Hamdi Joudeh

ICT Lab, SPS Group, EE Department, Eindhoven University of Technology
Flux 7.101, De Groene Loper 19, 5612 AP Eindhoven, The Netherlands

h.joudeh@tue.nl • www.tue.nl/en/research/researchers/hamdi-joudeh/

Research Interests

• Information Theory • Wireless Communications • Machine Learning

Current Position

Eindhoven University of Technology — **Eindhoven, Netherlands**
Assistant Professor, Department of Electrical Engineering — *2020–pres.*
Information and Communication Theory Lab
Signal Processing System Group

Previous Positions

Technische Universität Berlin — **Berlin, Germany**
Research Associate, Communications and Information Theory group — *2019–2020*
Mentor: Prof. Giuseppe Caire.

Imperial College London — **London, UK**
Research Associate, Communications and Signal Processing group — *2016–2019*
Mentor: Prof. Bruno Clerkcx.

Samsung Electronics — **Suwon, South Korea**
Assistant Engineer, Mobile Communication Division — *2011–2012*

Education

Imperial College London — **London, UK**
Ph.D. in Electrical and Electronic Engineering — *2012–2016*
Thesis title: A rate-splitting approach to multiple-antenna broadcasting

Imperial College London — **London, UK**
M.Sc. in Communications and Signal Processing — *2010–2011*
Degree Classification: Distinction (highest award)

Islamic University of Gaza — **Gaza, Palestine**
B.Sc. in Electrical Engineering — *2005–2010*
Degree Classification: Excellent (highest award)

Awards and Honors

- **Humboldt Research Fellowship**, Alexander von Humboldt Foundation — *2020*
  Declined to accept a faculty position at the Eindhoven University of Technology
- **Best Presentation Award**, EEE Department Research Symposium, Imperial College London — *2019*
- **Travel Grant**, IEEE Signal Processing Society — *2016*
- **Departmental Doctoral Scholarship**, EEE Department, Imperial College London — *2012–2016*

- **Outstanding Achievement**, EEE Department, Imperial College London *2011*
  Awarded to top M.Sc. student (Communications and Signal Processing)
- **HQSF Master's Scholarship**, Hani Qaddumi Scholarship Foundation (HQSF) *2010–2011*
  Awarded to 3 candidates in Palestine
- **HESPAL Master's Scholarship**, Higher Education Scholarship Palestine – British Council *2010*
  Awarded to 10 candidates in Palestine (Declined to accept HQSF scholarship)

Invited Talks

- **Cellular networks and treating inter-cell interference as noise**
  EECS Seminars, University of California, Irvine, CA, 2021
- **Robust interference management – An information-theoretic view**
  Eindhoven University of Technology (TU/e), Netherlands, 2020
  University of Colorado Boulder, CO, 2020
- **Rate-splitting for robust interference management**
  Qualcomm, San Diego, CA, 2019
- **Robust cache-aided interference management**
  King's College London, UK, 2018
- **On the degrees of freedom of MISO broadcast channels with partial CSIT**
  CentraleSupélec, France, 2018
- **Rate splitting for MIMO wireless networks: A promising PHY-layer strategy for 5G**
  Half-day tutorial presented jointly with Prof. Bruno Clerckx at:
  • IEEE International Conference on Communications (ICC) Paris, 2017
  • IEEE Vehicular Technology Conference (VTC-Fall), Montreal, 2016
- **A rate-splitting approach to multiple-antenna broadcasting with CSIT uncertainty**
  Shanghai Jiao Tong University, China, 2016

Supervising

Eindhoven University of Technology **Eindhoven, Netherlands**
Ph.D. Supervisor/Co-supervisor
- **Han Wu**, Ph.D. student, 2021–pres.
- **Mehrangiz Ensan**, Ph.D. student, 2020–pres. (joint with Prof. F. Willems and Dr. A. Alvarado)

Imperial College London **London, UK**
Mentor/Co-supervisor
- **Enrico Piovano**, Ph.D. student, 2015–2019
- **Jian Zhang**, visiting Ph.D. student (Xidian University), 2018–2019
- **Yijie (Lina) Mao**, visiting Ph.D. student (The University of Hong Kong), 2017–2018
- **Alexey Buzuverov**, visiting Ph.D. student (TU Darmstadt), 2017
- 4 M.Sc. students • 3 M.Eng. students

Teaching

Eindhoven University of Technology **Eindhoven, Netherlands**
Responsible Lecturer
- Information Theory (3rd-year course), Spring (Q3) 2021

Technische Universität Berlin **Berlin, Germany**
Teaching Assistant/Instructor
- Probability and Stochastic Processes (M.Sc. course), Spring 2020/Fall 2019

