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## **CURRICULUM VITAE, PUBLICATIONS, AND LECTURES**

July 7, 2011

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

**Current teaching:**

- Modulation and Detection Techniques
- Information Theory and Coding
- Information Theory for Communications Engineers
- Parameter Estimation Methods
- Research Projects in Advanced Signal Processing (seminar course)

**Publications:** 2 books, 3 edited books, 16 book contributions, 2 invited review papers, 40 papers in refereed international journals, 135 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 (pending)

**Research grants (without EU projects):** Acquisition or co-acquisition and technical (co-)management of 12 research grants funded by the Austrian Science Fund (FWF) and by the Wiener Wissenschafts-, Forschungs- und Technologiefonds (WWTF). Total amount of research funds obtained: EUR 2.418.000

**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

**Sabbatical and visiting positions:**

- 13-month stay as Visiting Researcher/Professor with the Department of Electrical Engineering, University of Rhode Island, RI, USA
- Two one-month stays as Visiting Researcher/Professor with Ecole Nationale Supérieure d’Electrotechnique, d’Electronique, d’Informatique et d’Hydraulique de Toulouse (ENSEEIH), Toulouse, France

- One-month stay as Visiting Researcher/Professor 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 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 SPAWC (2003, 2005–2011), IEEE SSP (2007, 2011), IEEE/ITG WSA (2004, 2008–2012), IEEE TFTS (1996), EUSIPCO (2006–2009)
- 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:**

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

## II. CURRICULUM VITAE

### Personal details

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

Married to Renate Hlawatsch-Mausser, née Mausser

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

### Sabbatical and visiting positions

July 2001 and July 1999: Visiting Researcher/Professor with Ecole Nationale Supérieure d’Electrotechnique, d’Electronique, d’Informatique et d’Hydraulique de Toulouse (ENSEEIH), Toulouse, France

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

Feb. 1991 – March 1992: Visiting Researcher/Professor 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

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 the IEEE Signal Processing Society 2001 Young Author Award

since Aug. 2000: Senior Member of the *Institute of Electrical and Electronics Engineers* (IEEE)

## Acquisition of research grants

(EU projects: see next section)

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; project manager: 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

2008–2012: 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; project manager: 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 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 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 application A 9199/2008 “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 (pending, submitted June 2008)
- 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 hierfür” (“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 2005: Annual 1-semester course “Modulations- und Detektionsverfahren” (“Modulation and Detection Techniques,” in English)

<https://tiss.tuwien.ac.at/course/courseDetails.xhtml?courseNr=389078&semester=2011S>

since 2005: Annual 1-semester course “Informationstheorie und Codierung” (“Information Theory and Coding,” in English)

<https://tiss.tuwien.ac.at/course/courseDetails.xhtml?courseNr=389101&semester=2010W>

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

<https://tiss.tuwien.ac.at/course/courseDetails.xhtml?courseNr=389032&semester=2010W>

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

<https://tiss.tuwien.ac.at/course/courseDetails.xhtml?courseNr=389119&semester=2011S>

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

<https://tiss.tuwien.ac.at/course/courseDetails.xhtml?courseNr=382012&semester=2010W>

## 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 random processes

1978–1982: Supervision of three exercise courses on mathematics

### **Supervision of doctoral dissertations**

F. Meyer, “Message Passing Algorithms for Distributed Localization” (ongoing)

G. Kail, “Markov Chain Monte Carlo Methods for Estimation with Structural Constraints” (ongoing)

O. Hlinka, “Distributed Particle Filtering in Wireless Sensor Networks” (ongoing)

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

D. Seethaler, “Efficient 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

- 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 Robust 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**

- 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**

- 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. Gonçalves, “Time-Frequency and Time-Scale Representations: Synthesis and Contributions,” Institut National Polytechnique de Grenoble, France, 1993

