

Hamdi Joudeh

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Research Interests

• Information Theory • Wireless Communications • Machine Learning

Current Position

Eindhoven University of Technology

Eindhoven, Netherlands

Assistant Professor, Department of Electrical Engineering
Information and Communication Theory Lab
Signal Processing System Group

2020–pres.

Previous Positions

Technische Universität Berlin

Berlin, Germany

Research Associate, Communications and Information Theory group
Mentor: Prof. Giuseppe Caire.

2019–2020

Imperial College London

London, UK

Research Associate, Communications and Signal Processing group
Mentor: Prof. Bruno Clercx.

2016–2019

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
Thesis title: A rate-splitting approach to multiple-antenna broadcasting

2012–2016

Imperial College London

London, UK

M.Sc. in Communications and Signal Processing
Degree Classification: Distinction (highest award)

2010–2011

Islamic University of Gaza

Gaza, Palestine

B.Sc. in Electrical Engineering
Degree Classification: Excellent (highest award)

2005–2010

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)

Talks and Seminars

- **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

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|---|-------------------------------|
| Eindhoven University of Technology
<i>Ph.D. Supervisor/Co-supervisor</i> <ul style="list-style-type: none"> • Han Wu, Ph.D. student, 2021–pres. • Mehrangiz Ensan, Ph.D. student, 2020–pres. (joint with Prof. F. Willems and Dr. A. Alvarado) | Eindhoven, Netherlands |
| Imperial College London
<i>Mentor/Co-supervisor</i> <ul style="list-style-type: none"> • 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 | London, UK |

Teaching

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|---|-------------------------------|
| Eindhoven University of Technology
<i>Responsible Lecturer</i> <ul style="list-style-type: none"> • Information Theory (3rd-year course), Spring (Q3) 2021 | Eindhoven, Netherlands |
| Technische Universität Berlin
<i>Teaching Assistant/Instructor</i> <ul style="list-style-type: none"> • Probability and Stochastic Processes (M.Sc. course), Spring 2020/Fall 2019 | Berlin, Germany |

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, e-print: <https://h-joudeh.github.io/P3.pdf>.
- [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. Chungtragn, 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.