie Licentiatexamen)
Chalmers University of Technology (Sweden) *Juni 2014*
Topic: On Signal Constellations and Coding for Long-Haul Fiber-Optical Systems
Thesis Advisor: Prof. Alexandre Graell i Amat

Diplom-Ingenieur (Dipl.-Ing.), M.Sc. equiv., Electrical Engineering
Ulm University, (Germany) *2005–2011*
Topic: Bidirectional Wireless Communication via Relay Nodes using Lattices
Thesis Advisor: Prof. Aydin Sezgin
Passed with distinction (grade 1.0)

Edith Cowan University, Perth (Australia) *Feb.–July 2008*
Exchange student

Professional Experience

Internship
Bosch Security Systems GmbH, Munich (Germany) *May–Oct. 2010*

- PHY layer design of an OFDM based communication system
- Implemented a bit- and power-loading algorithm
- Simulated and compared different channel coding strategies
- Investigated the effect of clipping distortions on error rates

Teaching Experience

Teaching Assistant
Chalmers University of Technology, Gothenburg (Sweden) *Oct. 2012–present*

- Conducted tutorial sessions for the course *Digital Communications*
- Designed the course project, exercise sheets, and exams
- Supervised the course project
- Conducted oral examinations

Private Teacher
Studienkreis Ulm (Germany) *July 2009–May 2010*

- Taught school children mathematics and physics

Student Assistant
Institute of Telecommunications and Applied Information Theory, Ulm University (Germany) *Dec. 2006–Feb. 2009*

- Wrote an introductory text to probability theory
- Designed and programmed a database for organizing problem sheets
- Taught tutorials for the course *Signals and Systems*

Scholarships and Awards

Diploma Thesis Award
Ulm (Germany) *Nov. 2012*
Awarded by the VDI (Association of German Engineers), Donau-Iller section, for an outstanding diploma thesis

Scholarship
Ulm (Germany) *Feb. 2008*
Awarded by the Landesstifung Baden-Württemberg to support the studies at the Edith Cowan University (Australia)

Scholarship
Ulm (Germany) *Sep. 2007*
Awarded by the University of Ulm for the 5% best students of the intermediate diploma (remission of the tuition fees).

Grants

Ericsson Research Foundation Grant (50000 SEK $\approx$ 7439 USD)
Gothenburg (Sweden) *May. 2014*

Ericsson Research Foundation Grant (40000 SEK $\approx$ 6030 USD)
Gothenburg (Sweden) *May. 2012*

Research Visits

Duke University, Durham (USA)
Host: Dr. Henry D. Pfister *Sep.–Dec 2014*

Ecole Nationale Supérieure de l'Electronique et de ses Applications (ENSEA), Cergy (France)
Host: Dr. Iryna Andriyanova *May 2013*

University of Cambridge (UK)
Host: Dr. Alex Alvarado *Mar.–Apr. 2013*

Invited Talks

7th IEEE Workshop on Advanced Information Processing for Wireless Communication Systems
Aalborg (Denmark) *Nov. 2012*
Title: Optimized bit mappings for spatially coupled LDPC codes over parallel binary erasure channels

University of Cambridge
Cambridge (UK) *Apr. 2013*
Title: Constellation optimization for coherent optical channels distorted by nonlinear phase noise

6th IEEE Workshop on Advanced Information Processing for Wireless Communication Systems
Copenhagen (Denmark) *May 2012*
Title: bidirectional multi-hop communication via two relays using nested Voronoi codes

Publications

Journal

[J1] C. Häger, A. Graell i Amat, F. Brännström, A. Alvarado, and E. Agrell, "Terminated and tailbiting spatially-coupled codes with optimized bit mappings for spectrally efficient fiber-optical systems," *accepted for publication in J. Lightw. Technol.*, Jan. 2015.

[J2] ——, "Improving soft FEC performance for higher-order modulations via optimized bit channel mappings," *Opt. Express*, vol. 22, no. 12, pp. 14 544–14 558, Jun. 2014.

[J3] C. Häger, L. Beygi, E. Agrell, P. Johannisson, M. Karlsson, and A. Graell i Amat, "A low-complexity detector for polarization-multiplexed fiber-optical channels," *IEEE Commun. Lett.*, vol. 18, no. 2, pp. 368–371, Jan. 2014.

[J4] C. Häger, A. Graell i Amat, A. Alvarado, and E. Agrell, "Design of APSK constellations for coherent optical channels with nonlinear phase noise," *IEEE Trans. Commun.*, vol. 61, no. 8, pp. 3362–3373, Aug. 2013.

Conference

[C1] C. Häger, A. Graell i Amat, H. D. Pfister, F. Brännström, A. Alvarado, and E. Agrell, "On parameter optimization for staircase codes," in *Proc. Optical Fiber Communication Conf. and Exposition (OFC)*, Los Angeles, CA, Mar. 2015.

[C2] C. Häger, A. Graell i Amat, F. Brännström, A. Alvarado, and E. Agrell, "Comparison of terminated and tailbiting spatially coupled LDPC codes with optimized bit mapping for PM-64-QAM," in *Proc. European Conf. Optical Communication (ECOC)*, Cannes, France, Sep. 2014.

[C3] ——, "Optimized bit mappings for spatially coupled LDPC codes over parallel binary erasure channels," in *Proc. IEEE Int. Conf. Communications (ICC)*, Sydney, Australia, Jun. 2014.

[C4] C. Häger, A. Graell i Amat, A. Alvarado, and E. Agrell, "Constellation optimization for coherent optical channels distorted by nonlinear phase noise," in *Proc. IEEE Global Communications Conf. (GLOBECOM)*, Anaheim, CA, USA, Dec. 2012.

Other

[O1] C. Häger, "On signal constellations and coding for long-haul fiber-optical systems," Chalmers University of Technology, Gothenburg, Sweden, Licentiate Thesis, 2014.

[O2] ——, "Bidirectional wireless communication via relay nodes using lattices," Ulm University, Ulm, Germany, Diplomarbeit (Diploma Thesis), 2011.

[O3] ——, "Mitarbeit am entwurf des physikalischen layers eines OFDM basierten drahtgebundenen kommunikationssystems (Physical-Layer design of an OFDM based wireline communication system)," Bosch Security Systems GmbH, Munich, Germany, Technical Report, 2010.

[O4] ——, "Turbo equalization performance: The effect of precoding and application of turbo codes," Ulm University, Ulm, Germany, Studienarbeit (Study Thesis), 2009.

Professional Activities

Reviewer for

- Journals: IEEE Transactions on Communications, IEEE Transactions on Wireless Communications
- Conferences: IEEE Global Communications Conference, IEEE Wireless Communications and Networking Conference, IEEE International Symposium of Information Theory

Languages

German: native language

English: very good, spoken and written

Latin: Latinum

Swedish: beginner level

IT skills

OS: Windows, Mac OS X, Linux

Simulation: Matlab

Webdesign: HTML, CSS, PHP, Joomla

Programming: C, C++, IT++ library

Documentation: LaTeX, PSTricks

CAS: Mathematica, Maple