## Other professional activities

- 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 SPAWC—Workshop on Signal Processing Advances in Wireless Communications (2003, 2005–2011)*
  - *IEEE SSP—Statistical Signal Processing Workshop (2007, 2011)*
  - *IEEE/ITG WSA—Workshop on Smart Antennas (2004, 2008–2012)*
  - *IEEE TFTS—Int. Sympos. on Time-Frequency and Time-Scale Analysis (1996)*
  - *EUSIPCO—European Signal Processing Conference (2006–2009)*

### 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 (out of print).

#### Edited books

5. F. Hlawatsch and G. Matz (eds.), *Wireless Communications over Rapidly Time-Varying Channels*, Academic Press, 2011.
4. F. Hlawatsch and F. Auger (eds.), *Time-Frequency Analysis: Concepts and Methods*, London, UK: ISTE/Wiley, 2008. (English translation of 3.)
3. F. Hlawatsch and F. Auger (eds.), *Temps-fréquence: concepts et outils*, Paris, France: Hermes/Lavoisier, 2005. (English translation: see 4.)
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. W. Mecklenbräuker and F. Hlawatsch (eds.), *The Wigner Distribution: Theory and Applications in Signal Processing*, Amsterdam, The Netherlands: Elsevier, 1997 (out of print).

#### Other editorial work

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, 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.
7. A. Papandreou-Suppappola, F. Hlawatsch, and G. F. Boudreaux-Bartels, “Power class time-frequency representations and their applications,” in *Time-Frequency Signal Analysis and Processing: A Comprehensive Reference*, ed. B. Boashash, Oxford, UK: Elsevier, 2003, ch. 15.3, pp. 643–650.
6. F. Hlawatsch, G. Tauböck, and T. Twaroch, “Covariant time-frequency analysis,” in *Wavelets and Signal Processing*, ed. L. Debnath, Boston, MA: Birkhäuser, 2003, ch. 7, pp. 177–231.
5. G. Matz and F. Hlawatsch, “Linear time-frequency filters: On-line algorithms and applications,” in *Applications in Time-Frequency Signal Processing*, ed. A. Papandreou-Suppappola, Boca Raton, FL: CRC Press, 2002, ch. 6, pp. 205–271.
4. F. Hlawatsch and G. Matz, “Quadratic time-frequency analysis of linear time-varying systems,” in *Wavelet Transforms and Time-Frequency Signal Analysis*, ed. L. Debnath, Boston, MA: Birkhäuser, 2001, pp. 235–287.
3. H. Bölcskei and F. Hlawatsch, “Oversampled modulated filter banks,” in *Gabor Analysis and Algorithms: Theory and Applications*, eds. H. G. Feichtinger and T. Strohmer, Boston, MA: Birkhäuser, 1998, pp. 295–322.
2. F. Hlawatsch and P. Flandrin, “The interference structure of the Wigner distribution and related time-frequency signal representations,” in *The Wigner Distribution: Theory and Applications in Signal Processing*, eds. W. Mecklenbräuker and F. Hlawatsch, Amsterdam, The Netherlands: Elsevier, 1997, pp. 59–133.
1. F. Hlawatsch and W. Krattenthaler, “Signal synthesis algorithms for bilinear time-frequency signal representations,” in *The Wigner Distribution: Theory and Applications in Signal Processing*, eds. W. Mecklenbräuker and F. Hlawatsch, Amsterdam, The Netherlands: Elsevier, 1997, pp. 135–209.

## Invited review papers

2. A. Papandreou-Suppappola, F. Hlawatsch, and G. F. Boudreaux-Bartels, “Quadratic time-frequency representations with scale covariance and generalized time-shift covariance: A unified framework for the affine, hyperbolic, and power classes,” *Digital Signal Processing—A Review Journal*, vol. 8, no. 1, pp. 3–48, Jan. 1998.
1. F. Hlawatsch and G. F. Boudreaux-Bartels, “Linear and quadratic time-frequency signal representations,” *IEEE Signal Processing Magazine*, vol. 9, no. 2, pp. 21–67, April 1992.

## Papers in refereed international journals

### *IEEE Transactions on Information Theory*

5. A. Jung, Z. Ben-Haim, F. Hlawatsch, and Y. C. Eldar, “Unbiased estimation of a sparse vector in white Gaussian noise,” *IEEE Trans. Inform. Theory*, to appear.

