Prof. Dr. Helmut Bölcskei

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and Electrical Engineering
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CURRICULUM VITAE, PUBLICATIONS, PATENTS, AND LECTURES

January 2012

I. CURRICULUM VITAE

General research interests

Information Theory, Mathematical Signal Processing, Applied and Computational Harmonic Analysis

Personal details

Born on May 29, 1970 in Mödling, Austria; Austrian nationality; married, one child (Philip, born Nov. 20, 2005)

Education

1980–1988: High school in Wiener Neustadt, Austria

June 1988: High school graduation with highest honors

1989–1994: Studies in electrical engineering/communication engineering, Vienna University of Technology, Vienna, Austria

Oct. 1994: Engineering diploma (M.S.) with highest honors

1994-1997: Doctoral studies in electrical engineering/communication engineering, Vienna University of Technology, Vienna, Austria

Nov. 1997: Ph.D. in electrical engineering/communication engineering with highest honors (doctoral dissertation: "Oversampled Filter Banks and Predictive Subband Coders," thesis advisors: Prof. F. Hlawatsch (Department of Communications and Radio-Frequency Engineering, Vienna University of Technology) and Prof. H. G. Feichtinger (Department of Mathematics, University of Vienna))

Academic work experience

(see also Section "Teaching activities")

Oct. – Nov. 1994: Research Assistant ("wissenschaftlicher Mitarbeiter"), Department of Mathematics, University of Vienna, Vienna, Austria

Dec. 1994 – Apr. 1997: Research and Teaching Assistant ("wissenschaftlicher Mitarbeiter"), Department of Communications and Radio-Frequency Engineering, Vienna University of Technology, Vienna, Austria

May 1997 – Jan. 1999: University Assistant ("Universitätsassistent"), Department of Communications and Radio-Frequency Engineering, Vienna University of Technology, Vienna, Austria

Feb. 1998 – March 1998: Visiting Researcher at Ecole Nationale Supérieure des Télécommunications (ENST) Paris, Paris, France (with Prof. P. Duhamel)

Sept. 1998: One-week stay at the Isaac Newton Institute for Mathematical Sciences, Workshop on "*Gabor Analysis*"

Feb. 1999 – Feb. 2001: Post-doctoral researcher in the Information Systems Laboratory (with Prof. A. Paulraj), Dept. of Electrical Engineering, and in the Department of Statistics (with Prof. D. Donoho), Stanford University, Stanford, CA, USA

March 2001 – Jan. 2002: Assistant Professor (tenure track) of Electrical and Computer Engineering, Coordinated Science Laboratory and Department of Electrical Engineering, University of Illinois at Urbana-Champaign. (Feb. 2002 – June 2004: Adjunct Assistant Professor)

Feb. 2002 – Sept. 2006: Assistant Professor (tenure track) of Electrical Engineering, Department of Information Technology and Electrical Engineering, ETH Zurich, Switzerland.

Oct. 2006 – : Full Professor (o. Univ.-Prof.) of Electrical Engineering, Department of Information Technology and Electrical Engineering, ETH Zurich, Switzerland.

Industrial work experience

Feb. – May 1996: Visiting Researcher at *Philips Research Laboratories Eindhoven*, The Netherlands (worked on the design of filter banks for subband image and video coding applications)

Jan. 1998 – Dec. 1998: Consulting for the Austrian company *AKG* on low-delay audio coding

Feb. 1999 – Feb. 2001: Member of founding team and part-time member of technical staff in the startup company *Iospan* (formerly *Gigabit*) *Wireless Inc.*, San Jose, CA, USA, founded in Dec. 1998 by Prof. A. Paulraj, acquired in 2002 by Intel Corp.; work on physical layer and system architecture of a cellular fixed broadband wireless access (BWA) system using multiple-antenna (MIMO) technology ("Air Burst" system), MIMO channel measurements and development of MIMO channel models for fixed BWA in the US MMDS band ($2.5 - 2.7$GHz)

March 2001 – July 2001: Consulting for *Iospan Wireless Inc.*, work on physical layer and system architecture of second generation "Air Burst" system

