Ao. Univ.-Prof. Dipl.-Ing. Dr. Franz Hlawatsch

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CURRICULUM VITAE, PUBLICATIONS, AND LECTURES

January 26, 2015

I. TWO-PAGE SUMMARY

Personal details: Born 1959; Austrian nationality; married, two children

Education: Diploma and doctoral studies in electrical engineering/communications engineering, Vienna University of Technology; diploma and doctoral degrees summa cum laude

Academic career: Ao. Univ.-Prof. (tenured) at Vienna University of Technology; Univ.-Dozent degree (*venia docendi*) for "Signal Processing"

Current research interests:

- Statistical signal processing
- Distributed signal processing in sensor networks
- Sparsity-aided signal processing
- Signal processing for wireless communications

Current teaching:

- Digital Communications 1 (modulation and detection)
- Digital Communications 2 (channel coding)
- Information Theory for Communications Engineers
- Parameter Estimation Methods
- Signal Processing Seminar
- Research Projects in Advanced Signal Processing

Publications: 2 books, 3 edited books, 16 book contributions, 2 invited review papers, 54 papers in refereed international journals, 150 papers in proceedings of international conferences and workshops

Patents: (i) Technique and Equipment for Blind Equalization of Signals Transmitted over Time-varying Transmission Channels; (ii) Technique and Transmit/Receive Equipment for Transmission of Data Streams; (iii) Method of Equalizing a Multicarrier Signal for Intercarrier Interference

National research grants: Acquisition or co-acquisition and technical (co-)management of 13 research grants funded by the Austrian Science Fund (FWF) and by the Vienna Science and Technology Fund (WWTF). Total amount of research funds obtained: EUR 2.740.560

EU projects: Participation in two EU projects: FP5/IST project ANTIUM on interference analysis/identification in cellular wireless communications networks; FP6/IST project MASCOT on multiuser MIMO communication systems. Total amount of research funds obtained: EUR 822.334

Visiting positions:

- 13-month stay with the Department of Electrical Engineering, University of Rhode Island, RI, USA
- Two one-month stays with Ecole Nationale Supérieure d'Electrotechnique, d'Electronique, d'Informatique et d'Hydraulique de Toulouse (ENSEEIHT), Toulouse, France

- One-month stay with Institut de Recherche en Communication et Cybernétique de Nantes (IRCCyN), Ecole Centrale de Nantes, France

Other professional activities:

- Associate Editor for the *IEEE Transactions on Signal and Information Processing over Networks* (2014–2017)
- Tutorial speaker at the *IEEE 2013 Workshop on Advanced Information Processing for Wireless Communication Systems*
- Associate Editor for the *IEEE Transactions on Information Theory* (2008–2011)
- Co-organizer of the invited special session "Transceiver Processing for Doubly Selective Channels" at the *14th European Signal Processing Conference (EUSIPCO-06)* and of the special session "Sparsity in Signal Processing" at the *16th European Signal Processing Conference (EUSIPCO-08)*
- Member of the IEEE Signal Processing for Communications Technical Committee (2004–2009)
- Associate Editor for the *IEEE Transactions on Signal Processing* (2003–2007)
- Co-organizer and teacher of two industry courses, "Two-Day Tutorial on MIMO Communication Systems" and "Two-Day Tutorial on OFDM Communication Systems" (Siemens AG, Vienna, Austria, 2004 and 2005)
- Technical Co-chair of the *12th European Signal Processing Conference (EUSIPCO-04)*
- Teacher at the *Ecole pré-doctorale de physique "Traitement du signal—développements récents"* (Les Houches, France, 1993) and the *Summer School "Wavelet and Multifractal Analysis 2004"* (Institut d'Études Scientifiques de Cargèse, Corsica, France, July 2004)
- Member of the Technical Committees of IEEE ISIT (2013), IEEE SPAWC (2003, 2005–2010, 2012), IEEE SSP (2007, 2011), IEEE/ITG WSA (2004, 2008–2014), IEEE TFTS (1996), EUSIPCO (2006–2009), International Zurich Seminar (2014, 2016), IEEE ICC/ANLN Workshop (2013–2015), CoSeRa 2015
- Keynote speaker at the *1995 UK Symposium on Applications of Time-Frequency and Time-Scale Methods*
- Tutorial speaker at the *IEEE 1994 International Symposium on Time-Frequency and Time-Scale Analysis*

Awards and honors:

- Fellow of the IEEE (*Institute of Electrical and Electronics Engineers*)
- Coauthor of a paper that received an IEEE Signal Processing Society Young Author Best Paper Award (2001)
- Coauthor of a paper that received a Best Student Paper Award at IEEE ICASSP 2011

II. CURRICULUM VITAE

Personal details

Born on June 27, 1959 in Vienna, Austria; Austrian nationality

Married to Renate Hlawatsch-Mauser, née Mauser

Two children (born 1993 and 1995)

Education

June 1988: Engineering Doctorate (summa cum laude) from Vienna University of Technology. Doctoral dissertation: "A Study of Bilinear Time-Frequency Signal Representations, with Applications to Time-Frequency Signal Synthesis." Thesis advisor: Univ.-Prof. Dr. W. Mecklenbräuker

1983–1988: Doctoral studies in Electrical Engineering/Communications Engineering, Vienna University of Technology

June 1983: Engineering Diploma (summa cum laude) from Vienna University of Technology

1977–1983: Studies in Electrical Engineering/Communications Engineering, Vienna University of Technology

June 1977: High school graduation with honors

1969–1977: High school in Vienna

Academic career

since Oct. 1997: Ao. Univ.-Prof. (tenured) with the Institute of Telecommunications (formerly Institute of Communications and Radio-Frequency Engineering), Vienna University of Technology