Imperial College London **London, UK**
Teaching Assistant/Instructor
- Information Theory (M.Sc. course), Spring 2019/Spring 2018
- Mobile Radio Communication (M.Sc. course), Spring 2013
- Advanced Data Communication (M.Sc. course), Fall 2012
- Discrete Fourier Transform and MATLAB (2nd-year lab), Spring 2012

Islamic University of Gaza **Gaza, Palestine**
Teaching Assistant/Instructor
- Signals and Systems (3rd-year course), Spring 2010
- Digital Signal Processing (4th-year course), Spring 2010

Professional Service

- **Associate Editor:** IEEE Communications Letters *2020–pres.*
- **Associate Editor:** EURASIP Journal on Wireless Communications and Networking *2017–2020*
- **Technical Program Committee (TPC) Member:** • IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC) 2019 • IEEE Wireless Communications and Networking Conference (WCNC) 2021,19,18 • IEEE International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC) 2018
- **Special Session Organizer:** • *Rate-splitting and robust interference management*, organized jointly with Prof. Eduard Jorswieck (TU Braunschweig) at the IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC) 2019
- **Journal Reviewer:** • IEEE Transactions on Information Theory • IEEE Journal on Selected Areas in Information Theory • IEEE Transactions on Signal Processing • IEEE Journal of Selected Topics in Signal Processing • IEEE Transactions on Communications • IEEE Transactions on Wireless Communications • IEEE Communications Letters • IEEE Wireless Communications Letters • EURASIP Journal on Wireless Communications and Networking
- **Conference Reviewer:** • IEEE Int. Symposium on Information Theory (ISIT) • IEEE Information Theory Workshop (ITW) • IEEE Int. Workshop on Signal Processing Advances in Wireless Communications (SPAWC) • IEEE Int. Conference on Acoustics, Speech, and Signal Processing (ICASSP) • IEEE Int. Conference on Communications (ICC) • IEEE Global Communications Conference (GLOBECOM) • IEEE Wireless Communications and Networking Conference (WCNC) • IEEE Int. Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC)

Publications

Google Scholar profile: https://scholar.google.com/citations?user=_ANZ5mkAAAAJ&hl=en&oi=ao

Preprints

[P3] E. Lampiris, **H. Joudeh**, G. Caire and P. Elia, "Coded caching under asynchronous demands," submitted to *IEEE Int. Symp. Inf. Theory (ISIT)*, 2021.

[P2] **H. Joudeh** and G. Caire, "Cellular networks with finite precision CSIT: GDoF optimality of multi-cell TIN and extremal gains of multi-cell cooperation," submitted to *IEEE Trans. Inf. Theory*, (second-round review), e-print: https://arxiv.org/abs/2008.08945.

[P1] **H. Joudeh**, E. Lampiris, P. Elia and G. Caire, "Fundamental limits of wireless caching under mixed cacheable and uncacheable traffic," submitted to *IEEE Trans. Inf. Theory*, (second-round review), e-print: https://arxiv.org/abs/2002.07691.

Journal Papers

[J10] **H. Joudeh**, X. Yi, B. Clerckx and G. Caire, "On the optimality of treating inter-cell interference as noise: Downlink cellular networks and uplink-downlink Duality," *IEEE Trans. Inf. Theory*, vol. 66, no. 11, pp. 6939-6961, 2020.

[J9] **H. Joudeh** and B. Clerckx, "On the separability of parallel MISO broadcast channels under partial CSIT: A degrees of freedom region perspective," *IEEE Trans. Inf. Theory*, vol. 66, no. 7, pp. 4513-4529, 2020.

[J8] E. Piovano, **H. Joudeh**, and B. Clerckx, "Centralized and decentralized cache-aided interference management in heterogeneous parallel channels," *IEEE Trans. Commun.*, vol. 68, no. 3, pp. 1881-1896, 2020.

[J7] **H. Joudeh** and B. Clerckx, "On the optimality of treating inter-cell interference as noise in uplink cellular networks," *IEEE Trans. Inf. Theory*, vol. 65, no. 11, pp. 7208-7232, 2019.

[J6] E. Piovano, **H. Joudeh**, and B. Clerckx, "Generalized degrees of freedom of the symmetric cache-aided MISO broadcast channel with partial CSIT," *IEEE Trans. Inf. Theory*, vol. 65, no. 9, pp. 5799-5815, 2019.

[J5] **H. Joudeh** and B. Clerckx, "Rate-splitting for max-min fair multigroup multicast beamforming in overloaded systems," *IEEE Trans. Wireless Commun.*, vol. 16, no. 11, pp. 7276–7289, 2017.

[J4] **H. Joudeh** and B. Clerckx, "Robust transmission in downlink multiuser MISO systems: A rate-splitting approach," *IEEE Trans. Signal Process.*, vol. 64, no. 23, pp. 6227–6242, 2016.

