

# Gerhard Kramer

## Curriculum Vitae, April 12, 2019

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### Work Address

Technical University of Munich  
Chair of Communications Engineering  
D-80290 Munich Germany

Web: <http://www.lnt.ei.tum.de>  
Email: [gerhard.kramer@tum.de](mailto:gerhard.kramer@tum.de)  
Phone: +49.89.289.23491

### Education

- *Dr. sc. techn. (Doktor der technischen Wissenschaften)*, ETH Zürich, Switzerland 1998
- *Post Diploma in Information Technology*, ETH Zürich, 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-  
Alexander von Humboldt Professor and Chair of Communications Engineering
- *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**

- *IEEE Information Theory Society Distinguished Lecturer*, 2015-2016
- *Thomson Reuters Highly Cited Researcher* in Computer Science, 2014-2016
- *Lecturer Award (Dozentenpreis)*, selected by the TUM ECE Dept. Student Association, 2015
- *Member, Bavarian Academy of Sciences and Humanities*, 2015
- *President, IEEE Information Theory Society*, 2013
- *Vodafone Innovations Prize*, for fundamental research on cooperative communication networks, 2011
- *Alexander von Humboldt Professorship*, 2010
- *IEEE Fellow*, for contributions to coded modulation, iterative decoding, and cooperative commun., 2010
- *Bell Labs President's Gold Award*, member of the Bell Labs Layered Space-Time (BLAST) team, 2003
- *ETH Medal*, for outstanding work on the doctoral dissertation, 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**

- Int. Graduate School of Science and Engineering (IGSSE), Deputy Director, 2016-
- University Awards Committee, 2014-
- University Appointment and Tenure Board, 2012-
- ECE Dept. Tenure Track Assistant Prof. Mentor, 2016-, 2017-, 2018-
- ECE Dept. Bachelor Study Exam Board, 2016-
- ECE Dept. Gender Equality Officer, 2015-
- ECE Dept. Master of Science in Communications Engineering (MSCE) Program Director, 2010-
- *Past*: Institute for Advanced Study Advisory Council (2011-17); ECE Dept. Strategy Committee (2011-14); “EI nach Garching” Task Force (2014-15); ECE Dept. Committee for Equal Opportunity (Chair, 2014-18); numerous W3 professor search committees (2011-)

### **Bavarian Academy of Sciences & Humanities (BAdW)**

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

### **Bavaria & Germany** (selected assignments)

- Vertrauensdozent, Bayerische EliteAkademie, 2017-
- Mentor and Selection Committee, Max Weber Program, 2016-
- Board of Curators of the Eduard Rhein Foundation, 2013-
- Information and System Theory Technical Committee (Fachausschuss 5.1), VDE ITG, 2011-

### **Evaluator & Examiner**

- Chair of panel evaluating the Department of Electrical Engineering, Chalmers University, Sweden, 2018
- Chair of “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)
- Chair, member, and external evaluator for several professor search committees in Germany, 2011-
- Member of associate professor search committee in Spain, 2019
- External examiner of 4 habilitation à diriger des recherches (HDR) in France, 2012-2016
- External examiner of 46 Dr. / Ph.D. dissertations in Australia, Austria, Canada, Denmark, Finland, France, Germany, Hong Kong, Israel, Japan, Singapore, Spain, Sweden, Switzerland, UK, USA

### **Munich & Local Workshops** (26 in total, selected recent events are listed)

- Chair, Joint Workshop on Communications and Coding (JWCC), Kühtai, Austria, Mar 2019
- Co-Organizer, Chalmers-DLR-TUM Workshop on Channel Coding, Oberpfaffenhofen, Germany, Feb 2019
- Co-Organizer, Workshop on Coding, Coop., Security Commun. Networks (COCO), Haifa, Israel, Dec 2018
- Chair, Munich Workshop on Information Theory of Optical Fiber (MIO), Dec 2014-2016, 2018
- Co-Organizer, Claude Shannon 100th Birthday Celebration, Heinz Nixdorf Museum, Germany, May 2016

### **IEEE (Institute of Electrical & Electronics Engineers)**

- 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 and subcommittees since 2005