May 1996: Univ.-Dozent degree (*venia docendi*) for "Signal Processing" from Vienna University of Technology. Habilitation thesis: "Time-Frequency Analysis and Synthesis of Linear Signal Spaces, with Signal Processing Applications" (appeared as: F. Hlawatsch, *Time-Frequency Analysis and Synthesis of Linear Signal Spaces: Time-Frequency Filters, Signal Detection and Estimation, and Range-Doppler Estimation*. Boston, MA: Kluwer, 1998)

Jan. 1986 – May 1996: Research and Teaching Assistant (Universitätsassistent) with the Institute of Communications and Radio-Frequency Engineering, Vienna University of Technology

Sept. 1983 – Dec. 1985: Research Assistant with the Institute of Communications and Radio-Frequency Engineering, Vienna University of Technology

Visiting positions

July 2001 and July 1999: Visiting researcher with Ecole Nationale Supérieure d'Electrotechnique, d'Electronique, d'Informatique et d'Hydraulique de Toulouse (ENSEEIHT), Toulouse, France

July 2000: Visiting researcher with Institut de Recherche en Communication et Cybernétique de Nantes (IRCCyN), Ecole Centrale de Nantes, France

Feb. 1991 – March 1992: Visiting researcher with the Department of Electrical Engineering, University of Rhode Island, RI, USA; funded by Erwin Schrödinger Research Fellowship J0530-TEC, "Time-Frequency Methods for Detection and Estimation," given by the Austrian Science Fund (FWF)

Industrial work experience

1984–1985: Consulting for the Austrian company *AKG Acoustics* (application of time-frequency methods to the analysis and design of electroacoustic transducers)

1983–1988: Consulting for the Austrian company *Schrack Elektronik AG* (design of voiceband data modems)

Awards and honors

Fellow of the IEEE (*Institute of Electrical and Electronics Engineers*)

The paper "Performance bounds for sparse parametric covariance estimation in Gaussian models" by A. Jung, S. Schmutzhard, F. Hlawatsch, and A. O. Hero III received a Best Student Paper Award at IEEE ICASSP 2011

The paper "Frame-theoretic analysis of oversampled filter banks" by H. Bölcskei, F. Hlawatsch, and H. G. Feichtinger (*IEEE Trans. Signal Processing*, vol. 46, Dec. 1998) received an IEEE Signal Processing Society Young Author Best Paper Award (2001)

Acquisition of research grants

(EU projects: see next section)

2015–2017: FWF Grant P 27379-N30, "Random Finite Set Methods for Network-Based Bayesian Estimation" granted by the Austrian Science Fund (FWF); funding: EUR 322.560

2011–2014: WWTF Grant ICT10-066, "NOWIRE – Noncoherent Wireless Communications over Doubly Selective Channels," granted by the *Wiener Wissenschafts-, Forschungs- und Technologiefonds* (WWTF); funding: EUR 354.500; total NOWIRE funding: EUR 698.000; co-acquisition with project partners E. Riegler, K. Gröchenig, and T. Zemen; Principal Investigator: E. Riegler

2008–2014: FWF Grant S10603, "Statistical Inference" within the National Research Network "SISE – Signal and Information Processing in Science and Engineering," granted by the Austrian Science Fund (FWF); funding: EUR 631.546

2008–2013: WWTF Grant MA 07-004 "SPORTS – Sparse Signals and Operators: Theory, Methods, and Applications," granted by the *Wiener Wissenschafts-, Forschungs- und Technologiefonds* (WWTF); funding: EUR 304.000; total SPORTS funding: EUR 505.000; co-acquisition with project partners C. Haisch, H. Rauhut, and G. Tauböck; Principal Investigator: G. Tauböck

2005–2009: WWTF Grant MA-44 "MOHAWI – Modern Harmonic Analysis Methods for Advanced Wireless Communications," granted by the *Wiener Wissenschafts-, Forschungs- und Technologiefonds* (WWTF); funding: EUR 249.475; total MOHAWI funding: EUR 500.000; project partners: K. Gröchenig and H. G. Feichtinger (Numerical Harmonic Analysis Group, University of Vienna)

2002–2004: FWF Grant P15156, "Advanced Multicarrier Systems for Wireless Communications," granted by the Austrian Science Fund (FWF); funding: EUR 210.979

1997–2002: FWF Grant P12228-TEC, "Oversampled Filter Banks and Redundant Signal Expansions," granted by the Austrian Science Fund (FWF); funding: EUR 117.439

1997–2001: FWF Grant P11904-ÖPY, "Time-Frequency Processing and Modeling of Nonstationary Random Processes," granted by the Austrian Science Fund (FWF); funding: EUR 113.951

1995–1997: FWF Grant P10531-ÖPH, "Matched Time-Frequency Signal Representations," granted by the Austrian Science Fund (FWF); funding: EUR 84.373

1994–1996: FWF Grant P10012-ÖPH, "Time-Frequency Methods for Statistical Signal Processing," granted by the Austrian Science Fund (FWF); funding: EUR 108.646

1991–1992: FWF Erwin Schrödinger Research Fellowship J0530-TEC, "Time-Frequency Methods for Detection and Estimation," granted by the Austrian Science Fund (FWF); funding: EUR 21.657

1990–1993: FWF Grant P7354-PHY, "Time-Frequency Signal Processing," granted by the Austrian Science Fund (FWF); funding: EUR 103.050

1985–1989: FWF Grant P5466, "Computer Algorithms for the Time-Frequency Analysis of Natural Signals," granted by the Austrian Science Fund (FWF); funding: EUR 118.384

