Giuseppe Durisi: Curriculum Vitae

Work address:
Department of Electrical Engineering
Chalmers University of Technology
41296 Gothenburg, Sweden

Tel: +46 31 772 18 02
e-mail: durisi at ieee dot org
url: http://gdurisi.github.io

RESEARCH — Information theory, communication theory, machine learning

PERSONAL — Born on November 28, 1977 in Turin, Italy; Italian citizenship; male; married with two children; languages: Italian, English, German, Swedish

EDUCATION

- Mar. 2012: Chalmers University of Technology, Sweden
  Docent diploma in Information Theory
- Mar. 2006: Politecnico di Torino, Italy
  Ph.D. in electrical and communication engineering
  - Doctoral dissertation: *Noncoherent fading channels: capacity and coding*
  - Advisor: Professor Sergio Benedetto (Politecnico di Torino, Italy)
- Nov. 2001: Politecnico di Torino, Italy
  Telecommunications Engineering Diploma [M.Sc.], *summa cum laude*
  - Diploma dissertation: *Analysis and simulation of an ultra-wideband communication system over a multipath channel*
  - Advisors: Professor Sergio Benedetto (Politecnico di Torino, Italy), Dr. Giovanni Romano (Telecom Italia Lab, Turin, Italy)

ACADEMIC WORK EXPERIENCE

- Oct. 2018-current: Co-director of Chalmers artificial-intelligence research center
- Feb. 2016-current: Co-director information and communication technology (ICT) area of advance at Chalmers University of Technology, Sweden
- Jan. 2017-current: Professor at Chalmers University of Technology, Sweden
- Dec. 2013-Dec. 2016: Associate professor at Chalmers University of Technology, Sweden
- Nov. 2010-Nov. 2013: Assistant professor at Chalmers University of Technology, Sweden
- Apr. 2012: Guest professor at Vienna University of Technology, Austria
- Feb. 2008-Oct. 2010: Senior researcher at ETH Zurich, Switzerland
- Feb. 2006-Jan. 2008: Postdoctoral researcher at ETH Zurich, Switzerland
- Nov. 2004-Nov. 2005: Visiting researcher at ETH Zurich, Switzerland
- Mar. 2004-Jul. 2004: Visiting researcher at Università di Pisa, Italy
- Jan. 2002-Jan. 2006: Junior researcher at Istituto Superiore Mario Boella, Turin, Italy

INDUSTRIAL WORK EXPERIENCE

- Sep. 2018-current: Visiting researcher at Qamcom, Sweden
- Jan. 2014-2017: Visiting researcher at Ericsson Research, Sweden
- Nov. 2002-Apr. 2003: Visiting researcher at IMST GmbH, Germany
- Feb. 2001-Nov. 2001: Master thesis internship at Telecom Italia Lab, Turin, Italy

Honors

- ◇ 2017 exemplary reviewer, IEEE Transactions on Wireless Communications
- ◇ 2016 exemplary reviewer, IEEE Transactions on Communications
- ◇ 2013 IEEE ComSoc Young Researcher Award for Europe, Middle East, and Africa Region
- ◇ 2013 IEEE Sweden VT-COM-IT Chapter *best student conference paper award* (lead author: Ph.D. student Wei Yang)
- ◇ *Student paper award* at the IEEE International Symposium on Information Theory (ISIT 2012) (lead author: Ph.D. student Wei Yang)
- ◇ *Senior member* of the Institute of Electrical and Electronics Engineers (IEEE), Feb. 2012
- ◇ *Optime* award from Unione Industriale, Turin, Italy (for best graduates of the year 2001)
- ◇ 19 invited papers, 1 invited book chapter, organized 2 invited session at international conferences

Teaching & Supervision

- ◇ Chalmers University of Technology: **Lecturer**
  - · 2016–2018: Probability and random processes (7.5 credits, master/PhD course, fall semester, taught in English)
  - · 2014-18: Electrical Measurements: Systems and Methods (7.5 credits, bachelor course, spring semester, taught in English/Swedish)
  - · 2012–2018: Wireless Communications (7.5 credits, master course, spring semester, taught in English, *guest lecturer*)
  - · 2011–2017: Information Theory (7.5 credits, master/PhD course, spring semester, taught in English)
  - · 2011: Network Information theory (7.5 credits, PhD course, fall semester, taught in English)
- ◇ Vienna University of Technology: **Lecturer**
  - · 2012: Network information theory (1.5 unit, graduate/PhD short course, spring semester, taught in English)
- ◇ ETH Zurich: **Teaching assistant** for graduate courses
  - · 2007–2010: Fundamentals of Wireless Communications (4-unit graduate course, spring semester, taught in English)
  - · 2009: Receivers for Wireless Communications (4-unit graduate course, spring semester, taught in English)
  - · 2009: Harmonic Analysis: Theory and Applications in Advanced Signal Processing (4-unit graduate course, spring semester, taught in English)
- ◇ Politecnico di Torino: **Teaching assistant** for undergraduate courses
  - · 2005: Analysis of Discrete-Time Signals (2-unit undergraduate course, fall semester, taught in Italian)
  - · 2003–2004: Signal Theory (2-unit undergraduate course, fall semester, taught in Italian)
- ◇ Currently supervised Ph.D. students at Chalmers University of Technology:
  - · R. Devassy, *Finite block-length bounds for multiple-access protocols*, started in 2013
  - · K. Keykhosravi, *Information theory for fiber-optic channels*, started in 2015, (co-supervisor)
  - · S. Jacobsson, *Massive MIMO with low precision converters*, started in 2015 (industrial PhD student at Ericsson Research, Gothenburg, Sweden)
  - · J. Östman, *Low-latency ultra-reliable communications*, started in 2015, (co-supervisor)
  - · Y. Ettefagh, *Multiantenna wireless architectures*, started in 2017
  - · F. Hellström, *Mathematics of deep learning*, started in 2018
- ◇ Past Ph.D. post-doctoral fellows at Chalmers University of Technology:

- G. C. Ferrante, *finite blocklength information theory*, 2017-2018

◇ Past Ph.D. students

- W. Yang, *Fading Channels: Capacity and Channel Coding Rate in the Finite-Blocklength Regime*, PhD 2015 (main supervisor, Chalmers University of Technology)
- M. R. Khanzadi, *Phase Noise in Communication Systems: Modeling, Compensation, and Performance Analysis* , PhD 2015 (co-supervised, Chalmers University of Technology)
- P. Kuppinger, *General uncertainty relations and sparse signal recovery*, PhD 2011 (co-supervised, ETH Zurich)
- V. I. Morgensthern, *Crystallization and noncoherence in wireless communication*, PhD 2010 (co-supervised, ETH Zurich)
- U. G. Schuster, *Wireless communication over wideband channels*, PhD 2007 (co-supervised, ETH Zurich)

Professional Service

◇ Editorships:

- Associate editor, IEEE Transactions on Communications, 2015-current
- Publications editor, IEEE Transactions on Information Theory, 2011-2014.