June 2001: Visiting researcher at the *Heinrich-Hertz Institut für Nachrichtentechnik Berlin GmbH,* Berlin, Germany

July 2004: Consulting for *Beceem Communications Inc.*, Santa Clara, CA, USA

2007: Co-founder of *Celestrius AG*, Zurich, Switzerland

Awards and honors

Erwin Schrödinger Fellowship (1999-2001) given by the Austrian National Science Foundation

2001 IEEE Signal Processing Society Young Author Best Paper Award

("*The Young Author Best Paper Award honors the author(s) of an especially meritorious paper dealing with a subject related to the Society's technical scope and appearing in one of the Society's Transactions and who, upon the date of submission of the paper, is less than 30 years of age. Eligibility is based on a three-year window*.")

2005 "Golden Owl" Teaching Award for the Department of Information Technology and Electrical Engineering, ETH Zurich

2006 IEEE Communications Society *Leonard G. Abraham Prize*

("*Given annually to the best original paper published in IEEE Journal on Selected Areas in Communications in the past year*.")

ICICS 2008/2009 Distinguished Lecture, The University of British Columbia, Vancouver, Canada

Fellow of IEEE, class of 2009, nominated by IEEE Information Theory Society, citation: "For contributions to multiple-input multiple-output wireless communication and filter bank theory"

Editor-in-chief, *IEEE Transactions on Information Theory*, since June 2010

Vodafone Innovations Award 2010

("*Der Innovationspreis zeichnet exzellente Wissenschaftlerinnen und Wissenschaftler vorwiegend aus dem deutschen Sprachraum aus. Er ist mit 25.000 EUR dotiert. Bei der Auswahl finden herausragende Arbeiten, die die Entwicklung der Mobil- und Festnetzkommunikation zum Thema haben, eine besondere Beachtung*.")

Invited speaker at first EU-US Frontiers of Engineering (FoE) Meeting, Sept. 2010, Cambridge, UK

EURASIP Fellow 2011

("*In 2007, the EURASIP Administrative Committee (AdCom) initiated a Fellowship Programme, to recognize outstanding achievements of its members and volunteers. Each year, a select group of signal processing researchers are elevated to "EURASIP Fellow", the Association's most prestigious honor*.")

Plenary lectures

"The SIMO pre-log can be larger than the SISO pre-log," *International ITG Workshop on Smart Antennas (WSA)*, Dresden, Germany, Mar. 2012

"Compressive system identification," *International Symposium on Wireless Communication Systems (ISWCS)*, Aachen, Germany, Nov. 2011

"Nonparametric identification of linear time-varying systems," *53rd International Symposium ELMAR*, Zadar, Croatia, Sept. 2011

"Uncertainty relations and signal recovery," *European Signal Processing Conference (EUSIPCO)*, Barcelona, Spain, Sept. 2011

"The SIMO pre-log can be larger than the SISO pre-log," *IEEE Communication Theory Workshop (CTW)*, Sitges, Spain, June 2011

"How sensitive is fading channel capacity to the channel model?," *International Conference on Wireless Communications and Signal Processing (WCSP)*, Suzhou, China, Oct. 2010

"On the sensitivity of noncoherent capacity to the channel model," *Kailath Lecture and Colloquium*, Stanford University, Stanford, CA, USA, Nov. 2009

"Mathematical roots of compressed sensing," *IEEE Information Theory Workshop (ITW)*, Taormina, Italy, Oct. 2009

"The case for optimum detection algorithms in MIMO wireless systems," *IEEE Israel Convention*, Eilat, Israel, Dec. 2008

"Capacity of underspread fading channels," *IEEE Sensor Array and Multichannel Signal Processing Workshop*, Darmstadt, Germany, July 2008

"Soft-output sphere decoding: Theory and VLSI implementation," *Conference on "Wireless Intelligent Networks" to celebrate the opening of the Wireless Intelligent Networking Center at Nile University*, Cairo, Egypt, Apr. 2008

"Sphere decoding: Theory and VLSI implementation," *IEEE Benelux/DSP Valley Signal Processing Symposium*, Antwerp, Belgium, March 2007

"Frequency-domain algorithms for efficient polynomial matrix inversion and QR decomposition," *IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Puerto Vallarta, Mexico, Dec. 2005