EU projects

2006–2008: Participation in the 3-year EU/FP6/IST project MASCOT (Multiple Access Space-Time Coding Testbed). Project goal: Development and VHDL implementation of transceiver techniques for multiuser MIMO communication systems. Funding: EUR 498.100,– (total MASCOT funding: EUR 3.090.000,–). Project partners: Forschungszentrum Telekommunikation Wien (FTW), Nokia, Fraunhofer Institute for Communications/Heinrich Hertz Institute, Politecnico di Torino, Swiss Federal Institute of Technology (ETH Zurich), Fundaci Barcelona Media Universitat Pompeu Fabra; Principal Investigator: G. Matz

2001–2003: Participation in the 3-year EU/FP5/IST project ANTIUM (Advanced Radio Network Identification Equipment for Universal Mobile Communications). Project goal: Development of algorithms and a demonstrator unit for interference analysis/identification within UMTS mobile communications networks and future cellular DVB-T networks. Funding: EUR 324.234,– (total ANTIUM funding: EUR 2.144.950,–). Project partners: Thales, Télédiffusion de France, Bouygues Telecom, Telefonica I+D, Université de Marne la Vallée

Patents

Austrian patent AT 511.343, "Verfahren zum Entzerren eines Mehrträgersignals hinsichtlich Interträgerinterferenz" ("Method of Equalizing a Multicarrier Signal for Intercarrier Interference"), with G. Matz, G. Tauböck, T. Hrycak, M. Hampejs, K. Gröchenig, A. Klotz, and H. G. Feichtinger, Nov. 2012

Patent AT410870 B, "Verfahren und Einrichtung zum blinden Entzerren von über zeitvariante Übertragungskanäle übertragenen Signalen" ("Technique and Equipment for Blind Equalization of Signals Transmitted over Time-varying Transmission Channels"), with H. Artés, Aug. 2003

Patent AT410738 B, "Verfahren zum Übertragen von Datenströmen sowie Sende- und Empfangseinrichtungen hiefür" ("Technique and Transmit/Receive Equipment for Transmission of Data Streams"), with H. Artés, July 2003

Current teaching

(See also section "Class lectures." The courses are being held at Vienna University of Technology.)

since 2014: Participation in the annual 1-semester course "Datenkommunikation" ("Data Communications")

https://tiss.tuwien.ac.at/course/courseDetails.xhtml?windowId=ee3&courseNr=389153&semester=2015S

since 2005: Annual 1-semester course "Digital Communications 1" (in English)

https://tiss.tuwien.ac.at/course/courseDetails.xhtml?windowId=1ab&courseNr=389163&semester=2015S

since 2005: Annual 1-semester course "Digital Communications 2" (in English)

https://tiss.tuwien.ac.at/course/courseDetails.xhtml?windowId=1ab&courseNr=389164&semester=2014W

since 2000: Annual 1-semester course "Information Theory for Communications Engineers" (in English)

https://tiss.tuwien.ac.at/course/courseDetails.xhtml?windowId=aca&courseNr=389032&semester=2014W

since 1997: Annual 1-semester course "Parameter Estimation Methods" (in English)

https://tiss.tuwien.ac.at/course/courseDetails.xhtml?locale=en&windowId=1ab&courseNr=389119&semester=2014S

since 2008: Annual 1-semester seminar "Signal Processing Seminar" (in English)

https://tiss.tuwien.ac.at/course/courseDetails.xhtml?windowId=dcc&courseNr=389176&semester=2014S

since 1997: Annual seminar course "Research Projects in Advanced Signal Processing" (in English)

https://tiss.tuwien.ac.at/course/courseDetails.xhtml?windowId=26d&courseNr=382012&semester=2014S

Past teaching

(See also section "Class lectures." The courses were held at Vienna University of Technology unless specified otherwise.)

2010: 4-day block course "Bayesian Estimation Theory and Methods: An Introduction" at Brno University of Technology, Brno, Czech Republic

2005–2006: Annual 1-semester course "Verarbeitung stochastischer Signale" ("Processing of Stochastic Signals")

1998–2004: Annual 2-semester course "Übertragungsverfahren I + II" on analog and digital communications techniques

2002: 3-day block course "The Importance of Being Underspread: A Time-Frequency Paradigm for Nonstationary Statistical Signal Processing and Communications" at Ecole Polytechnique Fédérale de Lausanne, Switzerland

1992–1999: Annual 1-semester course "Time-Frequency Methods for Signal Processing" (in English)

1997: 2-week block course on parameter estimation methods at Technische Universität Ilmenau, Germany

1995: Design of laboratory exercises on stochastic processes

1993–1998: Supervision of annual 1-semester exercise course on digital communications techniques

1993: 1-week block course on time-frequency methods at Ecole pré-doctorale de physique "Traitement du signal—développements récents" (Les Houches, France)

1991: 1-semester course "Time-Frequency Methods for Signal Processing" at University of Rhode Island, RI, USA

1989–1990 and 1992: Supervision of annual 1-semester exercise course on probability and random variables/processes

1988: Supervision of laboratory exercises on digital communications

1987: Design of laboratory exercises on digital communications

1986–1990, 1992, and 1997: Supervision of laboratory exercises on stochastic processes

1978–1982: Supervision of three exercise courses on mathematics

Supervision of doctoral dissertations

G. Koliander, "Information-Theoretic Analysis of Noncoherent Block-Fading Channels and Singular Random Variables" (ongoing)

F. Meyer, "Navigation and Tracking in Networks: Distributed Algorithms for Estimation and Information-Seeking Control" (ongoing)