4. G. Matz and F. Hlawatsch, “Nonstationary spectral analysis based on time-frequency operator symbols and underspread approximations,” *IEEE Trans. Inform. Theory*, vol. 52, no. 3, pp. 1067–1086, March 2006.
3. H. Bölcskei and F. Hlawatsch, “Noise reduction in oversampled filter banks using predictive quantization,” *IEEE Trans. Inform. Theory*, vol. 47, no. 1, pp. 155–172, Jan. 2001.
2. F. Hlawatsch and W. Kozek, “Second-order time-frequency synthesis of nonstationary random processes,” *IEEE Trans. Inform. Theory*, vol. IT-41, no. 1, pp. 255–267, Jan. 1995.
1. F. Hlawatsch, “Regularity and unitarity of bilinear time-frequency signal representations,” *IEEE Trans. Inform. Theory*, vol. IT-38, no. 1, pp. 82–94, Jan. 1992.

*IEEE Transactions on Signal Processing*

23. G. Tauböck, M. Hampejs, P. Švač, G. Matz, F. Hlawatsch, and K. Gröchenig, “Low-complexity ICI/ISI equalization in doubly dispersive multicarrier systems using a decision-feedback LSQR algorithm,” *IEEE Trans. Signal Process.*, vol. 59, no. 5, pp. 2432–2436, May 2011. (Correspondence)
22. M. Jachan, G. Matz, and F. Hlawatsch, “Vector time-frequency AR models for nonstationary multivariate random processes,” *IEEE Trans. Signal Process.*, vol. 57, no. 12, pp. 4646–4659, Dec. 2009.
21. M. Jachan, G. Matz, and F. Hlawatsch, “Time-frequency ARMA models and parameter estimators for underspread nonstationary random processes,” *IEEE Trans. Signal Process.*, vol. 55, no. 9, pp. 4366–4381, Sep. 2007.
20. D. Seethaler, H. Artés, and F. Hlawatsch, “Dynamic nulling-and-canceling for efficient near-ML decoding of MIMO systems,” *IEEE Trans. Signal Process.*, vol. 54, no. 12, pp. 4741–4752, Dec. 2006.
19. H. Artés, G. Matz, and F. Hlawatsch, “Unbiased scattering function estimators for underspread channels and extension to data-driven operation,” *IEEE Trans. Signal Process.*, vol. 52, no. 5, pp. 1387–1402, May 2004.
18. H. Artés, D. Seethaler, and F. Hlawatsch, “Efficient detection algorithms for MIMO channels: A geometrical approach to approximate ML detection,” *IEEE Trans. Signal Process., Special Issue on MIMO Wireless Communications*, vol. 51, no. 11, pp. 2808–2820, Nov. 2003.
17. F. Hlawatsch, G. Matz, H. Kirchauer, and W. Kozek, “Time-frequency formulation, design, and implementation of time-varying optimal filters for signal estimation,” *IEEE Trans. Signal Process.*, vol. 48, no. 5, pp. 1417–1432, May 2000.
16. F. Hlawatsch, A. Papandreou-Suppappola, and G. F. Boudreaux-Bartels, “The power classes—Quadratic time-frequency representations with scale covariance and dispersive time-shift covariance,” *IEEE Trans. Signal Process.*, vol. 47, no. 11, pp. 3067–3083, Nov. 1999.
15. H. Bölcskei, F. Hlawatsch, and H. G. Feichtinger, “Frame-theoretic analysis of oversampled filter banks,” *IEEE Trans. Signal Process.*, vol. 46, no. 12, pp. 3256–3268, Dec. 1998. (IEEE Signal Processing Society Young Author Award, 2001)
14. G. Matz, F. Hlawatsch, and W. Kozek, “Generalized evolutionary spectral analysis and the Weyl spectrum of nonstationary random processes,” *IEEE Trans. Signal Process.*, vol. 45, no. 6, pp. 1520–1534, June 1997.
13. H. Bölcskei and F. Hlawatsch, “Discrete Zak transforms, polyphase transforms, and applications,” *IEEE Trans. Signal Process.*, vol. 45, no. 4, pp. 851–866, Apr. 1997.
12. F. Hlawatsch, A. Papandreou-Suppappola, and G. F. Boudreaux-Bartels, “The hyperbolic class of quadratic time-frequency representations — Part II: Subclasses, intersection with the affine and power classes, regularity, and unitarity,” *IEEE Trans. Signal Process.*, vol. 45, no. 2, pp. 303–315, Feb. 1997.
11. F. Hlawatsch and W. Kozek, “Time-frequency projection filters and time-frequency signal expansions,” *IEEE Trans. Signal Process.*, vol. 42, no. 12, pp. 3321–3334, Dec. 1994.
10. F. Hlawatsch, A. H. Costa, and W. Krattenthaler, “Time-frequency signal synthesis with time-frequency extrapolation and don’t-care regions,” *IEEE Trans. Signal Process.*, vol. 42, no. 9, pp. 2513–2520, Sept. 1994 (Correspondence).