### Editorships

- Foundations and Trends in Communications and Information Theory, 2012-
- Associate Editor for Shannon Theory, *IEEE Trans. Inf. Theory*, 2006-2008
- Guest Editor, *IEEE Trans. Inf. Theory* Special Issue, 2007
- Publications Editor, *IEEE Trans. Inf. Theory*, 2004-2005

### Conference and Workshop Organization

- General Program Co-Chair: ISIT 2017 (Aachen), ITW 2017 (Kaohsiung)
- Technical Program Co-Chair: ISIT 2014 (Honolulu), ISTC 2014 (Bremen), ISIT 2008 (Toronto)
- Technical Program Committees: over 40 in total

### Schools of Information Theory (involved with 31 Schools in total, with over 2500 students)

- Europe (10 schools): 2012 (Co-Chair), 2013- (Advisor)
- North America (13 schools): 2008-2010 (Founding Co-Chair), 2011- (Advisor & Support)
- Africa, Australia, East Asia, India (7 schools): 2014-2016 (Support)
- Latin American School (1 school): 2018 (Advisor)

## **IEEE Communications Society**

- Technical Program Co-Chair: ISWCS 2011 (Aachen)
- Emerging Technologies Committee, 2009-2011
- Technical Program Committees: over 50 in total

## **Invited Talks & Lectures**

### **Keynote, Plenary & Distinguished Lectures** (31 in total, recent talks are listed)

- “Communication Theory for Key Agreement by Public Discussion,” Plenary, *Canadian Workshop on Information Theory (CWIT)*, Hamilton, ON, June, 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** (159 in total, recent talks are listed)

- “Channel Resolvability Codes for Secrecy and Stealth,” *Workshop on Contemporary Coding Theory*, Oberwolfach, Germany, Mar 18, 2019
- “Design of Coarsely-Quantized Message Passing Decoders,” *Oberpfaffenhofen Workshop on High Throughput Coding (OWHTC)*, DLR, Germany, Feb 27, 2019
- “Efficient Coding and Modulation for Satellite Links with Severe Delay Constraints,” DLR, Oberpfaffenhofen, Germany, Feb 25, 2019

### **Talks for Local Audiences** (30 in total, recent talks are listed)

- “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. Diego Lentner, Coding, Information Theory, and Security. 2019-
2. Tayyab Mehmood, Coding and Constellation Shaping for Optical Communication. 2019- (joint with DTU)
3. Emna Ben Yacoub, Codes for Multi-user Communication. 2018-
4. Thomas Wiegart, Coding and Information Theory. 2018-
5. Mustafa Cemil Coşkun, Low-latency Coding and Channel Estimation. 2017- (joint with DLR)
6. Delcho Donev, Low-latency Waveforms and Coding. 2017- (joint with DLR)
7. Javier García, Fiber Optic Channels. 2016-
8. Thomas Jerkovits, Channel Coding. 2016- (with DLR)
9. Fabian Steiner, Coded Modulation. 2016-
10. Tobias Prinz, Polar Codes. 2016-
11. Peihong Yuan, Coded Modulation. 2015-
12. Patrick Schulte, Constellation Shaping and Coding. 2014-
13. Marcin Pikus, Constellation Shaping and Coding. 2015- (with Huawei)
14. Lars Palzer, Compression of Sparse Sources. 2014-