O. Hlinka, "Distributed Particle Filtering in Networks of Agents" (2012)

G. Kail, "Markov Chain Monte Carlo Methods for Detection and Estimation with Structural Constraints" (2012)

A. Jung, "An RKHS Approach to Estimation with Sparsity Constraints" (2011)

D. Seethaler, "Efficent Near-Optimum Detection Algorithms for MIMO Communication Systems" (2006)

M. Jachan, "Time-Frequency-Autoregressive-Moving-Average Modeling of Nonstationary Processes" (2006)

L. Cottatellucci, "Low Complexity Multiuser Detectors for Randomly Spread CDMA Systems" (2006)

D. Schafhuber, "Wireless OFDM Systems: Channel Prediction and System Capacity" (2004)

K. Kopsa, "Space-Time Processing for UMTS/TDD" (co-supervision, 2003)

H. Artés, "Algorithms for Time-Varying Channels: Scattering Function Estimation and Blind Equalization" (2003)

G. Matz, "A Time-Frequency Calculus for Time-Varying Systems and Nonstationary Processes with Applications" (2000)

T. Twaroch, "Signal Representations and Group Theory" (1999)

H. Bölcskei, "Oversampled Filter Banks and Predictive Subband Coders" (1997)

W. Kozek, "Matched Weyl-Heisenberg Expansions of Nonstationary Environments" (co-supervision, 1997)

W. Krattenthaler, "Signal Synthesis Algorithms for Non-smoothed and Smoothed Wigner Distributions" (co-supervision, 1990)

Supervision of diploma theses

T. Tandogan, "Collision-free Indoor Navigation Using an Artificial Potential Field Controller" (ongoing)

G. Pichler, "Information Theory on Rectifiable Sets" (2013)

R. Karrer, "A Finite Random Set Method for Distributed Multi-Target Tracking in the Presence of Multi-Path Propagation" (2013)

B. Kausl, "Channel Aware Inference Based on the Fisher Information" (2012)

F. Meyer, "MIMO Detection Using Soft Heuristics" (2011)

I. Krastanov, "Self-localization in Sensor Networks Using Nonparametric Belief Propagation" (2010)

N. Siljak, "Noncoherent Communications over Time-Frequency-Selective Channels" (2009)

A. Jung, "Sparse Methods in Statistical Signal Processing" (2008)

G. Kail, "Bayesian Sampling Methods for Optical Coherence Tomography" (2007)

E. Hinterberger, "Semidefinite Relaxation Techniques for MIMO Detection" (2006)

F. Büchinger, "Dispersionsentzerrung in der Optischen Kohärenztomographie" (2006)

M. Wrulich, "Capacity Analysis of MIMO Systems" (2006)

C. Novak, "Optical Coherence Tomography: Signal Modeling and Processing" (2006)

T. Danzer, "Exploiting Subcarrier Correlations to Reduce Complexity of MIMO-OFDM Receivers" (2005)

H. Wendt, "Support Vector Machines for Regression Estimation and Their Application to Chaotic Time Series Prediction" (2005; co-supervised at ENS Lyon, France)

A. Skupch, "Free Probability and Random Matrices: Theory and Applications to MIMO Communication Systems" (2005)

N. Czink, "Optimal Training for MIMO Wireless Channels" (2004)

H. Perko, "Robust Nonstationary Detection with Application to Seismic Data" (2003)

B. Hofer, "Adaptive Robuston Filters" (2003)

M. Hartmann, "Multipulse-Multicarrier Systems for Wireless Communications" (2003)

A. Raidl, "Robust Time-Frequency Methods for Nonstationary Detection and Estimation" (2003)

D. Seethaler, "Space-Time Algorithms for Multiuser Detection" (2002)

A. Sheikholeslami, "Analysis and Implementation of Spatial Models for Time-Variant Mobile Radio Channels" (2002)

M. Weisenhorn, "Optimal Receivers for Multipulse PAM" (2001)

M. Jachan, "Time-Varying Parametric Models for Linear Systems and Random Processes" (2001)

D. Schafhuber, "Time-Varying Channel Estimation for OFDM Systems" (1999)

A. Huber, "Techniques for Blind Identification and Equalization of Mobile Radio Channels" (1999)

G. Tauböck, "Covariance Theory of Joint Signal Representations" (1999)

L. Navarro de Lara, "Optimum Time-Frequency Expansions of Locally Stationary Processes" (1997)

H. Artés, "Iterative Methods for Noise Reduction in Oversampled A/D Conversion" (1997)

G. Berger, "Time-Frequency Techniques for Signal Detection" (1995)

K. Vavrina, "Linear Time-Frequency Filters" (1995)

G. Matz, "Time-Varying Spectral Analysis" (1994)

H. Bölcskei, "Gabor Expansion and Frame Theory" (1994)

H. Kirchauer, "Optimal Filters for Signal Enhancement: Time-Frequency Analysis and Design" (1994)

P. Podlucky, "Multi-Pulse Range-Doppler Estimator" (1993)

M. Spandl, "Analysis of Time-Varying Systems Using Weyl Symbol and Zadeh Function" (1993)

H. Fitz, "Time-Frequency Filters" (1991)

S. Schandl, "Time-Frequency Synthesis of Signals and Signal Spaces with Signal Space Constraints" (1990)

H. Bernkopf, "Synthesis of Signal Spaces Using the Pseudo Wigner Distribution" (1990)

R. Urbanke, "Time-Frequency Signal Analysis Using the Exponential Distribution and the 'Reduced Interference' Distributions" (1990)