"Wideband OFDM communication," *IEEE International Symposium on Spread Spectrum Techniques and Applications (ISSSTA)*, Sydney, Australia, Sept. 2004

"Fundamental tradeoffs in MIMO wireless systems," *IEEE 6th CAS Workshop/Symposium on Emerging Technologies: Frontiers of Mobile and Wireless Communication*, Shanghai, China, June 2004

"Space-time modulation for real-world MIMO-OFDM systems," COST 273 Workshop on *"Opportunities of the Multidimensional Propagation Channel"*, Espoo, Finland, May 2002

"MIMO wireless communications," *IEEE Benelux Signal Processing Symposium (SPS)*, Leuven, Belgium, March 2002.

"Digital signal processing challenges in MIMO wireless communications," *2001 IEEE Workshop on Signal Processing Systems (SIPS)*, Antwerp, Belgium, Sept. 2001

Erdös number

Erdös number: 3

P. Erdös and J. H. van Lint, "On the average ratio of the smallest and largest prime divisor of n," *Nederl. Akad. Wetensch. Indag. Math.*, 44 (1982), 127-132.

I. Hall, A. J. E. M. Janssen, A. W. J. Kolen, and J. H. van Lint, "Equidistant codes with distance 12," Discrete Mathematics 17 (1977), pp. 71-83.

H. Bölcskei and A. J. E. M. Janssen, "Gabor Frames, unimodularity, and window decay," *The Journal of Fourier Analysis and Applications*, Vol. 6, No. 3, 2000, pp. 255-276.

Research grants obtained

Grant J1629-TEC, "Redundant signal expansions in wireless communications," (given by the *Austrian National Science Foundation (FWF)*), funding $35K (US), 2/1999-1/2000

Grant J1868-TEC (follow-up to J1629-TEC), "Redundant signal expansions in wireless communications," (given by the *Austrian National Science Foundation (FWF)*), funding $35K (US), 2/2000-1/2001

"Real-time MIMO-OFDM system for high-speed broadband wireless access," (given by *ETHZ Research Commission (TH and SEP)*), funding 1.2M (CHF), jointly with Prof. W. Fichtner (IIS, ETHZ), 8/2002-7/2005

"Cooperative MIMO wireless networks," (given by the *Swiss Federal Office for Education and Science (BBW), COST-273*), funding 100K (CHF), jointly with Prof. A. Wittneben (IKT, ETHZ), 1/2003 - 12/2004

"Multi-user MIMO wireless systems," (given by the *Swiss National Science Foundation (SNF)*), funding 170K (CHF), 5/2003-4/2005

"Performance assessment and coexistence issues of ultra-wideband radio systems (PACURS)," (given by the *Swiss Federal Office for Professional Education and Technology (KTI/CTI)*), Industrial partner *Swisscom Innovations AG*, funding 231K (CHF), 3/2004-2/2006

"Multi-standard software defined radio for multimedia applications" (given by the *Swiss Federal Office for Professional Education and Technology (KTI/CTI)*), Industrial partner *BridgeCo AG, Dübendorf, Switzerland*, funding 387K (CHF), jointly with Prof. W. Fichtner (IIS, ETHZ), 3/2005-9/2006

"Multiuser and multicellular MIMO wireless systems," (given by the *Swiss National Science Foundation (SNF)*), funding 250K (CHF), jointly with Dr. J. Hansen (CTG/ETHZ), 10/2005-9/2008

Industry sponsored research

"Code design for semi-coherent MIMO-OFDM systems (part of Nokia's 4G cellular systems research project)," with *Nokia Research Center (NRC) Helsinki, Finland*, 1/2003 - 12/2003, funding 125K (CHF)

"WLAN MIMO radio channel measurements," with *Zyray Wireless Inc., San Diego, CA, USA*, 1/2003 - 3/2003, funding 18K (CHF)

"MIMO radio channel modeling and channel emulator development for 4G cellular and next-generation WLAN systems," with *Elektrobit Ltd., Oulu, Finland*, 1/2003 - 6/2004, funding 210K (CHF)