9. F. Hlawatsch and R. L. Urbanke, "Bilinear time-frequency representations of signals: The shift-scale invariant class," *IEEE Trans. Signal Process.*, vol. 42, no. 2, pp. 357–366, Feb. 1994.
8. A. Papandreou, F. Hlawatsch, and G. F. Boudreaux-Bartels, "The hyperbolic class of quadratic time-frequency representations — Part I: Constant-Q warping, the hyperbolic paradigm, properties, and members," *IEEE Trans. Signal Process., special issue on Wavelets and Signal Processing*, vol. 41, no. 12, pp. 3425–3444, Dec. 1993.
7. F. Hlawatsch and W. Kozek, "The Wigner distribution of a linear signal space," *IEEE Trans. Signal Process.*, vol. 41, no. 3, pp. 1248–1258, March 1993.
6. W. Krattenthaler and F. Hlawatsch, "Time-frequency design and processing of signals via smoothed Wigner distributions," *IEEE Trans. Signal Process.*, vol. 41, no. 1, pp. 278–287, Jan. 1993.
5. F. Hlawatsch and W. Krattenthaler, "Bilinear signal synthesis," *IEEE Trans. Signal Process.*, vol. 40, no. 2, pp. 352–363, Feb. 1992.
4. F. Hlawatsch, "Duality and classification of bilinear time-frequency signal representations," *IEEE Trans. Signal Process.*, vol. 39, no. 7, pp. 1564–1574, July 1991.
3. F. Hlawatsch and W. Krattenthaler, "Phase matching algorithms for Wigner distribution signal synthesis," *IEEE Trans. Signal Process.*, vol. 39, no. 3, pp. 612–619, March 1991.
2. W. Krattenthaler and F. Hlawatsch, "Improved signal synthesis from pseudo Wigner distribution," *IEEE Trans. Signal Process.*, vol. 39, no. 2, pp. 506–509, Feb. 1991 (Correspondence).
1. F. Hlawatsch, "A note on 'Wigner distribution for finite duration or band-limited signals and limiting cases'," *IEEE Trans. Acoust., Speech, Signal Process.*, vol. ASSP-36, pp. 927–929, June 1988 (Correspondence).

#### *IEEE Transactions on Communications*

2. K. Kopsa, H. Artés, G. Matz, and F. Hlawatsch, "Multiuser space-time algorithms for synchronization, channel estimation, and data detection in an interference monitoring system for UMTS/TDD networks," *IEEE Trans. Comm.*, vol. 55, no. 10, pp. 1973–1983, Oct. 2007.
1. G. Matz, A. F. Molisch, F. Hlawatsch, M. Steinbauer, and I. Gaspard, "On the systematic measurement errors of correlative mobile radio channel sounders," *IEEE Trans. Comm.*, vol. 50, no. 5, pp. 808–821, May 2002.

#### *IEEE Journal of Selected Topics in Signal Processing*

1. G. Tauböck, F. Hlawatsch, D. Eiwen, and H. Rauhut, "Compressive estimation of doubly selective channels in multicarrier systems: Leakage effects and sparsity-enhancing processing," *IEEE J. Sel. Top. Signal Process.*, vol. 4, no. 2, pp. 255–271, Apr. 2010.