W. Kozek, "Time-Frequency Signal Decomposition" (1990)

J. F. Prinz, "Interactive Surface Editor for Time-Frequency Signal Processing" (1990)

W. Wokurek, "Representation and Analysis of Speech Signals Using Wigner Distribution and Spectrogram" (1986)

W. Grech, "Surface Editor for the Wigner Distribution" (1986)

M. Bauer, "Graphical Signal Editor" (1986)

W. Krattenthaler, "Analysis of the Signal Synthesis Algorithm for Modified Wigner Distributions" (1985)

Participation in habilitation committees

P. Bianchi, "Performances asymptotiques de systèmes de communications numériques et de réseaux de capteurs," Télécom ParisTech/Université de Paris-Est, France, 2011

W. Hachem, "Performances asymptotiques de systèmes de communication," Université de Paris 11/Supélec, France, 2006

G. Matz, "Time-Varying Linear Systems in Wireless Communications," Vienna University of Technology, Austria, 2004

Participation in extramural PhD thesis committees

C. Lin, "P and T Wave Analysis in ECG Signals Using Bayesian Methods," Institut National Polytechnique de Toulouse, France, 2012

A. Jarrot, "Time-Frequency Filtering of Signals with Nonlinear Modulation of the Instantaneous Phase," Université de Bretagne Occidentale, Brest, France, 2007

M. Weisenhorn, "Low-Complexity Techniques for Ultra-Wideband Communication Systems" Munich University of Technology, Germany, 2007

M. Davy, "Classification of Nonstationary Signals in the Time-Frequency Plane," Ecole Centrale de Nantes, France, 2000

M. Durnerin, "An Interpretation Strategy for Spectral Analysis," Institut National Polytechnique de Grenoble, France, 1999

M. Chabert, "Detection and Estimation of Abrupt Changes Corrupted by Multiplicative Noise—Classical and Time-Scale Approaches," Institut National Polytechnique de Toulouse, France, 1997

P. Gonçalvès, "Time-Frequency and Time-Scale Representations: Synthesis and Contributions," Institut National Polytechnique de Grenoble, France, 1993

Other professional activities

2014–2017: Associate Editor for the *IEEE Transactions on Signal and Information Processing over Networks*

Nov. 2013: Tutorial speaker at the *IEEE 2013 Workshop on Advanced Information Processing for Wireless Communication Systems*, Copenhagen, Denmark

2008–2011: Associate Editor for the *IEEE Transactions on Information Theory*

2008: Co-organizer of the special session "Sparsity in Signal Processing" at the *16th European Signal Processing Conference (EUSIPCO-08)*, Lausanne, Switzerland, Aug. 2008

2006: Organizer of a workshop on the occasion of the retirement of Prof. W. Mecklenbräuker, Vienna, Austria, Nov. 2006

2006: Co-organizer of the invited special session "Transceiver Processing for Doubly Selective Channels" at the *14th European Signal Processing Conference (EUSIPCO-06)*, Florence, Italy, Sept. 2006

2004–2009: Member of the *IEEE Signal Processing for Communications Technical Committee (IEEE SPCOM-TC)*

2003–2007: Associate Editor for the *IEEE Transactions on Signal Processing*

2004 and 2005: Co-organizer and teacher of two industry courses, "Two-Day Tutorial on MIMO Communication Systems" and "Two-Day Tutorial on OFDM Communication Systems," taught at Siemens AG, Vienna, Austria.

2004: Technical Program Co-chair of the *12th European Signal Processing Conference (EUSIPCO-04)*, Vienna, Austria, Sept. 2004

Aug. 1995: Keynote speaker at the *1995 UK Symposium on Applications of Time-Frequency and Time-Scale Methods*, Coventry, UK

Oct. 1994: Tutorial speaker at the *IEEE 1994 International Symposium on Time-Frequency and Time-Scale Analysis*, Philadelphia, PA

Member of the Technical Committees of

- *IEEE ISIT—Int. Sympos. on Information Theory* (2013)
- *IEEE ICC/ANLN—Int. Conf. on Communications/Workshop on Advances in Network Localization and Navigation* (2013–2015)
- *IEEE SPAWC—Workshop on Signal Processing Advances in Wireless Communications* (2003, 2005–2010, 2012)
- *IEEE SSP—Statistical Signal Processing Workshop* (2007, 2011)
- *IEEE/ITG WSA—Workshop on Smart Antennas* (2004, 2008–2014)
- *IEEE TFTS—Int. Sympos. on Time-Frequency and Time-Scale Analysis* (1996)
- *EUSIPCO—European Signal Processing Conference* (2006–2009)
- *International Zurich Seminar* (2014, 2016)
- *CoSeRa—Int. Workshop on Compressed Sensing Theory and its Applications to Radar, Sonar and Remote Sensing* (2015)

III. PUBLICATIONS

Books

2. F. Hlawatsch, *Time-Frequency Analysis and Synthesis of Linear Signal Spaces: Time-Frequency Filters, Signal Detection and Estimation, and Range-Doppler Estimation*. Boston, MA: Kluwer, 1998.

1. H. Weinrichter and F. Hlawatsch, *Stochastische Grundlagen nachrichtentechnischer Signale*. Vienna, Austria: Springer-Verlag, 1991.

Edited books

4. F. Hlawatsch and G. Matz (eds.), *Wireless Communications over Rapidly Time-Varying Channels*, Academic Press, 2011.

3. F. Hlawatsch and F. Auger (eds.), *Time-Frequency Analysis: Concepts and Methods*, London, UK: ISTE/ Wiley, 2008. (English translation of 2.)

2. F. Hlawatsch and F. Auger (eds.), *Temps-fréquence: concepts et outils*, Paris, France: Hermes/Lavoisier, 2005. (English translation: see 3.)

1. W. Mecklenbräuker and F. Hlawatsch (eds.), *The Wigner Distribution: Theory and Applications in Signal Processing*, Amsterdam, The Netherlands: Elsevier, 1997.

