

Gerhard Kramer

Curriculum Vitae, January 2021

Work Address

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Education

- *Dr. sc. techn. (Doktor der technischen Wissenschaften)*, ETH Zurich, Switzerland 1998
- *Post Diploma in Information Technology*, ETH Zurich, Switzerland 1996
- *Master of Science*, University of Manitoba, Winnipeg, MB, Canada 1992
- *Bachelor of Science in Engineering*, University of Manitoba, Winnipeg, MB, Canada 1991

Positions Held

- *Technical University of Munich (TUM)*, Germany Oct 2010-
Professor and Chair of Communications Engineering
Senior Vice President Research and Innovation, Oct 2019-
- *University of Southern California (USC)*, Los Angeles, CA, USA 2009-2013
Professor, Dept. of Electrical Engineering, Jan 2009 - Sep 2011
Adjunct Research Professor, Oct 2011 - Dec 2013
- *Bell Labs, Alcatel-Lucent*, Murray Hill, NJ, USA 2000-2008
Member of Technical Staff, Mathematical and Algorithmic Sciences Research Center
- *Endora Tech AG*, Basel, Switzerland 1998-2000
Communications Engineering Consultant

Visiting and Adjunct Positions

- Otto Mønsted Guest Professor, Dept. of Photonics Engineering, DTU, Lyngby, Denmark 2017-2018
- Visiting Scientist, Dept. of Electrical Engineering and Inf. Technology, Lund Univ., Sweden 2007-2008
- Visiting Professor, School of Electrical Engineering, Korea Univ., Seoul, South Korea 2007
- Adjunct Assistant Professor, Dept. of Electrical Engineering, Columbia Univ., NY, USA 2002 & 2005

Principal Honors & Awards

Professional

- *Thomson Reuters Highly Cited Researcher* in Computer Science, 2014-2016
- *Lecturer Award (Dozentenpreis)*, TUM ECE Dept. Student Association, 2015
- *Member, Bavarian Academy of Sciences and Humanities*, 2015
- *Vodafone Innovations Prize*, 2011
- *Alexander von Humboldt Professorship*, 2011
- *IEEE Fellow*, 2010
- *Bell Labs President's Gold Award*, 2003
- *ETH Medal*, 1999

Papers and Patents

- *Best Paper Award*, EURASIP Journal on Wireless Communications and Networking, 2014
- *Thomas Alva Edison Patent Award*, Research & Development Council of New Jersey, 2012
- *Stephen O. Rice Prize Paper Award*, IEEE Communications Society, 2005

Assignments & Service

TUM

- Senior Vice President Research and Innovation, Oct 2019-

Ex-Officio & Past Assignments:

- University: Awards Committee, 2014- ; Appointment and Tenure Board, 2012- (Chair 2019-); Int. Graduate School of Science and Engineering (IGSSE) 2016- (Deputy Director, 2016-2020); Institute for Advanced Study Advisory Council, 2011-2017
- ECE Department: Tenure Track Assistant Prof. Mentor, 3 mentees since 2016; ECE Master of Science in Communications Engineering (MSCE) Program Director, 2010-2020; Bachelor Study Exam Board, 2016-2019; Gender Equality Officer, 2015-2019; Committee for Equal Opportunity (Chair), 2014-2018; “EI nach Garching” Task Force, 2014-2015; Strategy Committee, 2011-2014; numerous W3 professor search committees, 2011-2018

Bavarian Academy of Sciences & Humanities (BAdW)

- Forum Technologie, 2016-
- Selection Committee, Junges Kolleg, 2017-
- Symposium Organizer: Informationsübertragung mit Photonen, Apr 2018

Bavaria & Germany

- Mentor, Max Weber Program, 2016-
- Vertrauensdozent, Bayerische EliteAkademie, 2017-2019
- Board of Curators, Max Planck Institute of Quantum Optics, Garching, 2020-
- Board of Curators, Eduard Rhein Foundation, 2013-
- VDE ITG Information and System Theory Technical Committee (Fachausschuss KT 1), 2011-
- VDE ITG Awards Committees, 2015-2021