#### *IEEE Transactions on Wireless Communications*

1. G. Matz, D. Schafhuber, K. Gröchenig, M. Hartmann, and F. Hlawatsch, "Analysis, optimization, and implementation of low-interference wireless multicarrier systems," *IEEE Trans. Wireless Comm.*, vol. 6, no. 5, pp. 1921–1931, May 2007.

#### *IEEE Transactions on Circuits and Systems*

1. H. Bölcskei and F. Hlawatsch, "Oversampled cosine modulated filter banks with perfect reconstruction," *IEEE Trans. Circuits and Systems II, special issue on Multirate Systems, Filter Banks, Wavelets and Applications*, vol. 45, no. 8, pp. 1057–1071, Aug. 1998.

### *Journal of Mathematical Physics*

1. G. Matz and F. Hlawatsch, “Time-frequency transfer function calculus (symbolic calculus) of linear time-varying systems (linear operators) based on a generalized underspread theory,” *J. Math. Phys., special issue on Wavelet and Time-Frequency Analysis*, vol. 39, no. 8, pp. 4041–4070, Aug. 1998.

### *Journal of the Franklin Institute*

1. G. Matz and F. Hlawatsch, “Minimax robust nonstationary signal estimation based on a  $p$ -point uncertainty model,” *J. Franklin Inst., special issue on Time-Frequency Signal Analysis and Applications*, vol. 337, no. 4, pp. 403–419, 2000.

### *IEEE Signal Processing Letters*

2. H. Bölcskei, K. Gröchenig, F. Hlawatsch, and H. G. Feichtinger, “Oversampled Wilson expansions,” *IEEE Signal Process. Letters*, vol. 4, no. 4, pp. 106–108, Apr. 1997.
1. F. Hlawatsch and H. Bölcskei, “Covariant time-frequency distributions based on conjugate operators,” *IEEE Signal Process. Letters*, vol. 3, no. 2, pp. 44–46, Feb. 1996.

### *Signal Processing*

2. G. Matz and F. Hlawatsch, “Wigner distributions (nearly) everywhere: Time-frequency analysis of signals, systems, random processes, signal spaces, and frames,” *Signal Processing, special section “From Signal Processing Theory to Implementation,”* vol. 83, pp. 1355–1378, 2003.
1. F. Hlawatsch, T. G. Manickam, R. L. Urbanke, and W. Jones, “Smoothed pseudo-Wigner distribution, Choi-Williams distribution, and cone-kernel representation: Ambiguity-domain analysis and experimental comparison,” *Signal Processing*, vol. 43, no. 2, pp. 149–168, May 1995.

### *Journal of the Audio Engineering Society*

1. D. Preis, F. Hlawatsch, P. J. Bloom, and J. A. Deer, “Wigner distribution analysis of filters with perceptible phase distortion,” *J. Audio Eng. Soc.*, vol. 35, no. 12, pp. 1004–1012, Dec. 1987.

### *Int. Journal of Electronics and Communications (AEÜ)*

1. G. Matz and F. Hlawatsch, “Time-frequency subspace detectors and application to knock detection,” *Int. J. Electron. Commun. (AEÜ), special issue on the occasion of Prof. Böhme’s 60th birthday*, vol. 53, no. 6, pp. 379–385, Dec. 1999.

### **Papers in other journals**

2. D. Seethaler, H. Artés, and F. Hlawatsch, “Detection techniques for MIMO spatial multiplexing systems,” *Elektrotechnik und Informationstechnik (e&I)*, vol. 122, no. 3, pp. 91–96, March 2005.
1. H. Bölcskei and F. Hlawatsch, “Filterbänke mit Überabtastung,” *Elektrotechnik und Informationstechnik (e&I)*, vol. 115, no. 1, pp. 16–23, 1998 (in German).