Other editorial work

2. F. Hlawatsch, G. Matz, M. Rupp, and B. Wistawel (eds.), *Proceedings of the 12th European Signal Processing Conference (EUSIPCO-2004)*, vol. 1–3. Vienna, Austria, Sept. 2004.

1. H. Bölcskei, F. Hlawatsch, and G. Kubin (eds.), "From signal processing theory to implementation," Special Section in *Signal Processing*, vol. 83, 2003, pp. 1353–1444.

Book contributions

17. G. Matz and F. Hlawatsch, "Fundamentals of time-varying communication channels," in *Wireless Communications over Rapidly Time-Varying Channels*, eds. F. Hlawatsch and G. Matz, Academic Press, 2011, ch. 1, pp. 1–63.

16. F. Hlawatsch and G. Matz, "Time-frequency methods for non-stationary statistical signal processing," in *Time-Frequency Analysis: Concepts and Methods*, eds. F. Hlawatsch and F. Auger, London, UK: ISTE/Wiley, 2008, ch. 10, pp. 279–320. (English translation of 14.)

15. C. F. Mecklenbräuker, J. Wehinger, T. Zemen, H. Artés, and F. Hlawatsch, "Multiuser MIMO channel equalization," in *Smart Antennas—State of the Art*, Eds. T. Kaiser, A. Bourdoux, H. Boche, J. R. Fonollosa, J. Bach Andersen, and W. Utschick, EURASIP Book Series on Signal Processing and Communications, New York, NY: Hindawi, 2005, Section 1.4, pp. 53–76.

14. F. Hlawatsch and G. Matz, "Temps-fréquence et traitement statistique," in *Temps-fréquence: concepts et outils*, eds. F. Hlawatsch and F. Auger, Paris, France: Hermes/Lavoisier, 2005, ch. 10, pp. 289–330. (English translation: see 16.)

13. F. Hlawatsch and G. Matz, "Linear time-frequency filters," in *Time-Frequency Signal Analysis and Processing: A Comprehensive Reference*, ed. B. Boashash, Oxford, UK: Elsevier, 2003, ch. 11.1, pp. 466–475.

12. F. Hlawatsch and G. Matz, "Time-frequency methods for signal estimation and detection," in *Time-Frequency Signal Analysis and Processing: A Comprehensive Reference*, ed. B. Boashash, Oxford, UK: Elsevier, 2003, ch. 12.4, pp. 528–538.

11. F. Hlawatsch and G. Tauböck, "The covariance theory of time-frequency analysis," in *Time-Frequency Signal Analysis and Processing: A Comprehensive Reference*, ed. B. Boashash, Oxford, UK: Elsevier, 2003, ch. 4.3, pp. 102–113.
10. G. Matz and F. Hlawatsch, "Time-frequency characterization of random time-varying channels," in *Time-Frequency Signal Analysis and Processing: A Comprehensive Reference*, ed. B. Boashash, Oxford, UK: Elsevier, 2003, ch. 9.5, pp. 410–420.
9. G. Matz and F. Hlawatsch, "Time-frequency transfer function calculus of linear time-varying systems," in *Time-Frequency Signal Analysis and Processing: A Comprehensive Reference*, ed. B. Boashash, Oxford, UK: Elsevier, 2003, ch. 4.7, pp. 135–144.
8. G. Matz and F. Hlawatsch, "Time-varying power spectra of nonstationary random processes," in *Time-Frequency Signal Analysis and Processing: A Comprehensive Reference*, ed. B. Boashash, Oxford, UK: Elsevier, 2003, ch. 9.4, pp. 400–409.
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4. F. Hlawatsch and W. Kozek, "Zeit-Frequenz-Filter," in *Proc. ITG-Diskussionssitzung "Neue Anwendungen theoretischer Konzepte in der Elektrotechnik,"* Hannover, Germany, pp. 115–120, Feb. 1990 (Ed. W. Mathis, Universitätsverlag Ulm, 1991).

3. W. Wokurek, F. Hlawatsch, and G. Kubin, "Hochauflösende Zeit-Frequenz-Analyse von Sprachsignalen," in *Proc. DAGA-87*, Aachen, Germany, pp. 633–636, March 1987.

2. P. Skritek and F. Hlawatsch, "Untersuchung von Musik-Kompandern mittels kombinierter Zeit-Frequenz-Signaldarstellung," in *Proc. DAGA-86*, Oldenburg, Germany, pp. 381–384, March 1986.

1. F. Hlawatsch, "Pseudowignerverteilung modulierter Schwingungen," in *Proc. 5. Aachener Kolloquium*, Aachen, Germany, pp. 344–347, Sept. 1984.

IV. LECTURES

Class lectures

13. "Datenkommunikation" ("Data Communications"), course unit on Reed-Solomon codes, taught annually since 2014 at Vienna University of Technology, Austria.
12. "Bayesian estimation theory and methods: An introduction," 4-day block course taught in Sep. 2010 at Brno University of Technology, Czech Republic.
11. "Digital communications 1," 1-semester course on modulation and detection techniques, taught annually since 2005 at Vienna University of Technology, Austria.
10. "Digital Communications 2," 1-semester course on channel coding techniques, taught annually since 2005 at Vienna University of Technology, Austria.
9. "Verarbeitung stochastischer Signale" ("Processing of stochastic signals"), 1-semester course taught in 2005 and 2006 at Vienna University of Technology, Austria.
8. "Übertragungsverfahren I + II," 2-semester course on analog and digital communication techniques, taught annually from 1998 to 2004 at Vienna University of Technology, Austria.
7. "Information theory for communications engineers," 1-semester course taught annually since 2000 at Vienna University of Technology, Austria.
6. "Parameter estimation methods," 1-semester course taught annually since 1997 at Vienna University of Technology, Austria.
5. "Time-frequency methods for signal processing," 1-semester course taught annually from 1992 to 1999 at Vienna University of Technology, Austria, and in 1991 at University of Rhode Island, RI, USA.
4. "Wavelets and affine distributions: A time-frequency perspective," 90-min. lecture taught at Summer School "Wavelet and Multifractal Analysis 2004," Institut d'Études Scientifiques de Cargèse, Corsica, France, July 2004.
3. "The importance of being underspread: A time-frequency paradigm for nonstationary statistical signal processing and communications," 3-day block course taught in June 2002 at Ecole Polytechnique Fédérale de Lausanne, Switzerland.
2. "Methoden der Parameterschätzung," 2-week block course on parameter estimation techniques, taught in July 1997 at Technische Universität Ilmenau, Germany.
1. "Time-frequency methods for signal processing," 1-week block course taught in Aug.-Sept. 1993 at Ecole pré-doctorale de physique "Traitement du signal—développements récents," Les Houches, France.