◇ Member of the organizing committee:

- International Symposium on Information Theory (ISIT), Aachen, Germany, Jul. 2017
- European School of Information Theory (ESIT), Gothenburg, Sweden, May 2016
- 7th *International Symposium on Turbo Codes & Iterative Information Processing (ISTC)*, Gothenburg, Sweden, Aug. 2012
- Workshop on *Machine Learning and Large Data Sets*, Gothenburg, Sweden, Aug. 2011
- 1st workshop on *Ultra-Wideband for Wireless Personal Area and Sensor Networks*, Turin, Italy, Nov. 2004

◇ Technical program committee membership:

· *IEEE Int. Conf. Commun. (ICC)*:	2006, 2011–2016, 2018, 2019
· *IEEE Global Commun. Conf. (GLOBECOM)*:	2011–2013, 2018
· *Int. Zurich Seminar (IZS)*:	2014, 2016, 2018
· *Int. Conf. Telecommun. (ICT)*	2015, 2018
· *Int. Symp. Wirel. Commun. Sys. (ISWCS)*:	2011, 2017, 2018
· *Int. Veh. Tech. Conf (VTC)*:	2017,2018
· *Int. ITG Conf. Sys. Commun. Coding (SCC)*:	2017, 2019
· *IEEE Inf. Theory. Workshop (ITW)*:	2016
· *IEEE Wirel. Commun. Net. Conf. (WCNC)*:	2013–2016, 2019
· *Int. Workshop Physic Wirel. Comm. Net. (PHYSCOMNET)*:	2014
· *Int. Conf. Comput. Net. Commun. (ICNC)*:	2012, 2018
· *Int. Symp. Personal, Indoor, Mobile Radio Commun. (PIMRC)*:	2012
· *IEEE Swedish Commun. Tech. Workshop (SWE-CTW)*:	2011, 2012
· *Int. Conf. on Commun. Net. in China (CHINACOM)*:	2010
· *IEEE Int. Conf. Ultra-Wideband (ICUWB)*:	2009

◇ Referee for the European Research Council (ERC)

◇ Referee for the Italian agency for the evaluation of universities and research institutes (ANVUR)

◇ Referee for the German Verband der Elektrotechnik Elektronik Informationstechnik (VDE-ITG)

- ◇ Referee for the Austrian Wiener Wissenschaft- Forschungs- und Technologiesfonds (WWTF)
- ◇ Member of examination committee/opponent in research degree examinations
  - · Silvio Mandelli, "Analysis of Wiener phase noise issues in optical transmission systems", PhD Thesis, Politecnico di Milano, Italy, Jan. 2016.
  - · Simone Pecorino, "Information rates of channels with memory by Bayesian tracking", PhD Thesis, Politecnico di Milano, Italy, Jan. 2016.
  - · Zhao Wang, "Interference Alignment with Imperfect Channel Knowledge and Secrecy Constraints", PhD Thesis, KTH Royal Institute of Technology, Sweden, May 2015.
  - · Günther Koliander, "Information-theoretic analysis of noncoherent block-fading channels and singular random variables", PhD Thesis, Vienna University of Technology, Vienna, Austria, Apr. 2015
  - · Hien Quoc Ngo, *Massive MIMO: fundamentals and system designs*, PhD Thesis, Linköping University, Sweden, Mar. 2015
  - · David Gustafsson, *Extending the bandwidth of the Doherty power amplifier*, PhD thesis, Chalmers University of Technology, Sweden, Sep. 2014
  - · Nicolas Schrammar, *On deterministic models for Gaussian networks*, PhD thesis, KTH Royal Institute of Technology, Sweden, Jun. 2013
  - · Hien Quoc Ngo, *Performance bounds for very large multiuser MIMO systems*, Licentiate thesis, Linköping University, Sweden, Dec. 2012
  - · Lu Lu, *Wireless broadcasting with network coding*, Licentiate thesis, KTH Royal Institute of Technology, Sweden, Sep. 2011
  - · P. Kuppinger, *General uncertainty relations and sparse signal recovery*, PhD thesis, ETH Zurich, Switzerland Feb. 2011

FUNDING

- ◇ "Secure, Private, and Low-Latency Cloud Connectivity for IoT Applications", WASP expedition project, 2019-2021, responsibility: **principal investigator**
- ◇ "Communication in time: theory and practice for the automated society", Swedish Research Council, *2018-04359 project grant* 2019-2022, 4 000 kSEK, responsibility: **co-investigator**
- ◇ "Low-Latency Wireless Random Access for IoT connectivity", Swedish Foundation for Strategic Research (SSF), Mobility Grant, 933 kSEK, 2018-2019, responsibility: **principal investigator**
- ◇ "Protection in a Power-Electronic Converter Dominated Medium-Voltage Microgrid Utilizing Digital Communication", Chalmers Energy Area of Advance, 2MSEK, 2018-2019, responsibility: **co-investigator**
- ◇ "Wireless communication for stability and performance enhancement in converter-dominated AC microgrids", Chalmers E2 seed fund, 250 kSEK, 2018, responsibility: **co-investigator**
- ◇ "INNER–information theory of deep neural networks", Chalmers E2 seed fund, 500 kSEK, 2018, responsibility: **principal investigator**
- ◇ "SWIFT–short-packet wireless information theory", Swedish Research Council, *2016-03293 project grant* 2017-2020, 3 680 kSEK **principal investigator**
- ◇ "mmMAGIC–Millimetre-Wave Based Mobile Radio Access Network for Fifth Generation Integrated Communications", European Commission, Horizon 2020, 2015-2017, responsibility: **project member**
- ◇ "Massive MIMO systems with low-precision converters", Swedish Foundation for Strategic Research (SSF), Industrial PhD grant, 2 500 kSEK, 2015-2019, responsibility: **principal investigator**
- ◇ "Theory and practice for optimum spectral efficiency for ad-hoc wireless networks with strict requirements on latency and reliability", Swedish Research Council, *2014-6066 project grant* 2015-2018, 3 643 kSEK **co-investigator**