"Code design for semi-coherent MIMO-OFDM systems (part of Nokia's 4G cellular systems research project)," with *Nokia Research Center (NRC) Helsinki, Finland*, 1/2004 - 12/2004, funding 70K (CHF)

"Multi-antenna techniques for HSDPA (part of the national German 3GET project)," with *Nokia Research Center (NRC) Bochum, Germany*, 1/2004 - 12/2004, funding 175K (CHF)

"MIMO-OFDM system development and algorithm implementation for future mobile communications (MAGIC)," with *Siemens AG ICM PA*, Bocholt, Germany, 1/2004 - 12/2004, funding 320K (CHF), jointly with Prof. W. Fichtner (IIS, ETHZ)

"Wideband distributed antenna systems," with *Nokia Research Center (NRC) Helsinki, Finland*, 5/2005 - 4/2006, funding 70K (CHF)

"Multi-user MIMO communications," with *Nokia Research Center (NRC) Helsinki, Finland*, 5/2005 - 4/2006, funding 128K (CHF)

"MIMO-OFDM system development and algorithm implementation for future mobile communications (MAGIC)," with *Siemens AG ICM PA*, Bocholt, Germany, 1/2005 - 12/2005, funding 320K (CHF), jointly with Prof. W. Fichtner (IIS, ETHZ)

"Relaying strategies for real-world wireless networks," with *Nokia Research Center (NRC) Helsinki, Finland*, 6/2006 - 12/2006, funding 42K (CHF)

EU Projects

FP6 Integrated Project "Wireless world initiative new radio (WINNER)," project coordinator *Siemens AG, Germany*, 1/2004 - 12/2005, funding 687K (CHF)

FP6 Integrated Project "Pervasive ultra-wideband low spectral energy radio systems (PULSERS)," project coordinator *Gesellschaft für Wissens- und Technologietransfer (GWT), Dresden, Germany*, 1/2004 - 12/2005, funding 618K (CHF), jointly with Prof. A. Wittneben (IKT, ETHZ)

FP6 Integrated Project "Pervasive ultra-wideband low spectral energy radio systems (PULSERS) Phase II," project coordinator *Gesellschaft für Wissens- und Technologietransfer (GWT), Dresden, Germany*, 1/2006 - 12/2007, funding 500K (CHF), jointly with Prof. A. Wittneben (IKT, ETHZ)

FP6 Network of Excellence "Network of excellence in communications (NEWCOM)," project coordinator *Istituto Superiore Mario Boella, Torino, Italy*, 1/2004 - 9/2005, funding 206K (CHF), jointly with Proff. D. Dahlhaus, H. A. Loeliger, and A. Wittneben (all ETHZ)

FP6 STREP "Multi-element multi-hop backhaul reconfigurable antenna network (MEMBRANE)," project coordinator *Imperial College London, UK*, 1/2006 - 6/2008, funding 900K (CHF)

FP6 STREP "Multiple-access space-time coding testbed (MASCOT)," project coordinator *Forschungszentrum Telekommunikation Wien (FTW)*, 1/2006 - 12/2008, funding 1.95M (CHF), jointly with Prof. W. Fichtner (IIS, ETHZ)

Teaching activities

University of Illinois at Urbana-Champaign

Aug. 2001 – Dec. 2002: course "ECE310-Digital Signal Processing" (4-units undergraduate course)

Swiss Federal Institute of Technology (ETH) Zurich

since 10/2002: course "Signal- und Systemtheorie I," (3-units undergraduate course, winter semester, taught in German)

since 4/2003: course "Fundamentals of Wireless Communications," (4-units graduate course, summer semester, taught in English)

since 2/2009: course "Harmonic Analysis: Theory and Applications in Advanced Signal Processing," (4-units graduate course, summer semester, taught in English)

developed course for D-ITET doctoral school C3 on "MIMO Wireless Communications," jointly with Dr. R. U. Nabar, taught by Dr. Nabar in summer semesters 2003 and 2004

Co-organizer of a seminar on *Topics in Communications, Information Theory, and Signal Processing* (jointly with Prof. A. Lapidoth), winter semester 2002/2003