Tutorial and keynote lectures

4. "Think Global, Act Local: Distributed cooperative estimation in agent networks," 1-hour tutorial lecture held at 7th IEEE Workshop on Advanced Information Processing for Wireless Communication Systems (AIPWCS-13), Aalborg University, Aalborg, Denmark, Nov. 2013.
3. "Time-frequency signal processing: A statistical perspective," 30-min tutorial lecture held at IEEE Workshop Circuits, Systems, Signal Processing (CSSP-98), Mierlo, The Netherlands, Nov. 1998.
2. "Covariant time-frequency analysis: A unifying framework," 1-hour keynote lecture held at IEEE UK Sympos. Applications of Time-Frequency and Time-Scale Methods, University of Warwick, Coventry, UK, Aug. 1995.
1. "New concepts in quadratic time-frequency analysis," 2-hour tutorial lecture held at IEEE Int. Sympos. Time-Frequency Time-Scale Analysis, Philadelphia, PA, Oct. 1994.

Industry courses

2. "Two-day tutorial on MIMO communication systems," Siemens AG, Vienna, Austria, Sept. 2005 (with N. Czink, M. Jachan, G. Matz, and D. Seethaler).

1. "Two-day tutorial on OFDM communication systems," Siemens AG, Vienna, Austria, June 2004 (with M. Hartmann and D. Schafhuber).

Other lectures

42. "Pulse-shaping multicarrier transmission over underspread fading channels: A time-frequency perspective," Acoustics Research Institute, Austrian Academy of Sciences, Vienna, Austria, May 2012.

41. "From harmonic analysis to compressive channel estimation," invited talk, Workshop "From Abstract to Computational Harmonic Analysis: Function Spaces, Gabor Analysis, Sampling Theory and Algorithms," Strobl, Austria, June 2011.

40. "Compressive estimation of time-varying channels," Acoustics Research Institute, Austrian Academy of Sciences, Vienna, Austria, Feb. 2010.

39. "Compressive channel estimation," ITG-Fachgruppensitzung "Algorithmen für die Signalverarbeitung," Communication Technology Laboratory, Swiss Federal Institute of Technology (ETH) Zurich, Zurich, Switzerland, March 2009.

38. "The Wigner distribution: Cross terms, smoothing, and signal synthesis," Workshop "Applied Analysis and Fast Computation in Phase Space," Wolfgang Pauli Institute, University of Vienna, Vienna, Austria, Nov. 2008.

37. "Factor graph based receiver design for MIMO-IDMA communications," ITG-Fachgruppensitzung "Algorithmen für die Signalverarbeitung," Vienna University of Technology, Vienna, Austria, Oct. 2008.

36. "Pulse-shaping multicarrier transmission over underspread fading channels: A time-frequency perspective," 4th Joint Workshop on Coding and Communications (JWCC 2007), Dürnstein, Austria, Oct. 2007.

35. "Struktureigenschaften der kapazitätserzielenden Sendestatistik für Mehrträger-Kommunikation über zeit-frequenz-dispersive Kanäle," Lehrstuhl für Netzwerktheorie und Signalverarbeitung, Munich University of Technology, Germany, March 2007.

34. "Lineare Methoden zur Zeit-Frequenz-Filterung," Workshop (Festkolloquium) on the occasion of the retirement of W. Mecklenbräuker, Vienna University of Technology, Austria, Nov. 2006.

33. "Dynamic nulling-and-cancelling for efficient near-ML decoding of MIMO systems," Dipartimento Ingegneria Elettronica e Informazione, Università di Perugia, Italy, Sept. 2006.

32. "Efficient demodulation for MIMO systems based on a Gaussian approximation for the post-equalization interference," Supélec, Gif sur Yvette, France and Université de Marne la Vallée, France, Jan. 2006.

31. "Linear methods for time-frequency filtering," Workshop on Time-Frequency Analysis and Nonstationary Filtering, Banff International Research Station, Banff, Alberta, Canada, Sept. 2005.

30. "Dynamic nulling-and-cancelling with near-maximum likelihood performance for MIMO communication systems," Nachrichtentechnisches Kolloquium, Vienna University of Technology, Austria, June 2005.

29. "Time-frequency characterization of random time-varying communication channels," ESI05 Special Semester "Modern Methods of Time-Frequency Analysis," Workshop "Time-Frequency Methods for Pseudodifferential Operators," Erwin Schrödinger Institute for Mathematical Physics (ESI), Vienna, Austria, May 2005 (with G. Matz).

28. "A tutorial on time-varying communication channels," HASSIP Workshop "Application of Time Frequency Analysis in Acoustics," Acoustics Research Institute, Austrian Academy of Sciences, Vienna, Austria, Apr. 2005 (with G. Matz).