- ◇ "Multi-antenna technologies for wireless access and backhaul (MATWAB)", VINNOVA, 3570 kSEK, 2015-2016; responsability: **co-investigator and project manager**
- ◇ "Massive MIMO: from hype to roll-out", Ericsson AB, 4000 kSEK, 2014-2016, **co-investigator**
- ◇ "Nonlinear hardware impairments in massive MIMO systems", Swedish Foundation for Strategic Research (SSF), Strategic Mobility Grant, 942 kSEK, 2014-2015, responsibility: **principal investigator**
- ◇ "Optical interference is not noise", Swedish Research Council, *2013-5271 project grant*, 4 720 kSEK, 2014-2017; responsibility: **co-investigator**
- ◇ "Multipath test environment for future communication systems" Swedish Research Council, *2013-5718 industrial Ph.D. project grant*, 2 156 kSEK, 2014-2017; responsibility: **co-investigator**
- ◇ "Fundamental limits of user cooperation in wireless networks", Swedish Research Council, *2012-4571 Junior researcher grant*, 3 280 kSEK; 2013-2016; responsibility: **principal investigator**
- ◇ "Handling the data flood in wireless communications", Chalmers *Area of Advance* initiative: Information and Communication Technology; 8 000 kSEK; 2010-2014; responsibility: **principal investigator**

Publications: Overview

Since 2001, Dr. Durisi has published a book contribution, 34 journal papers, and 68 conference papers. These papers received 2915 citations according to Google Scholar, with a corresponding *h-index* of 28. The publications are listed below in reversed chronological order.

Preprints

[P6] M. C. Coşkun, G. Durisi, T. Jerkovits, G. Liva, W. Ryan, B. Stein, and F. Steiner, "Efficient error-correcting codes in the short blocklength regime," Dec. 2018. [Online]. Available: https://arxiv.org/abs/1812.08562

[P5] K. Keykhosravi, M. Secondini, G. Durisi, and E. Agrell, "How to increase the achievable information rate by per-channel dispersion compensation," Dec. 2018. [Online]. Available: https://arxiv.org/abs/1812.03556

[P4] K. Keykhosravi, G. Durisi, and E. Agrell, "Bounds on the capacity of memoryless simplified fiber-optical channel models," Sep. 2018. [Online]. Available: https://arxiv.org/abs/1708.03102

[P3] S. Jacobsson, G. Durisi, M. Coldrey, and C. Studer, "Linear precoding with low-resolution DACs for massive MU-MIMO-OFDM downlink," Jul. 2018. [Online]. Available: https://arxiv.org/abs/1709.04846

[P2] R. Devassy, G. Durisi, G. C. Ferrante, O. Simeone, and E. Uysal-Biyikoglu, "Reliable transmission of short packets through queues and noisy channels under latency and peakage violation guarantees," Jun. 2018. [Online]. Available: https://arxiv.org/pdf/1806.09396

[P1] A. Lancho, T. Koch, and G. Durisi, "On single-antenna Rayleigh block-fading channels at finite blocklength," Jun. 2017. [Online]. Available: https://arxiv.org/abs/1706.07778

Publications: Books

[B1] A. Zaidi, F. Athley, J. Medbo, U. Gustavsson, G. Durisi, and X. Cheng, *5G Physical Layer: principles, models and technology components*. Academic Press, 2018. [Online]. Available: https://www.elsevier.com/books/5g-physical-layer/zaidi/978-0-12-814578-4

Publications: Book Chapters

[BC1] G. Durisi, U. G. Schuster, V. I. Morgenshtern, H. Bölcskei, and S. Shamai (Shitz), "Information theory of underspread WSSUS channels," in *Wireless Communications over Rapidly Time-Varying Channels*, F. Hlawatsch and G. Matz, Eds. Academic Press, Mar. 2011.

Publications: Journal Papers

[J34] J. Östman, G. Durisi, E. G. Ström, M. C. Coşkun, and G. Liva, "Short packets over block-memoryless fading channels: Pilot-assisted or noncoherent transmission?" *IEEE Trans. Commun.*, 2018, to appear. [Online]. Available: https://arxiv.org/abs/1712.06387

[J33] P. Popovski, K. F. Trillingsgaard, O. Simeone, and G. Durisi, "5G wireless network slicing for eMBB, URLLC, and mMTC: A communication-theoretic view," *IEEE ACCESS*, 2018, to appear. [Online]. Available: https://arxiv.org/pdf/1804.05057

[J32] K. F. Trillingsgaard, W. Yang, G. Durisi, and P. Popovski, "Common-message broadcast channels with feedback in the nonasymptotic regime: Full feedback," *IEEE Trans. Inf. Theory*, 2018, to appear. [Online]. Available: https://arxiv.org/abs/1706.07731

[J31] K. F. Trillingsgaard, W. Yang, G. Durisi, and P. Popovski, "Variable-length coding with stop-feedback for the common-message broadcast channel in the nonasymptotic regime," *IEEE Trans. Inf. Theory*, 2018, to appear. [Online]. Available: http://arxiv.org/abs/1607.03519

[J30] W. Yang, A. Collins, G. Durisi, Y. Polyanskiy, and H. V. Poor, "Beta-beta bounds: Finite-blocklength analog of the golden formula," *IEEE Trans. Inf. Theory*, vol. 64, no. 9, pp. 6236–6256, Sep. 2018. [Online]. Available: https://arxiv.org/abs/1706.05972

[J29] K. Keykhosravi, M. Tavana, E. Agrell, and G. Durisi, "Demodulation and detection schemes for a memoryless optical WDM channel," *IEEE Trans. Commun.*, vol. 66, no. 7, pp. 2994–3005, Jul. 2018.