PhD students graduated

D. S. Baum, "Information-theoretic analysis of a class of MIMO channel measurement devices," 2007

M. Borgmann, "Noncoherent MIMO wideband communications," 2007

M. Gärtner, "Space-time coding and multiple access in MIMO fading channels", 2007

U. G. Schuster, "Wireless communication over wideband channels", 2007

P. Coronel, "Diversity-multiplexing tradeoff in selective fading channels", 2008

C. Akçaba, "Diversity-multiplexing tradeoff in relay and interference channels", 2009

J. Thukral, "Spatial multiplexing in multiuser networks with limited feedback," 2009

D. Cescato, "Interpolation-based matrix arithmetics for MIMO-OFDM systems," 2010

P. Kuppinger, "General uncertainty relations and sparse signal recovery," 2011

Participation in international PhD thesis committees

R. Hleiss, "Conception et egalisation de nouvelles structures de modulations multiporteuses," Ecole Nationale Supérieure des Télécommunications, Paris (France), 1/2000

R. W. Heath Jr., "Space-time signaling in multi-antenna wireless systems," Stanford University, CA, USA, 2/2001

M. Schubert, "Transmit optimization in multi-user MIMO systems," Technical University of Berlin, Germany, 12/2002

D. Tujkovic, "Space-time turbo coded modulation for wireless communication systems," University of Oulu, Finland, 4/2003

G. Wunder, "A theoretical framework for the peak-to-average power control problem in OFDM transmission," Technical University of Berlin, Germany, 9/2003

N. Marina, "Successive decoding," Ecole Polytechnique Federale de Lausanne (EPFL), Lausanne, Switzerland, 1/2004

Y. Souilmi, "Analysis of signaling and coding schemes for non-coherent ultra-wideband systems," Institut Eurecom, Sophia-Antipolis, France, 6/2005

B. Clerckx, "Space-time signaling for real-world MIMO channels," Universite catholique de Louvain, Louvain, Belgium, 6/2005

V. Pohl, "Die analytische und algebraische Struktur frequenzselektiver Vektorkanäle," Technical University of Berlin, Germany, 8/2006

C. Abou-Rjeily, "Construction and analysis of new space-time codes for impulse-radio ultra-wideband systems," ENST Paris, France, 10/2006

S. de la Kethulle de Ryhove, "Rate-adaptive schemes and capacity issues in wireless systems," Norwegian University of Science and Technology (NTNU), Norway, 4/2007

G. Kraidy, "Coded modulations for the multiple-antenna and cooperative fading channels," ENST Paris, France, 7/2007

M. Wiczanowski, "Algorithmic and analytic framework for optimization of multi-user performance in wireless networks with interference," Technical University of Berlin, Germany, 8/2007

Y. Sheng, "Cooperative diversity in MIMO channels with amplify-and-forward," ENST Paris, France, 11/2007

P. Tejera, "Principles and algorithms for transmission in multiple-input multiple-output broadband multiuser systems," Technical University of Munich, Germany, 8/2008

T. Pedersen, "Contributions in radio channel sounding, modeling, and estimation," Aalborg University, Denmark, 1/2009

A. Özgür, "Capacity of wireless ad-hoc networks," EPFL, Lausanne, Switzerland, 9/2009

L. Mroueh, "On space time coding design and multiuser multiplexing gain over selective channels," ENST Paris, 1/2010

M. Badr, "Space-time block codes construction for MIMO multiple-access channels," ENST Paris, 2/2010

R. Zakhour, "Aspects of limited feedback, cooperation and coordination in multi-antenna cellular systems," Institut Eurecom, Sophia-Antipolis, France, 4/2010

M. Dörpinghaus, "On the achievable rate of stationary fading channels," RWTH Aachen, Aachen, Germany, 4/2010

M. Myllylä, "Detection algorithms and architectures for wireless spatial multiplexing in MIMO-OFDM systems," Univ. of Oulu, Oulu, Finland, 1/2011

A. Jung, "An RKHS approach to estimation with sparsity constraints," Vienna Univ. of Technology, Vienna, Austria, 5/2011

E. Pauwels, "Pseudodifferential operators, wireless communications and sampling theorems," Univ. of Vienna, Vienna, Austria, 12/2011