Evaluator & Examiner

- Chair of panel evaluating the Dept. of Electrical Engineering, Chalmers University, Sweden, 2018
- Chair of the “Strukturkommission” for the DLR Institute for Communications and Navigation, 2018
- Panel reviewer for funding agencies in Austria (FWF), Finland (Academy of Finland), Germany (BMBF, DFG), Sweden (SRC), and USA (DARPA, NSF)
- Member and external evaluator for 9 professor search committees in Germany, Japan, Spain, 2011-2021
- External examiner of 4 habilitation à diriger des recherches (HDR) in France, 2012-2016
- External examiner of 54 Dr. / Ph.D. dissertations in Asia, Australia, Europe, North America, 2004-

Local Workshop Chair (29 events in total, selected events are listed)

- DLR-MIT-TUM Workshop on Coding and Random Access, Oberpfaffenhofen, Germany, Feb 2020
- Workshop on Coding, Coop. & Security in Commun. Networks (COCO), Haifa 2018, Munich 2019
- Munich Workshop on Information Theory of Optical Fiber (MIO), Dec 2014-2016, 2018
- Claude Shannon 100th Birthday Celebration, Heinz Nixdorf Museum, Germany, May 2016

IEEE (Institute of Electrical & Electronics Engineers)

- Technical Field Awards Council, 2021-2023
- Eric E. Sumner Award Committee, 2020-2023 (Chair 2021-2023)
- Richard W. Hamming Medal Committee, 2014-2017
- Alexander Graham Bell Medal Committee, 2011-2014
- Technical Activities Board, 2013

IEEE Information Theory Society

Elected Positions and Committees

- President (2013), 1st Vice President (2012), 2nd Vice President (2011)
- Board of Governors, 2009-2015
- Numerous committees since 2005

Editorships

- Foundations and Trends in Communications and Information Theory, 2012-
- Associate Editor for Shannon Theory, *IEEE Trans. Inf. Theory*, 2006-2009
- Guest Editor, *IEEE Trans. Inf. Theory* Special Issue on Relaying & Cooperation, Oct 2007
- Publications Editor, *IEEE Trans. Inf. Theory*, 2004-2005

Conference and Workshop Organization

- General Program Chair: ISIT 2023 (Taipei), ISIT 2017 (Aachen), ITW 2017 (Kaohsiung)
- Technical Program Chair: ISIT 2014 (Honolulu), ISIT 2008 (Toronto), ISTC 2014 (Bremen)
- Technical Program Committees: over 50 in total

Schools of Information Theory (involved with 34 Schools with over 2500 students)

- Europe (10 schools): 2012 (Chair), 2013- (Advisor)
- North America (15 schools): 2008-2010 (Founding Chair), 2011- (Advisor & Support)
- Africa, Australia, East Asia, India (8 schools): 2014-2017 (Support)
- Latin American School (1 school): 2018 (Advisor)

IEEE Communications and Photonics Societies

- Photonics Society Fellow Evaluations, 2020
- Technical Program Chair: ISWCS 2011 (Aachen)
- ComSoc Emerging Technologies Committee, 2009-2011
- ComSoc Technical Program Committees: over 60 in total

Invited Talks & Lectures (recent talks are listed)

Keynote, Plenary & Distinguished Lectures (31 in total)

- “Communication Theory for Key Agreement by Public Discussion,” Plenary, *Canadian Workshop Inf. Theory (CWIT)*, Hamilton, ON, Jun 5, 2019
- “Information Theory for Selected Optical Fiber Models,” Keynote, *ShanghaiTech Workshop on Information, Learning, and Decision (SWILD)*, Shanghai, China, Jun 30, 2018

Talks at Universities, Industrial Labs & Workshops (166 in total)

- “Basic Information Rates for Massive Multi-Access,” *Huawei Lake Baikal Summit 2020*, Russian Federation, Dec 21-12, 2020
- “Mismatched Models to Lower Bound the Capacity of Optical Fiber Channels,” *Huawei Optical Algorithm Workshop*, Moscow, Russian Federation, Sep 15-16, 2020
- “Quantized Precoding Algorithms for OFDM MIMO Channels,” *IEEE Kharagpur Section Webinar*, June 24, 2020
- “Capacity Bounds for Gaussian Massive Multi-access Systems,” *DLR-MIT-TUM Workshop on Coding and Random Access*, DLR, Germany, Feb 24, 2020

Talks for Local Audiences (31 in total)