[J28] O. Castañeda, S. Jacobsson, G. Durisi, M. Coldrey, T. Goldstein, and C. Studer, "1-bit massive MU-MIMO precoding in VLSI," *IEEE Trans. Emerg. Sel. Topics Circuits Syst*, vol. 7, no. 4, pp. 508–522, Dec. 2017.

[J27] S. Jacobsson, G. Durisi, M. Coldrey, T. Goldstein, and C. Studer, "Quantized precoding for massive MU-MIMO," *IEEE Trans. Commun.*, vol. 65, no. 11, pp. 4670–4684, Nov. 2017.

[J26] S. Jacobsson, G. Durisi, M. Coldrey, U. Gustavsson, and C. Studer, "Throughput analysis of massive MIMO uplink with low-resolution ADCs," *IEEE Trans. Wireless Commun.*, vol. 16, no. 6, pp. 4038–4051, Jun. 2017.

[J25] J. Scarlett, V. Y. F. Tan, and G. Durisi, "The dispersion of nearest-neighbor decoding for additive non-Gaussian channels," *IEEE Trans. Inf. Theory*, vol. 63, no. 1, pp. 81–92, Jan. 2017.

[J24] W. Yang, G. Durisi, and Y. Polyanskiy, "Minimum energy to send k bits over multiple-antenna fading channels," *IEEE Trans. Inf. Theory*, vol. 62, no. 12, pp. 6831 – 6853, Dec. 2016.

[J23] C. Studer and G. Durisi, "Quantized massive MU-MIMO-OFDM uplink," *IEEE Trans. Commun.*, vol. 64, no. 6, pp. 2387–2399, Jun. 2016.

[J22] G. Durisi, T. Koch, and P. Popovski, "Towards massive, ultra-reliable, and low-latency wireless communication with short packets," *Proc. IEEE*, vol. 104, no. 9, pp. 1711–1726, Sep. 2016.

[J21] G. Durisi, T. Koch, J. Östman, Y. Polyanskiy, and W. Yang, "Short-packet communications over multiple-antenna Rayleigh-fading channels," *IEEE Trans. Commun.*, vol. 64, no. 2, pp. 618–629, Feb. 2016.

[J20] R. Devassy, G. Durisi, J. Östman, W. Yang, T. Eftimov, and Z. Utkovski, "Finite-SNR bounds on the sum-rate capacity of Rayleigh block-fading multiple-access channels with no a priori CSI," *IEEE Trans. Commun.*, vol. 63, no. 10, pp. 3621–3632, Oct. 2015.

[J19] W. Yang, G. Caire, G. Durisi, and Y. Polyanskiy, "Optimum power control at finite blocklength," *IEEE Trans. Inf. Theory*, vol. 61, no. 9, pp. 4598–4615, Sep. 2015.

[J18] M. R. Khanzadi, G. Durisi, and T. Eriksson, "Capacity of SIMO and MISO phase-noise channels with common/separate oscillators," *IEEE Trans. Commun.*, vol. 63, no. 9, pp. 3218 – 3231, Sep. 2015.

[J17] G. Koliander, E. Riegler, G. Durisi, and F. Hlawatsch, "Degrees of freedom of generic block-fading MIMO channels without a priori channel state information," *IEEE Trans. Inf. Theory*, vol. 60, no. 12, pp. 7760–7781, Dec. 2014.

[J16] M. Dörpinghaus, G. Koliander, G. Durisi, E. Riegler, and H. Meyr, "Oversampling increases the pre-log of noncoherent Rayleigh fading channels," *IEEE Trans. Inf. Theory*, vol. 60, no. 9, pp. 5673–5681, Sep. 2014.

[J15] E. Agrell, A. Alvarado, G. Durisi, and M. Karlsson, "Capacity of a nonlinear optical channel with finite memory," *J. Lightw. Technol.*, vol. 32, no. 16, pp. 2862–2876, Aug. 2014, **invited paper**.

[J14] W. Yang, G. Durisi, T. Koch, and Y. Polyanskiy, "Quasi-static multiple-antenna fading channels at finite blocklength," *IEEE Trans. Inf. Theory*, vol. 60, no. 7, pp. 4232–4265, Jul. 2014.

[J13] G. Durisi, A. Tarable, C. Camarda, R. Devassy, and G. Montorsi, "Capacity bounds for MIMO microwave backhaul links affected by phase noise," *IEEE Trans. Commun.*, vol. 62, no. 3, pp. 920–929, Mar. 2014.

[J12] V. I. Morgenshtern, E. Riegler, W. Yang, G. Durisi, S. Lin, B. Sturmfels, and H. Bölcskei, "Capacity pre-log of noncoherent SIMO channels via Hironaka's theorem," *IEEE Trans. Inf. Theory*, vol. 59, no. 7, pp. 4213–4229, Jul. 2013.

[J11] W. Yang, G. Durisi, and E. Riegler, "On the capacity of large-MIMO block-fading channels," *IEEE J. Sel. Areas Commun.*, vol. 31, no. 2, pp. 117–132, Feb. 2013.

[J10] G. Durisi, V. I. Morgenshtern, and H. Bölcskei, "On the sensitivity of continuous-time noncoherent fading channel capacity," *IEEE Trans. Inf. Theory*, vol. 58, no. 10, pp. 6372–6391, Oct. 2012.

[J9] G. Durisi, "On the capacity of the block-memoryless phase-noise channel," *IEEE Commun. Lett.*, vol. 16, no. 8, pp. 1157–1160, Aug. 2012.

[J8] P. Kuppinger, G. Durisi, and H. Bölcskei, "Uncertainty relations and sparse signal recovery for pairs of general signal sets," *IEEE Trans. Inf. Theory*, vol. 58, no. 1, pp. 263-277 Jan. 2012.

[J7] G. Durisi and H. Bölcskei, "High-SNR capacity of wireless communication channels in the noncoherent setting: A primer," *Int. J. Electron. Commun. (AEÜ)*, vol. 65, no. 8, pp. 707–712, Aug. 2011, **invited paper**.