Participation in international search committees

Vienna University of Technolgy, Austria, Professorship in *Telecommunications services*, 2003

Helsinki University of Technology, Finland, 2 Professorships in *Communications*, 2004

EPFL, Switzerland, Professorship in *Signal Processing*, 2008

KTH Stockholm, Sweden, Professorship in *Communication Theory*, 2010

Editorships

Associate editor for *IEEE Transactions on Signal Processing* in the area of *communications*, 5/2000-5/2005

Associate editor for *IEEE Transactions on Wireless Communications* in the area of *physical layer techniques*, 2/2002-12/2005

Associate editor for *EURASIP Journal on Applied Signal Processing*, 7/2003-6/2005

Member of editorial board of *Foundations and Trends in Networking*, since 1/2005

Associate editor for *IEEE Transactions on Information Theory* in the area of *detection and estimation*, 6/2007-5/2010

Member of editorial board of *IEEE Signal Processing Magazine*, since Jan. 2012

Guest editor for a special issue on "Signal Processing for Multiple-Input Multiple-Output (MIMO) Wireless Communications Systems," in the *IEEE Transactions on Signal Processing*, Nov. 2003

Guest editor for a special section in *Signal Processing* (EURASIP) entitled "From Signal Processing Theory to Implementation," July 2003

Conference organization

Co-Chair of *Advanced Signal Processing in Communications Symposium*, *IEEE International Conference on Communications (ICC)*, Anchorage, AK, USA, May 2003

Co-Chair of *Communication Theory Symposium*, *IEEE Global Telecommunications Conference (GLOBECOM)*, San Francisco, CA, USA, Dec. 2003

Co-Chair of *2004 International Zurich Seminar on Communications (IZS)*, Zurich, Switzerland, Feb. 2004

Member of advisory committee for *2004 Workshop on Smart Antennas in Wireless Communications*, Stanford University, Stanford, CA, USA, July 2004

Member of organizing committee for *UngerboeckFest (in honor of Dr. G. Ungerböck's 65th birthday)*, Hertenstein, Switzerland, May 2005

Member of international advisory committee for *2005 International Workshop on Convergent Technologies (IWCT)*, Oulu, Finland, June 2005

Co-Chair of *2006 International Zurich Seminar on Communications (IZS)*, Zurich, Switzerland, Feb. 2006

Technical program co-chair of *2006 IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Cannes, France, July 2006

Special sessions and plenary talks co-chair of *European Signal Processing Conference (EUSIPCO)*, Florence, Italy, Sept. 2006

Co-chair of *Joint Workshop on Coding and Communications (JWCC)*, Dürnstein, Austria, Oct. 2007

Panel sessions co-chair of *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Las Vegas, NV, USA, 2008

Technical program co-chair of *IEEE International Symposium on Information Theory (ISIT) 2008*, Toronto, Canada, 2008

Co-chair of *2010 International Zurich Seminar on Communications (IZS)*, Zurich, Switzerland, March 2010

Co-chair of *Joint Workshop on Coding and Communications (JWCC)*, Santo Stefano Belbo, Italy, Oct. 2010

Co-chair of *2012 International Zurich Seminar on Communications (IZS)*, Zurich, Switzerland, March 2012

Technical program committee membership

IEEE International Symposium on Signal Processing and its Applications (ISSPA), Kuala Lampur, Malaysia, Aug. 2001

IEEE International Symposium on Wireless Personal Multimedia Communications (WPMC), Honolulu, HI, USA, Oct. 2002

IEEE Signal Processing Society Workshop on Signal Processing Advances in Wireless Communications (SPAWC), Rome, Italy, June 2003

EURASIP Conference on Video/Image Processing and Multimedia Communications, Zagreb, Croatia, July 2003

IEEE International Symposium on Signal Processing and Information Technology (ISSPIT), Darmstadt, Germany, Dec. 2003

IEEE/ITG Workshop on Smart Antennas, Munich, Germany, March 2004

SPIE Fluctuations and Noise (FaN) Conference, Gran Canaria, Spain, May 2004

IEEE Vehicular Technology Conference (VTC) Spring, Milan, Italy, May 2004

IEEE International Conference on Communications (ICC), Paris, France, June 2004

International Workshop on Wireless Ad-Hoc Networks (IWWAN), Oulu, Finland, June 2004