27. "Time-varying communications channels," Gabor Mini-Workshop, University of Vienna, Austria, Jan. 2005.

26. "A 'dynamic' nulling-and-cancelling algorithm for MIMO communication systems," ITG-Fachgruppensitzung "Algorithmen für die Signalverarbeitung," Ruhr-Universität Bochum, Germany, Oct. 2004.

25. "Presenting the Technical Programme of EUSIPCO-2004," Opening Address at EUSIPCO-2004, Vienna, Austria, Sept. 2004.

24. "Efficient detection algorithms for MIMO channels: A geometrical approach to approximate ML detection," Lehrstuhl für Netzwerktheorie und Signalverarbeitung, Technische Universität München, Germany, July 2004.

23. "Space-time matrix modulation: A novel scheme for communications over unknown MIMO channels," Eidgenössische Technische Hochschule (ETH) Zürich, Switzerland, June 2002.

22. "Predictive equalization of time-varying stochastic channels for OFDM systems," (i) INFOCOM Department, University of Rome "La Sapienza", Italy, Nov. 2001; (ii) Lehrstuhl für Netzwerktheorie und Schaltungstechnik, Technische Universität München, Germany, April 2001; (iii) Technische Universität Wien, Austria, Nov. 2000.

21. "Prädiktive Entzerrung zeitvarianter Kanäle in codierten OFDM/BFDM-Systemen," ITG-Fachgruppensitzung "Algorithmen für die Signalverarbeitung," Universität Bremen, Germany, Sept. 2000.

20. "Filtrage robuste non stationnaire: Théorie et formulation temps-fréquence," Laboratoire de Physique, Ecole Normale Supérieure de Lyon, France, Sept. 1999.

19. "Traitement temps-fréquence des signaux: Une perspective statistique," (i) Institut de Recherche en Communications et Cybernétique de Nantes, Ecole Centrale de Nantes, France, July 2000; (ii) Laboratoire des Images et des Signaux, Institut National Polytechnique de Grenoble, France, Sept. 1999.

18. "Zeit-Frequenz-Detektoren," Gerhard-Mercator-Universität Gesamthochschule Duisburg, Germany, Aug. 1999.

17. "A time-frequency perspective of statistical signal processing," Bell Laboratories, Lucent Technologies, Murray Hill, NJ, March 1999.

16. "Méthodes temps-fréquence pour l'estimation et la détection de processus nonstationnaires," (i) Ecole Nationale Supérieure des Télécommunications (ENST), Paris, France, March 1998; (ii) Ecole Nationale Supérieure de l'Electronique et de ses Applications (ENSEA/ETIS), Cergy-Pontoise, France, March 1998.

15. "Zeitvariante Spektren instationärer Zufallsprozesse," Technische Hochschule Darmstadt, Germany, Nov. 1997.

14. "Zeit-Frequenz-Signalanalyse mit der Wignerverteilung," Technische Hochschule Darmstadt, Germany, Nov. 1997.

13. "Zeit-Frequenz-Beschreibung linearer zeitvarianter Systeme: Theorie und Anwendungen," (i) Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, Nov. 1997; (ii) Technische Hochschule Darmstadt, Germany, Nov. 1997.

12. "Zeit-Frequenz-Analyse und -Klassifikation von Motorsignalen," (i) Universität-Gesamthochschule Paderborn, Germany, Nov. 1998; (ii) Universität Kaiserslautern, Germany, July 1998; (iii) Technische Universität Graz, Austria, Oct. 1997.

11. "Présentation d'une méthode d'analyse de signaux non stationnaires avec applications," Ecole Polytechnique Fédérale de Lausanne, Switzerland, Feb. 1997.

10. "A time-frequency perspective of nonstationary statistical signal processing," (i) Institut für Nachrichtentechnik, Universität Karlsruhe, Germany, Nov. 1996; (ii) Coordinated Science Laboratory, University of Illinois at Urbana-Champaign, IL, May 1996.

9. "Zeit-Frequenz-Signalverarbeitung," ITG-Fachgruppensitzung "Algorithmen für die Signalverarbeitung," Technische Universität Wien, Austria, Oct. 1996.

8. "Covariant time-frequency distributions," Electrical Engineering and Computer Science Dept., University of Michigan, Ann Arbor, MI, May 1995.

7. "Time-varying power spectra of nonstationary random processes," (i) Technische Universität Hamburg-Harburg, Germany, Feb. 1995; (ii) Universität Heidelberg, Germany, Feb. 1995.

6. "Filtrage temps-fréquence," Ecole Nationale Supérieure d'Electrotechnique, d'Electronique, d'Informatique et d'Hydraulique de Toulouse (ENSEEIHT), Toulouse, France, March 1994.

5. "Multipulse maximum likelihood range/Doppler estimation and the ambiguity function of a linear signal space," (i) Ruhr-Universität Bochum, Germany, July 1993; (ii) University of Rhode Island, Kingston, RI, April 1993.

4. "Constant-Q time-frequency analysis: Affine and hyperbolic time-frequency representations," AT&T Bell Laboratories, Murray Hill, NJ, April 1993.

3. "Affine and hyperbolic time-frequency representations," Wavelet Transform Workshop, Universität Wien, Austria, March 1993.

2. "Time-frequency analysis and synthesis of signal spaces," Workshop "Mathematical Methods in Signal and Image Processing," Lambrecht, Germany, July 1990.

1. "Time-frequency analysis and synthesis of linear systems and linear signal spaces," (i) Department of Electrical Engineering, University of Rhode Island, Kingston, RI, April 1990; (ii) Technical University Eindhoven, The Netherlands, Feb. 1990.