[J6] G. Durisi, U. G. Schuster, H. Bölcskei, and S. Shamai (Shitz), "Noncoherent capacity of underspread fading channels," *IEEE Trans. Inf. Theory*, vol. 56, no. 1, pp. 367–395, Jan. 2010.

[J5] U. G. Schuster, G. Durisi, H. Bölcskei, and H. V. Poor, "Capacity bounds for peak-constrained multiantenna wideband channels," *IEEE Trans. Commun.*, vol. 57, no. 9, pp. 2686–2696, Sep. 2009.

[J4] M. R. Casu and G. Durisi, "Implementation aspects of a transmitted-reference UWB receiver," *Wirel. Commun. Mob. Comput., Special Issue: Ultrawideband for Wireless Communications*, vol. 5, no. 5, pp. 537–549, Aug. 2005.

[J3] G. Durisi and S. Benedetto, "Comparison between coherent and noncoherent receivers for UWB communications," *EURASIP J. Signal Process., Special Issue: UWB—State of the Art*, no. 3, Mar. 2005.

[J2] G. Durisi, A. Tarable, J. Romme, and S. Benedetto, "A general method for error probability computation of UWB systems for indoor multiuser communications," *J. Commun. Netw., Special Issue: Ultra-Wideband (UWB) Communications*, vol. 5, no. 4, pp. 354–364, Dec. 2003.

[J1] G. Durisi and S. Benedetto, "Performance evaluation of TH-PPM in the presence of multiuser interference," *IEEE Commun. Lett.*, vol. 7, no. 5, May 2003.

PUBLICATIONS: CONFERENCE PAPERS

[C70] M. C. Coşkun, G. Liva, J. Östman, and G. Durisi, "Low-complexity joint channel estimation and list decoding of short codes," in *Int. ITG Conf. Sys. Commun. Coding (SCC)*, Rostock, Germany, Feb. 2019.

[C69] J. Östman, G. C. Ferrante, R. Devassy, and G. Durisi, "Low-latency short-packet transmissions: Fixed length or HARQ?" in *Proc. IEEE Global Telecommun. Conf. (GLOBECOM)*, Abu Dhabi, UAE, Dec. 2018.

[C68] S. Jacobsson, U. Gustavsson, G. Durisi, and C. Studer, "Massive MU-MIMO-OFDM uplink with hardware impairments: Modeling and analysis," in *Proc. Allerton Conf. Commun., Contr., Comput.*, Pacific Grove CA, U.S.A., Nov. 2018.

[C67] H. Sac, T. Bacinoglu, E. Uysal-Biyikoglu, and G. Durisi, "Age-optimal channel coding blocklength for a transmission queue with fcfs service and arq," in *Proc. IEEE Int. Workshop Signal Process. Advances Wireless Commun. (SPAWC)*, Kalamata, Greece, Jun. 2018.

[C66] S. Jacobsson, O. Castañeda, C. Jeon, G. Durisi, and C. Studer, "Nonlinear precoding for phase-quantized constant-envelope massive MU-MIMO-OFDM," in *Proc. Int. Conf. Telecommun. (ICT)*, Saint-Malo, France, Jun. 2018.

[C65] R. Devassy, G. Durisi, G. C. Ferrante, O. Simeone, and E. Uysal-Biyikoglu, "Delay and peak-age violation probability in short-packet transmission," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Vail, CO, U.S.A., Jun. 2018.

[C64] S. Jacobsson, Y. Ettefagh, G. Durisi, and C. Studer, "All-digital massive MIMO with a fronthaul constraint," in *Proc. IEEE Statistical Sig. Pro. Workshop (SSP)*, Friburg, Germany, Jun. 2018, **invited paper**.

[C63] O. Castañeda, S. Jacobsson, G. Durisi, T. Goldstein, and C. Studer, "VLSI design for a 3-bit constant-modulus precoder for massive MU-MIMO," in *Proc. IEEE Int. Symp. Circuits and Syst. (ISCAS)*, Florence, Italy, May 2018.

[C62] S. Jacobsson, W. Xu, G. Durisi, and C. Studer, "MSE-optimal 1-bit precoding for multiuser MIMO via branch and bound," in *Proc. IEEE Int. Conf. Acoust., Speech, Signal Process. (ICASSP)*, Calgary, Canada, Apr. 2018.

[C61] G. C. Ferrante, J. Östman, G. Durisi, and K. Kittichokechai, "Pilot-assisted short-packet transmission over multiantenna fading channels: A 5G case study," in *Conf. Inf. Sci. Sys. (CISS)*, Princeton, NJ, Mar. 2018, **invited paper**.

[C60] S. Jacobsson, G. Durisi, M. Coldrey, and C. Studer, "Massive multiuser MIMO downlink with low-resolution converters," in *Proc. Int. Zurich Seminar Commun. (IZS)*, Zurich, Switzerland, Feb. 2018, **invited paper**.

[C59] S. Jacobsson, G. Durisi, M. Coldrey, and C. Studer, "On out-of-band emissions of quantized precoding in massive MU-MIMO-OFDM," in *Proc. Asilomar Conf. Signals, Syst., Comput.*, Dec. 2017, **invited paper**.

[C58] S. Jacobsson, G. Durisi, M. Coldrey, and C. Studer, "Massive MU-MIMO-OFDM downlink with one-bit DACs and linear precoding," in *Proc. IEEE Global Telecommun. Conf. (GLOBECOM)*, Singapore, Dec. 2017.

[C57] K. Keykhosravi, G. Durisi, and E. Agrell, "A tighter bound on the capacity of the nondispersive optical fiber channel," in *European Conf. Optical Comm. (ECOC)*, Gothenburg, Sweden, Sep. 2017.

[C56] K. F. Trillingsgaard, W. Yang, G. Durisi, and P. Popovski, "Feedback halves the dispersion for some two-user broadcast channels with common message," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Aachen, Germany, Jun. 2017.