#### Postdoc

1. Roberto Ferrara, Quantum Communications. 2018-

### **Past (not including Bell Labs)**

#### Dr.-Ing. / Ph.D.

1. Markus Staudacher, 2014-2019; Quantized Precoding for Massive MIMO
2. Rana Ali Amjad, 2014-2019; Information Theory and Machine Learning
3. Amir Mehdi Ahmadian, 2015-2018; Precoding for Massive MIMO
4. Andrei Nedelcu, 2012-2018; From Compact MIMO to Massive MIMO
5. Onur Günlü, Dr.-Ing. TUM, Nov 2018; Key Agreement with PUFs and Biometric Identifiers
6. Stefan Dierks, Dr.-Ing. TUM, Feb 2018; Multiple Antenna Precoding: Indoor Communications and EIRP
7. Hannes Bartz, Dr.-Ing. TUM, Apr 2017; Algebraic Decoding of Subspace and Rank-Metric Codes
8. Markus Stinner, Dr.-Ing. TUM, Sep 2016; Spatially Coupled LDPC Codes on the Binary Erasure Channel
9. Marwa El Hefnawy, Dr.-Ing. TUM, Dec 2015; Spectral Efficiency of Faster-than-Nyquist Signals
10. Joschi Brauchle, Dr.-Ing. TUM, Dec 2015; Algebraic Decoding of Reed-Solomon and Related Codes
11. Michael Heindlmaier, Dr.-Ing. TUM, Oct 2015; Network Coding for Relay and Broadcast Channels
12. Onurcan İşcan, Dr.-Ing. TUM, Dec 2014; Design of Communication Systems for Two-Way Relaying
13. Hassan Ghozlan, Ph.D. USC, Sep 2014; Capacity of Channels with Nonlinearity and Phase Noise
14. Tobias Lutz, Dr.-Ing. TUM, Aug 2014; Coding for Half-Duplex Relay Networks and The Trapdoor Channel
15. Ronald Böhnke, Dr.-Ing. Universität Bremen, Aug 2014; MIMO-OFDM Communications
16. Jie Hou, Dr.-Ing. TUM, Aug 2014; Coding for Relay Networks & Effective Secrecy for Wire-Tap Channels
17. Mohit Thakur, Dr.-Ing. TUM, Mar 2014; Relay Positioning for Multicast Relay Networks
18. Georg Zeitler, Dr.-Ing. TUM, Mar 2012; Low-Precision Quantizer Design for Communication Problems

#### Postdoc / Habilitation

1. Georg Böcherer, Dr.-Ing. habil. TUM, 2013-17; Postdoc, 2012-13; joined Huawei in Paris
2. Bernhard Geiger, Postdoc, 2014-17; continued Schrödinger Fellowship at TU Graz
3. Yongpeng Wu, Postdoc, 2017; joined Shanghai Jiao Tong University as Research Professor
4. Youlong Wu, Postdoc, 2014-17; joined ShanghaiTech University as Assistant Professor
5. Roy Timo, Postdoc, 2014-16; joined Ericsson in Stockholm
6. Shirin Saedi Bidokhti, Postdoc, 2012-16; continued postdoc at Stanford University

7. Mansoor Yousefi, Postdoc, 2012-16; joined Telecom ParisTech as Assistant Professor
8. Luca Barletta, Postdoc, 2012-15 ; joined Politecnico di Milano as Assistant Professor
9. Stefano Rini, Postdoc, 2011-12; joined National Chiao-Tung University as Assistant Professor
10. Christoph Hausl, Habilitation, 2010-13; joined Rohde & Schwarz in Munich

### **Honors and Awards for Dr. Researchers & Postdocs**

- Fabian Steiner, Georg Böcherer, Patrick Schulte, IEEE/OSA J. Lightwave 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
- Fabian Steiner, Prof. Ralf Kötter Memorial Award, 2016
- Georg Böcherer, Patrick Schulte, Fabian Steiner, 3rd Place, Bell Labs Prize, 2015
- Youlong Wu, Alexander von Humboldt Foundation Fellowship for Postdocs, 2015
- Onur Günlü, 1st Prize, Hands-On Project Digital Society, Alexander von Humboldt Found. & DAAD, 2014
- Rana Ali Amjad, Walter Gademann Master Thesis Prize, 2014
- Joschi Brauchle, Lecturer Award (Dozentenpreis), Student Association (Fachschaft), TUM ECE Dept., 2013
- Michael Heindlmaier, Qualcomm Innovation Fellowship, 2013
- Roy Timo, Alexander von Humboldt Foundation Fellowship for Postdocs, 2012
- Hannes Bartz, Prof. Ralf Kötter Memorial Award, 2012
- Tobias Lutz, Qualcomm Innovation Fellowship, 2012

### **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, Korea, Lund & Aalborg Universities

### **Short Courses & Tutorials**

Ferienakademie Sarntal, Südtirol, short course of 2 weeks (8 in total, recent courses listed)

- Machine Learning in Signal Processing & Communications (Bachelor & Master students), Sep-Oct 2019
- Redundancy & Irrelevance in Source & Channel Coding (Bachelor & Master students), Sep-Oct 2018
- Compressed Sensing (Bachelor & Master students), Sep 2017

Advanced Information Theory (23 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