[J3] **H. Joudeh** and B. Clerckx, "Sum-rate maximization for linearly precoded downlink multiuser MISO systems with partial CSIT: A rate-splitting approach," *IEEE Trans. Commun.*, vol. 64, no. 11, pp. 4847–4861, 2016.

[J2] B. Clerckx, **H. Joudeh**, C. Hao, M. Dai, and B. Rassouli, "Rate splitting for MIMO wireless networks: A promising PHY-layer strategy for LTE evolution," *IEEE Commun. Mag.*, vol. 54, no. 5, pp. 98–105, 2016.

[J1] M. K. Gurcan, I. Ma, A. Chungtragarn, and **H. Joudeh**, "System value-based optimum spreading sequence selection for high-speed downlink packet access (HSDPA) MIMO," *EURASIP J. Wireless Commun. Net.*, vol. 2013, no. 1, p. 74, 2013.

Conference Papers

[C18] **H. Joudeh** and G. Caire, "On the optimality of treating interference as noise: General message sets revisited," in *Proc. IEEE Inf. Theory Workshop (ITW)*, 2020.

[C17] **H. Joudeh** and G. Caire, "Extremal network theory and robust GDoF gain of multi-cell cooperation over multi-cell TIN," in *Proc. IEEE Global Telecommun. Conf. (GLOBECOM)*, 2020.

[C16] **H. Joudeh** and G. Caire, "Optimality of treating inter-cell interference as noise under finite precision CSIT," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, 2020.

[C15] **H. Joudeh**, E. Lampiris, P. Elia and G. Caire, "Fundamental limits of wireless caching under mixed cacheable and uncacheable traffic," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, 2020.

[C14] **H. Joudeh**, X. Yi, and B. Clerckx, "On multi-cell uplink-downlink duality with treating inter-cell interference as noise," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, 2019.

[C13] **H. Joudeh** and B. Clerckx, "DoF region of the MISO BC with partial CSIT: Proof by inductive Fourier-Motzkin elimination," in *Proc. IEEE Int. Workshop Signal Process. Adv. Wireless Commun. (SPAWC)*.

[C12] E. Piovano, **H. Joudeh**, and B. Clerckx, "Robust cache-aided interference management under full transmitter cooperation," in *Proc. IEEE Int. Symp. Inf. Theory (ISIT)*, 2018.

[C11] **H. Joudeh** and B. Clerckx, "On the optimality of treating interference as noise for interfering multiple access channels," in *Proc. IEEE Int. Symp. Inf. Theory* (*ISIT*), 2018.

[C10] M. Varasteh, B. Rassouli, **H. Joudeh**, and B. Clerckx, "Signaling for SWIPT in complex AWGN channels with two nonlinear energy harvester models," in *Proc. IEEE Int. Symp. Inf. Theory* (*ISIT*), 2018.

[C9] **H. Joudeh** and B. Clerckx, "On the DoF of parallel MISO BCs with partial CSIT: Total order and separability," in *Proc. IEEE Global Telecommun. Conf.* (*GLOBECOM*), 2017.

[C8] E. Piovano, **H. Joudeh**, and B. Clerckx, "On coded caching in the overloaded MISO broadcast channel," in *Proc. IEEE Int. Symp. Inf. Theory* (*ISIT*), 2017.

[C7] E. Piovano, **H. Joudeh**, and B. Clerckx, "Overloaded multiuser MISO transmission with imperfect CSIT," in *Proc. Asilomar Conf. Signals, Systems, Comput.*, 2016.

[C6] **H. Joudeh** and B. Clerckx, "A rate-splitting strategy for max-min fair multigroup multicasting," in *Proc. IEEE Int. Workshop Signal Process. Adv. Wireless Commun.* (*SPAWC*), 2016.

[C5] **H. Joudeh** and B. Clerckx, "A rate-splitting approach to robust multiuser MISO transmission," in *Proc. IEEE Int. Conf. Acoust., Speech, Signal Process.* (*ICASSP*), 2016.

[C4] **H. Joudeh** and B. Clerckx, "Achieving max-min fairness for MU-MISO with partial CSIT: A multicast assisted transmission," in *Proc. IEEE Int. Conf. Commun.* (*ICC*), 2015.

[C3] **H. Joudeh** and B. Clerckx, "Sum rate maximization for MU-MISO with partial CSIT using joint multicasting and broadcasting," in *Proc. IEEE Int. Conf. Commun.* (*ICC*), 2015.

[C2] **H. Joudeh** and B. Clerckx, "AMMSE optimization for multiuser MISO systems with imperfect CSIT and perfect CSIR," in *Proc. IEEE Global Telecommun. Conf.* (*GLOBECOM*), 2014.

[C1] **H. Joudeh** and M. K. Gurcan, "Beamforming enhanced multiflow HSDPA with interference cancellation," in *Proc. IEEE Wireless Commun. Net. Conf.* (*WCNC*), 2014.