[C55] A. Lancho, T. Koch, and G. Durisi, "A high-SNR normal approximation for single-antenna Rayleigh block-fading channels," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Aachen, Germany, Jun. 2017, **finalist student paper award**

[C54] J. Östman, G. Durisi, and E. G. Ström, "Finite-blocklength bounds on the maximum coding rate of rician fading channels with applications to pilot-assisted transmission," in *Proc. IEEE Int. Workshop Signal Process. Advances Wireless Commun. (SPAWC)*, Sapporo, Japan, Jul. 2017, **invited paper**

[C53] G. Liva, G. Durisi, M. C. S. S. Ullah, and S. C. Liew, "Short codes with mismatched channel state information: A case study," in *Proc. IEEE Int. Workshop Signal Process. Advances Wireless Commun. (SPAWC)*, Sapporo, Japan, Jul. 2017, **invited paper**

[C52] J. Östman, G. Durisi, E. G. Ström, J. Li, H. Sahlin, and G. Liva, "Low-latency ultra-reliable 5G communications: finite block-length bounds and coding schemes," in *Int. ITG Conf. Sys. Commun. Coding (SCC)*, Hamburg, Germany, Feb. 2017.

[C51] S. Jacobsson, G. Durisi, M. Coldrey, T. Goldstein, and C. Studer, "Nonlinear 1-bit precoding for massive MU-MIMO with higher-order modulation," in *Proc. Asilomar Conf. Signals, Syst., Comput.*, Pacific Grove CA, Nov. 2016, **invited paper**.

[C50] R. Devassy, G. Durisi, B. Lindqvist, W. Yang, and M. Dalai, "Nonasymptotic coding-rate bounds for binary erasure channels with feedback," in *Proc. IEEE Inf. Theory Workshop (ITW)*, Cambridge, U.K., Sep. 2016.

[C49] K. F. Trillingsgaaard, W. Yang, G. Durisi, and P. Popovski, "Variable-length coding with stop-feedback for the common-message broadcast channel," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Barcelona, Spain, Jul. 2016.

[C48] W. Yang, A. Collins, G. Durisi, Y. Polyanskiy, and H. V. Poor, "A beta-beta achievability bound with applications," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Barcelona, Spain, Jul. 2016.

[C47] J. Scarlett, V. Y. F. Tan, and G. Durisi, "The dispersion of nearest-neighbor decoding for additive non-Gaussian channels," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Jul. 2016.

[C46] J. Scarlett, V. Y. F. Tan, and G. Durisi, "The dispersion of nearest-neighbor decoding for additive non-Gaussian channels," in *Proc. Int. Zurich Seminar Commun. (IZS)*, Zurich, Switzerland, Mar. 2016.

[C45] W. Yang, A. Collins, G. Durisi, Y. Polyanskiy, and H. V. Poor, "A beta-beta achievability bound with applications," in *Proc. Int. Zurich Seminar Commun. (IZS)*, Zurich, Switzerland, Mar. 2016.

[C44] W. Yang, G. Durisi, and Y. Polyanskiy, "Minimum energy to send k bits over Rayleigh-fading channels," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Hong Kong, China, Jun. 2015.

[C43] K. F. Trillingsgaaard, W. Yang, G. Durisi, and P. Popovski, "Broadcasting a commom message with variable-length stop-feedback codes," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Hong Kong, China, Jul. 2015.

[C42] S. Jacobsson, G. Durisi, M. Coldrey, U. Gustavsson, and C. Studer, "One-bit massive MIMO: channel estimation and high-order modulations," in *Proc. IEEE Int. Conf. Commun. (ICC)*, London, U.K., Jun. 2015.

[C41] M. R. Khanzadi, G. Durisi, and T. Eriksson, "High-SNR capacity of multiple-antenna phase-noise channels with common/separate RF oscillators," in *Proc. IEEE Int. Conf. Commun. (ICC)*, London, U.K., Jun. 2015.

[C40] E. Agrell, G. Durisi, and P. Johannisson, "Information-theory-friendly models for fiber-optic channels: A primer," in *Proc. IEEE Inf. Theory Workshop (ITW)*, Jerusalem, Israel, Apr. 2015, **invited paper**

[C39] F. Athley, G. Durisi, and U. Gustavsson, "Analysis of massive MIMO with hardware impairments and different channel models," in *European Conf. Ant. Prop. (EUCAP)*, Lisbon, Portugal, Apr. 2015, **invited paper**.

[C38] U. Gustavsson, C. Sanchéz-Perez, T. Eriksson, F. Athley, G. Durisi, P. Landin, K. Hausmair, C. Fager, and L. Svensson, "On the impact of hardware impairments on massive MIMO," in Proc. *IEEE Global Telecommun. Conf. (GLOBECOM)*, Austin, TX, Dec. 2014.

[C37] J. Östman, W. Yang, G. Durisi, and T. Koch, "Diversity versus multiplexing at finite blocklength," in *Proc. IEEE Int. Symp. Wirel. Comm. Syst. (ISWCS)*, Barcelona, Spain, Aug. 2014, **invited paper**.

[C36] W. Yang, G. Caire, G. Durisi, and Y. Polyanskiy, "Finite-blocklength channel coding rate under a long-term power constraint," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Honolulu, HI, USA, Jul. 2014.

[C35] W. Yang, G. Durisi, T. Koch, and Y. Polyanskiy, "Dispersion of quasi-static MIMO fading channels via Stokes' theorem," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Honolulu, HI, USA, Jul. 2014.

[C34] R. Devassy, G. Durisi, P. Popovski, and E. G. Ström, "Finite-blocklength analysis of the ARQ-protocol throughput over the gaussian collision channel," in *Int. Symp. Commun., Cont., Signal Process. (ISCCSP)*, May 2014, **invited paper**.

[C33] W. Yang, G. Durisi, T. Koch, and Y. Polyanskiy, "Block-fading channels at finite block-length,", in *Proc IEEE Int. Symp. Wirel. Comm. Syst. (ISWCS)*, Illmenau, Germany, Aug. 2013, **invited paper**.

[C32] E. Riegler, G. Koliander, W. Yang, and G. Durisi, "How costly is it to learn fading channels?" in *Proc. Int. Black Sea Conf. Commun. Netw. (Blackseacom)*, Batumi, Georgia, Jul. 2013, pp. 18–22, **invited paper**.

[C31] W. Yang, G. Durisi, T. Koch, and Y. Polyanskiy, "Quasi-static SIMO fading channels at finite blocklength," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Istanbul, Turkey, Jul. 2013, pp. 1531–1535.