- “CareerDesign@TUM. Alternative Karrierewege: Researcher Track,” Munich, July 30, 2020
- “5G and Applications,” Eduard-Rhein-Preisverleihung, Deutsches Museum, Munich, Nov 17, 2018
- “Kommunikation und Information,” talk for high school students, TUM ECE Dept., Munich, Oct 30, 2018
- “Basics of Information Theory,” TUM ECE Open House, Munich, Oct 13, 2018

Doctoral & Postdoc Supervision

Current

Doctoral Thesis Supervisor

1. Francesca Diedolo, Short Reach Optical Communications. 2021-
2. Yusuf Şener, Coding for Multi-user Communications. 2020- (joint with Huawei)
3. Abdalla Ibrahim, Identification Capacity and Codes. 2019- (with C. Deppe)
4. Mohammad Salariseddigh, Identification Capacity and Codes. 2019- (with C. Deppe)
5. Diego Lentner, Information Theory and Codes for Stealth. 2019-
6. Tayyab Mehmood, Coding and Constellation Shaping for Optical Communication. 2019- (joint with DTU)
7. Emna Ben Yacoub, Quantized Message Passing and Codes for Multi-user Communication. 2018-
8. Thomas Wiegart, Polar Codes and Shaping. 2018-
9. Mustafa Coşkun, Low-latency Coding and Channel Estimation. 2017- (joint with DLR)
10. Delcho Donev, Low-latency Waveforms and Coding. 2017- (joint with DLR)
11. Javier García, Fiber Optic Channels. 2016-
12. Tobias Prinz, Polar Codes. 2016-
13. Peihong Yuan, Polar Codes. 2015-

Postdoc / Habilitation

1. Christian Deppe, Habilitation on Post Shannon Theory. 2020-
2. Uzi Pereg, Quantum Information Theory. 2019- (with C. Deppe)
3. Roberto Ferrara, Quantum Communications. 2018- (with C. Deppe)

Past (not including 12 Bell Labs interns from 2000-2008)

Dr.-Ing. / Ph.D. (19 Dr.-Ing., 1 Ph.D.)

1. Andrei Nedelcu, 2012-2020; Compact and Massive MIMO
2. Amir Mehdi Ahmadian, Dr.-Ing. TUM, May 2020; Precoding for Massive MIMO Wireless Systems
3. Patrick Schulte, Dr.-Ing. TUM, Apr 2020; Algorithms for Distribution Matching
4. Thomas Jerkovits, 2016-2020; Channel and Security Coding
5. Fabian Steiner, Dr.-Ing. TUM, Jan 2020; Coding for Higher-Order Modulation and Probabilistic Shaping
6. Lars Palzer, Dr.-Ing. TUM, Oct 2019; Rate-Distortion Analysis of Sparse Sources and Compressed Sensing
7. Marcin Pikus, Dr.-Ing. TUM, Sep 2019; Finite-Precision and Multi-Stream Distribution Matching
8. Rana Ali Amjad, Dr.-Ing. TUM, Sep 2019; Information Theory and Factor Graphs for Machine Learning
9. Markus Staudacher, 2014-2019; Quantized Precoding for Massive MIMO
10. Onur Günlü, Dr.-Ing. TUM, Nov 2018; Key Agreement with PUFs and Biometric Identifiers
11. Stefan Dierks, Dr.-Ing. TUM, Feb 2018; Multiple Antenna Precoding: Indoor Communications and EIRP
12. Hannes Bartz, Dr.-Ing. TUM, Apr 2017; Algebraic Decoding of Subspace and Rank-Metric Codes
13. Markus Stinner, Dr.-Ing. TUM, Sep 2016; Spatially Coupled LDPC Codes on the Binary Erasure Channel
14. Marwa El Hefnawy, Dr.-Ing. TUM, Dec 2015; Spectral Efficiency of Faster-than-Nyquist Signals
15. Joschi Brauchle, Dr.-Ing. TUM, Dec 2015; Algebraic Decoding of Reed-Solomon and Related Codes
16. Michael Heindlmaier, Dr.-Ing. TUM, Oct 2015; Network Coding for Relay and Broadcast Channels
17. Onurcan İşcan, Dr.-Ing. TUM, Dec 2014; Design of Communication Systems for Two-Way Relaying
18. Hassan Ghozlan, Ph.D. USC, Sep 2014; Capacity of Channels with Nonlinearity and Phase Noise
19. Tobias Lutz, Dr.-Ing. TUM, Aug 2014; Coding for Half-Duplex Relay Networks and The Trapdoor Channel
20. Ronald Böhnke, Dr.-Ing. Universität Bremen, Aug 2014; MIMO-OFDM Communications
21. Jie Hou, Dr.-Ing. TUM, Aug 2014; Coding for Relay Networks and Effective Secrecy
22. Mohit Thakur, Dr.-Ing. TUM, Mar 2014; Relay Positioning for Multicast Relay Networks
23. Georg Zeitler, Dr.-Ing. TUM, Mar 2012; Low-Precision Quantizer Design for Communication Problems