IEEE Signal Processing Society Workshop on Signal Processing Advances in Wireless Communications (SPAWC), Lisbon, Portugal, July 2004

European Signal Processing Conference (EUSIPCO), Vienna, Austria, Sept. 2004

International Symposium on Information Theory and its Applications (ISITA), Parma, Italy, Oct. 2004

IEEE Global Telecommunications Conference (GLOBECOM), Dallas, TX, USA, Dec. 2004

IEEE/ITG Workshop on Smart Antennas (WSA), Duisburg, Germany, Apr. 2005

International Workshop on Wireless Ad-Hoc Networks (IWWAN), London, UK, May 2005

SPIE Fluctuations and Noise (FaN) Conference, Austin, TX, USA, May 2005

IEEE WirelessCom, Maui, HI, USA, June 2005

IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC), New York, NY, USA, June 2005

EU FP6 Joint NEWCOM-ACE Workshop, Dresden, Germany, June 2005

IEEE Workshop on Statistical Signal Processing (SSP), Bordeaux, France, July 2005

IEEE International Conference on Ultra-Wideband (ICU), Zurich, Switzerland, Sept. 2005

IEEE International Symposium on Information Theory (ISIT), Adelaide, Australia, Sept. 2005

IEEE International Symposium on Personal Indoor and Mobile Radio Communications (PIMRC), Berlin, Germany, Sept. 2005

IEEE Global Telecommunications Conference (GLOBECOM), St. Louis, MO, USA, Nov. 2005

IEEE Vehicular Technology Conference (VTC) Spring, Melbourne, Australia, May 2006

IEEE International Conference on Communications (ICC), Istanbul, Turkey, June 2006

IEEE Workshop on Sensor Array and Multi-Channel Processing (SAM), Waltham, MA, USA, July 2006

IEEE/ITG Workshop on Smart Antennas (WSA), Vienna, Austria, Feb. 2007

IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC), Helsinki, Finland, June 2007

IEEE Global Telecommunications Conference (GLOBECOM), Washington DC, USA, Nov. 2007

IEEE/ITG Workshop on Smart Antennas (WSA), Darmstadt, Germany, Feb. 2008

International Zurich Seminar on Communications (IZS), Zurich, Switzerland, March 2008

IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC), Recife, Brazil, July 2008

IEEE International Symposium on Personal Indoor and Mobile Radio Communications (PIMRC), Cannes, France, Sept. 2008

International Workshop on Cooperative Wireless Communications and Networking (CONETS), London, UK, Sept. 2008

IEEE/ITG Workshop on Smart Antennas (WSA), Berlin, Germany, Feb. 2009

IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC), Perugia, Italy, June 2009

IEEE International Conference on Communications (ICC), Dresden, Germany, June 2009

IEEE International Symposium on Image and Signal Processing and Analysis, Salzburg, Austria, Sept. 2009

International Symposium on Wireless Communication Systems (ISWCS), Aachen, Germany, Nov. 2011

ITG Workshop on Smart Antennas, Dresden, Germany, March 2012

Professional activities

Scientific advisory board, *Forschungszentrum für Telekommunikation Wien (ftw)*, since 1/2010

Member of the board of governors of the *IEEE Information Theory Society*, 2009-2011

Delegate of the president of ETH Zurich for faculty searches, since 2008

Member of the MS admissions committee, Dept. of Information Technology and Electrical Engineering, ETH Zurich, since 2007

Elected member of the *IEEE Signal Processing Society's Technical Committee on Signal Processing for Communications*, 2002-2008

Officer in the *European Signal Processing Society (EURASIP)*, 9/2002-9/2006

Panel participation

Panelist at the *Fourth IEEE International Symposium on Wireless Personal Multimedia Communications (WPMC)*, Aalborg, Denmark, Sept. 2001. Panel on *"MIMO wireless systems"*

Panelist at the *Kailath Lecture and Colloquium (celebrating the 70th birthday of Prof. T. Kailath)*, Stanford, CA, June 2005. Panel on *"The next big thing in signal processing and communications"*