[C30] G. Koliander, E. Riegler, G. Durisi, and F. Hlawatsch, "Generic correlation increases noncoherent MIMO capacity," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Istanbul, Turkey, Jul. 2013, pp. 2084–2088.

[C29] G. Durisi, A. Tarable, and T. Koch, "On the multiplexing gain of MIMO microwave backhaul links affected by phase noise," in *Proc. IEEE Int. Conf. Commun. (ICC)*, Budapest, Hungary, Jun. 2013, pp. 3209–3214.

[C28] G. Durisi, A. Tarable, C. Camarda, and G. Montorsi, "On the capacity of MIMO Wiener phase-noise channels," in *Proc. Inf. Theory Applicat. Workshop (ITA)*, San Diego, CA, U.S.A., Feb. 2013, **invited paper**.

[C27] G. Koliander, E. Riegler, G. Durisi, V. I. Morgenshtern, and F. Hlawatsch, "A lower bound on the noncoherent capacity pre-log for the MIMO channel with temporally correlated fading," in *Proc. Allerton Conf. Commun., Contr., Comput.*, Oct. 2012, pp. 1–8.

[C26] W. Yang, G. Durisi, T. Koch, and Y. Polyanskiy, "Diversity versus channel knowledge at finite block-length," in *Proc. IEEE Inf. Theory Workshop (ITW)*, Lausanne, Switzerland, Sep. 2012, pp. 572–576. **Student paper award**.

[C25] A. Movahed, A. Panahi, and G. Durisi, "A robust RFPI-based 1-bit compressive sensing reconstruction algorithm," in *IEEE Inf. Theory Workshop (ITW)*, Lausanne, Switzerland, Sep. 2012, pp. 567–571.

[C24] W. Yang, G. Durisi, and E. Riegler, "Unitary isotropically distributed inputs are not capacity-achieving for large-MIMO fading channels," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Boston, MA, U.S.A., Jul. 2012, pp. 1717–1721. **Student paper award**.

[C23] A. Hussain, P.-S. Kildal, and G. Durisi, "Modeling system throughput of single and multi-port LTE devices," in *IEEE Int. Symp. Ant. Prop. (APSURSI)*, Chicago, IL, U.S.A., Jul. 2012, pp. 1–2.

[C22] P.-S. Kildal, A. Hussain, G. Durisi, C. Orlenius, and A. Skårbratt, "LTE MIMO multiplexing performance measured in a reverberation chamber and accurate simple theory," in *European Conf. Ant. Prop. (EUCAP)*, Prague, Czech Republic, Mar. 2012, pp. 2299–2302.

[C21] W. Yang, G. Durisi, V. I. Morgenshtern, and E. Riegler, "Capacity pre-log of SIMO correlated block-fading channels," in *Proc IEEE Int. Symp. Wirel. Comm. Syst. (ISWCS)*, Aachen, Germany, Nov. 2011, pp. 869–873.

[C20] G. Pope, M. Baumann, C. Studer, and G. Durisi, "Real-time principal component pursuit," in *Proc. Asilomar Conf. Signals, Syst., Comput.*, Pacific Grove CA, U.S.A., Nov. 2011, pp. 1433–1437.

[C19] E. Riegler, V. I. Morgenshtern, G. Durisi, S. Lin, B. Sturmfels, and H. Bölcskei, "Noncoherent SIMO pre-log via resolution of singularities," in *IEEE Int. Symp. Inf. Theory (ISIT)*, Saint Petersburg, Russia, Aug. 2011, pp. 2020–2024.

[C18] V. I. Morgenshtern, G. Durisi, and H. Bölcskei, "The SIMO pre-log can be larger than the SISO pre-log," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Austin, TX, U.S.A., Jun. 2010, pp. 320–324.

[C17] P. Kuppinger, G. Durisi, and H. Bölcskei, "Where is randomness needed to break the square-root bottleneck?" in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Austin, TX, U.S.A., Jun. 2010, pp. 1578–1582.

[C16] P. Kuppinger, G. Durisi, and H. Bölcskei, "Improved sparsity thresholds through dictionary splitting," in *Proc. IEEE Inf. Theory Workshop (ITW)*, Taormina, Italy, Oct. 2009, pp. 338 – 342, **invited paper**.

[C15] G. Durisi, V. I. Morgenshtern, and H. Bölcskei, "On the sensitivity of noncoherent capacity to the channel model," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Seoul, Korea, Jun. 2009, pp. 2174–2178.

[C14] U. G. Schuster, G. Durisi, H. Bölcskei, and H. V. Poor, "Capacity bounds for peak-constrained multiantenna wideband channels," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Toronto, ON, Canada, Jul. 2008, pp. 1582–1586.

[C13] G. Durisi, H. Bölcskei, and S. Shamai (Shitz), "Capacity of underspread WSSUS fading channels under peak signal constraints," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Nice, France, Jun. 2007, pp. 156–160.

[C12] G. Durisi, H. Bölcskei, and S. Shamai (Shitz), "Capacity of underspread WSSUS fading channels in the wideband regime," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Seattle, WA, U.S.A., Jul. 2006, pp. 1500–1504.

[C11] G. Durisi, L. Dinoi, and S. Benedetto, "eIRA codes for coded modulation systems," in *Proc. IEEE Int. Conf. Commun. (ICC)*, vol. 3, Istanbul, Turkey, Jun. 2006, pp. 1125–1130.

[C10] M. R. Casu, G. Durisi, and S. Benedetto, "On the implementation of a transmitted-reference UWB receiver," in *Proc. Eur. Signal Process. Conf. (EUSIPCO)*, Antalya, Turkey, Sep. 2005, pp. 1–4, **invited paper**.

[C9] U. G. Schuster, H. Bölcskei, and G. Durisi, "Ultra-wideband channel modeling on the basis of information-theoretic criteria," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, Adelaide, Australia, Sep. 2005, pp. 97–101.

[C8] G. Durisi and S. Benedetto, "Performance of coherent and noncoherent receivers for UWB communications," in *Proc. IEEE Int. Conf. Commun. (ICC)*, vol. 6, Paris, France, Jun. 2004, pp. 3429–3433.