Postdoc / Habilitation (10 Postdocs)

1. Georg Böcherer, Dr.-Ing. habil. TUM, 2013-2017; Postdoc, 2012-2013; joined Huawei in Paris & Munich
2. Bernhard Geiger, Postdoc, 2014-2017; joined Know-Center GmbH in Graz
3. Yongpeng Wu, Postdoc, 2017; joined Shanghai Jiao Tong University as Research Professor
4. Youlong Wu, Postdoc, 2014-2017; joined ShanghaiTech University as Assistant Professor
5. Roy Timo, Postdoc, 2014-2016; joined Ericsson in Stockholm
6. Shirin Saeedi Bidokhti, Postdoc, 2012-2016; joined University of Pennsylvania as Assistant Professor
7. Mansoor Yousefi, Postdoc, 2012-2016; joined Telecom ParisTech as Assistant Professor
8. Luca Barletta, Postdoc, 2012-2015 ; joined Politecnico di Milano as Assistant Professor
9. Stefano Rini, Postdoc, 2011-2012; joined National Chiao-Tung University as Assistant Professor
10. Christoph Hausl, Habilitation, 2010-2013; joined Rohde & Schwarz in Munich

Recognitions for Dr. Researchers & Postdocs (recent recognitions are listed)

- Thomas Wiegart, *Lecturer Award (Dozentenpreis)*, Student Association (Fachschaft), TUM ECE Dept., 2020
- Diego Lentner, *Prof. Ralf Kötter Memorial Award*, 2020
- Emna Ben Yacoub, *Ingenieurinnen-Preis*, Bavarian Ministry of Sciences and the Arts, 2019
- Emna Ben Yacoub, *Walter Gademann Master Thesis Prize*, 2019
- Tobias Prinz, Fabian Steiner, Thomas Wiegart, Peihong Yuan, *Heinrich Hecht Award* for Code Design, 2019
- Fabian Steiner, Georg Böcherer, Patrick Schulte, *IEEE/OSA J. Lightw. Technol. Paper Award*, 2019
- Mansoor Yousefi, *ERC Starting Grant*, 2018
- Mansoor Yousefi, *IEEE Information Theory Society Paper Award*, 2018
- Patrick Schulte, Fabian Steiner, *Overall Winner, INNOspace Masters Ideas Competition*, 2018
- Tobias Prinz, *Prof. Ralf Kötter Memorial Award*, 2018
- Georg Böcherer, *Johann-Philipp-Reis Award of the VDE ITG*, 2017

University Teaching

TUM (since 2010)

- Bachelor courses: Digital Communications, Digital Communications 2, Mobile Communications
- Master courses: Information Theory, Multi-User Information Theory, Machine Learning for Commun.
- TUM Asia Bachelor course: Digital Communications

USC (2009-2010)

- Information Theory (EE-565a), Fall 2009
- Multi-User Information Theory (EE-599), Spring 2009

Other: 7 courses from 1999-2008 at ETH, Columbia Univ., Korea, Lund & Aalborg Universities

Short Courses & Tutorials

Ferienakademie Sarntal, Südtirol, short course of 2 weeks (9 in total, recent courses listed)

- Advanced Topics in Information Theory and Communications (Doctoral Course), Sep-Oct 2021
- Machine Learning in Signal Processing & Communications (Bachelor & Master students), Sep-Oct 2019
- Redundancy & Irrelevance in Source & Channel Coding (Bachelor & Master students), Sep-Oct 2018

Advanced Information Theory and Coding (28 in total, recent courses/tutorials listed)

- short course (1 week), Indian Institute of Technology Kanpur, India, Mar 2018
- short course (3 weeks), Technical University of Denmark, Lyngby, Denmark, Aug 2017
- short course (3 lectures), IEEE North American School Inf. Theory, Atlanta, GA, Jun 2017