Panelist at the *IEEE Information Theory Workshop (ITW)*, Taormina, Sicily, Oct. 2009. Panel on *"The impact of information theory on technology development"*

Tutorials

Half-day tutorial (with A. Paulraj) on "Signal processing challenges in multi-antenna communication theory," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2001, Salt Lake City, UT, USA

Half-day tutorial on "Adaptive/smart antennas and arrays," *IEEE International Conference on Third Generation Wireless and Beyond*, May 2001, San Francisco, CA, USA

Half-day tutorial on "MIMO-OFDM for broadband wireless access," *IEEE Vehicular Technology Conference (VTC) Fall*, Oct. 2001, Atlantic City, NJ, USA

Half-day tutorial on "MIMO systems," *IEEE International Symposium on Spread Spectrum Techniques and Applications (ISSSTA)*, Sydney, Australia, Sept. 2004

Half-day tutorial (with Dr. R. U. Nabar) on "Fundamental performance limits of ad-hoc wireless networks," *International Workshop on Wireless Ad-hoc Networks (IWWAN)*, London, UK, May 2005

Short courses and industry courses

One-day course (together with A. Paulraj) on *"Fixed broadband wireless access,"* taught on Apr. 5, 2000 at Sprint Advanced Technology Labs (ATL), Burlingame, CA, USA

One-day course on *"Space-time coding,"* taught on (i) Oct. 7, 2002 at Aalborg University, Denmark, and (ii) Oct. 16, 2002 at Université Catholique de Louvain, Belgium

Two-day course on *"MIMO wireless for next generation WLANs and cellular networks,"* taught on Aug. 25/26, 2003 at Elektrobit Ltd., Oulu, Finland

Four-day course on *"MIMO wireless,"* taught on Sept. 9/10/16/17, 2003 at Nokia Research Center (NRC) Bochum, Germany

Two-day course on *"MIMO systems,"* taught on Oct. 7/8, 2004 at University of Rennes, France

Short course on *"Basics of MIMO wireless communications,"* Oct. 13, 2005, PRIMO Doctoral school (organized by Politecnico di Torino), Bressanone, Italy

Short course on *"Communication over noncoherent underspread fading channels,"* March/April 2009, Winter School on Coding and Information Theory, Loen, Norway

Three-day course on *"Compressed sensing,"* July 2010, Univ. of Erlangen, Erlangen, Germany

Short course on *"Compressed sensing,"* March 2011, Winter School on Coding and Information Theory, Barcelona, Spain

II. PUBLICATIONS AND PATENTS

5 representative papers marked with ∗

1. Edited book

1.1 H. Bölcskei, D. Gesbert, C. Papadias, and A. J. van der Veen, eds., "Space-time wireless systems: From array processing to MIMO communications," Cambridge University Press, 2006.

2. Invited book chapters

2.1 V. I. Morgenshtern and H. Bölcskei, "A short course on frame theory," *Mathematical Foundations for Signal Processing, Communications, and Networking*, E. Serpedin, T. Chen, and D. Rajan, eds., CRC Press, 2011.

2.2 G. Durisi, V. I. Morgenshtern, H. Bölcskei, U. G. Schuster, and S. Shamai (Shitz), "Information theory of underspread WSSUS channels," *Wireless Communications over Rapidly Time-Varying Channels*, F. Hlawatsch and G. Matz, eds., Academic Press, 2011, pp. 65-116.

2.3 H. Bölcskei, "Principles of MIMO-OFDM wireless systems," in *Signal Processing for Mobile Communications Handbook*, M. Ibnkahla, ed., CRC Press, 2004, pp. 12.1-12.22.

2.4 H. Bölcskei, "Orthogonal frequency division multiplexing based on offset QAM," in *Advances in Gabor Analysis*, H. G. Feichtinger and T. Strohmer, eds., Birkhäuser, 2003, pp. 321-352.

2.5 H. Bölcskei and A. J. Paulraj, "Multiple-input multiple-output (MIMO) wireless systems," in *The Communications Handbook*, 2nd edition, J. Gibson, ed., CRC Press, 2002, pp. 90.1 - 90.14.

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