[C7] J. Romme and G. Durisi, "Transmit-reference impulse radio systems using weighted correlation," in *IEEE Conf. Ultra Wideband Syst. Technol. (UWBST) Dig. Tech. Papers*, Kyoto, Japan, Dec. 2004, pp. 141–145.

[C6] G. Durisi, J. Romme, and S. Benedetto, "A general method for SER computation of M-PAM and M-PPM UWB systems for indoor multiuser communications," in *Proc. IEEE Global Telecommun. Conf. (GLOBECOM)*, vol. 2, San Francisco, CA, U.S.A., Dec. 2003, pp. 734–738.

[C5] G. Durisi, J. Romme, S. Benedetto, "Performance of TH and DS UWB multiaccess systems in presence of multipath and channel narrowband interference," in *Proc. Int. Workshop Ultra-Wideband Syst. (IWUWBS)*, Oulu, Finland, Jun. 2003.

[C4] J. Romme, J. Siemons, and G. Durisi, "A method for the detection of the narrowband interferer," in *Proc. Int. Workshop Ultra-Wideband Syst. (IWUWBS)*, Oulu, Finland, Jun. 2003.

[C3] G. Durisi and S. Benedetto, "Performance evaluation and comparison of different modulation schemes for UWB multiaccess systems," in *Proc. IEEE Int. Conf. Commun. (ICC)*, vol. 3, Anchorage, AK, U.S.A., May 2003, pp. 2187–2191.

[C2] G. Durisi and G. Romano, "Simulation analysis and performance evaluation of an UWB system in indoor multipath channel," in *IEEE Conf. Ultra Wideband Syst. Technol. (UWBST) Dig. Tech. Papers*, Baltimore, MD, U.S.A., May 2002, pp. 255–258.

[C1] G. Durisi, G. Romano, "On the validity of Gaussian approximation to characterize the multiuser capacity of UWB TH PPM," in *IEEE Conf. Ultra Wideband Syst. Technol. (UWBST) Dig. Tech. Papers*, Baltimore, MD, U.S.A., May 2002, pp. 157–161.

Patents

[S1] L. S. Sundström, V. Björk, S. Jacobsson, G. Durisi, U. Gustavsson, M. Coldrey, "Apparatus for Detection in Large Array Receivers", Application Number: PCT/EP2015/057375, under review.

Software

[S2] SPECTRE: short-packet communication toolbox. [Online]. Available: https://github.com/yp-mit/spectre

[S1] Quantized precoding for massive MIMO. [Online]. Available: https://github.com/quantizedmassivemimo/

Invited Talks

[T27] "Fundamentals of short-packet transmission", Plenary talk at the Small-Data Networks Special Session, Int. Symp. Personal, Indoor and Mobile Radio Commun., Sep. 2018

[T26] "Delay and peak-age violation probability in short-packet transmissions", Communication Theory Workshop (CTW), Miramar Beach, Florida, May 2018

[T25] "Short-packet over fading channels: pilot-assisted or noncoherent transmission?", NSF Workshop on Low-Latency Wireless Random-Access, MIT, Cambridge, MA, USA, Nov. 2017

[T24] "Short-packet transmission", tutorial presentation at "ITG-Fachgruppe": applied information theory, Bremen, Germany, Oct. 2017

[T23] "Quantized precoding for massive MU-MIMO", Ericcson, Stockholm, Sweden, Nov. 2016

[T22] "Latency-reliability trade-off in short packet communications", Communication Theory Workshop (CTW), Nafplio, Greece, May 2016

[T21] "My path through information theory: From double asymptotics to finite blocklength", Claude Elwood Shannon 100th Birthday Celebration, Paderborn, Germany, May 2016

[T20] "How much energy is needed to transmit k bits over fading channels?", Technische Universität München (TUM), Dec. 2015

[T19] "Towards low-latency wireless communications: the art of sending short packets", GRD ISIS workshop on recent advances in network information theory and coding theory, Lyon, Nov. 2015

[T18] "Short packet communications with multiple antennas", Vienna University of Technology, Apr. 2015

[T17] "Short packet communications with multiple antennas", Nordic Workshop on System & Network Optimization for Wireless, Geilo, Norway, Mar. 2015

[T16] "Short packet communications with multiple antennas", Linköping University, Sweden, Mar. 2015

[T15] "Short packet communications with multiple antennas", Inf. Theory Applicat. Workshop (ITA), San Diego, CA, Feb. 2015

[T14] "Massive MIMO uplink with 1 bit ADC", Ericsson AB, Stockholm, Sweden, Nov., 2014

[T13] "On the cost of CSI acquisition in large MIMO systems", Communication Theory Workshop, Phuket, Thailand, Jun., 2013

[T12] "How costly is it to learn fading channels?", Linköping University, Sweden, Dec., 2012

[T11] "How costly is it to learn fading channels?", RWTH Aachen, Germany, Jul., 2012

[T10] "How costly is it to learn fading channels?", Vienna University of Technology, Apr. 2012

[T9] "MIMO for microwave backhaul links: research challenges", Ericsson AB, Gothenburg, Sweden, Mar. 2012

[T8] "How costly is it to learn a MIMO fading channel?", Ericsson research, Gothenburg, Sweden, Mar. 2012

[T7] "Degrees of freedom of multiple-antenna systems under channel uncertainty", Politecnico di Torino, Turin, Italy, Sep. 2011

[T6] "Degrees of freedom of multiple-antenna systems under channel uncertainty", KTH Royal Institute of Technology, Stockholm, Sweden, Sep. 2011

[T5] "Compressed sensing and beyond", Gothenburg University, Sweden, Aug. 2011

[T4] "Handling the data flood in wireless communications", Chalmers University of Technology, Gothenburg, Sweden, May 2010.

[T3] "On the noncoherent capacity of wireless channels of practical interest", Joint UMIC and ISS seminar, RWTH Aachen, Germany, Jun. 2009.

[T2] "On the capacity of real-world fading channels", ITG meeting—Algorithms for signal processing, Zurich, Switzerland, Mar. 2009.

[T1] "Capacity bounds for peak-constrained multiantenna channels," in *Third IEEE Workshop on Advanced Signal Processing for Wireless Communication Systems*, Copenhagen, Denmark, Nov. 2007.