## Papers at international conferences

### *IEEE International Symposium on Information Theory (ISIT)*

2. S. Schmutzhard, A. Jung, and F. Hlawatsch, “Minimum variance estimation for the sparse signal in noise model,” in *Proc. IEEE ISIT-11*, Saint Petersburg, Russia, July/Aug. 2011.
1. G. Tauböck and F. Hlawatsch, “On the capacity-achieving input covariance for multicarrier communications over doubly selective channels,” in *Proc. IEEE ISIT-07*, Nice, France, pp. 2741–2745, June 2007.

### *IEEE Int. Conference on Acoustics, Speech, and Signal Processing (ICASSP)*

48. A. Jung, S. Schmutzhard, F. Hlawatsch, and A. O. Hero III, “Performance bounds for sparse parametric covariance estimation in Gaussian models,” in *Proc. IEEE ICASSP-11*, Prague, Czech Republic, pp. 4156–4159, May 2011. (Best Student Paper Award)
47. O. Hlinka, O. Slučiak, F. Hlawatsch, P. M. Djurić, and M. Rupp, “Distributed Gaussian particle filtering using likelihood consensus,” in *Proc. IEEE ICASSP-11*, Prague, Czech Republic, pp. 3756–3759, May 2011.
46. G. Kail, K. Witrissal, and F. Hlawatsch, “Direction-resolved estimation of multipath parameters for UWB channels: A partially collapsed Gibbs sampler method,” in *Proc. IEEE ICASSP-11*, Prague, Czech Republic, pp. 3484–3487, May 2011.
45. D. Eiwien, G. Tauböck, F. Hlawatsch, and H. G. Feichtinger, “Compressive tracking of doubly selective channels in multicarrier systems based on sequential delay-Doppler sparsity,” in *Proc. IEEE ICASSP-11*, Prague, Czech Republic, pp. 2928–2931, May 2011.
44. C. Lin, G. Kail, J.-Y. Tournet, C. Mailhes, and F. Hlawatsch, “P and T wave delineation and waveform estimation in ECG signals using a block Gibbs sampler,” in *Proc. IEEE ICASSP-11*, Prague, Czech Republic, pp. 537–540, May 2011.
43. A. Jung, Z. Ben-Haim, F. Hlawatsch, and Y. C. Eldar, “On unbiased estimation of sparse vectors corrupted by Gaussian noise,” in *Proc. IEEE ICASSP-10*, Dallas, TX, pp. 3990–3993, Mar. 2010.
42. D. Eiwien, G. Tauböck, F. Hlawatsch, H. Rauhut, and N. Czik, “Multichannel-compressive estimation of doubly selective channels in MIMO-OFDM systems: Exploiting and enhancing joint sparsity,” in *Proc. IEEE ICASSP-10*, Dallas, TX, pp. 3082–3085, Mar. 2010.
41. G. Kail, J.-Y. Tournet, F. Hlawatsch, and N. Dobigeon, “A partially collapsed Gibbs sampler for parameters with local constraints,” in *Proc. IEEE ICASSP-10*, Dallas, TX, pp. 3886–3889, Mar. 2010.
40. A. Jung, G. Tauböck, and F. Hlawatsch, “Compressive spectral estimation for nonstationary random processes,” in *Proc. IEEE ICASSP-09*, Taipei, Taiwan, R.O.C., pp. 3029–3032, April 2009.
39. O. Hlinka and F. Hlawatsch, “Time-space-sequential algorithms for distributed Bayesian state estimation in serial sensor networks,” in *Proc. IEEE ICASSP-09*, Taipei, Taiwan, R.O.C., pp. 2057–2060, April 2009.
38. G. Kail, C. Novak, B. Hofer, and F. Hlawatsch, “A blind Monte Carlo detection-estimation method for optical coherence tomography,” in *Proc. IEEE ICASSP-09*, Taipei, Taiwan, R.O.C., pp. 493–496, April 2009.
37. C. Novak, G. Matz, and F. Hlawatsch, “Factor graph based design of an OFDM-IDMA receiver performing joint data detection, channel estimation, and channel length selection,” in *Proc. IEEE ICASSP-09*, Taipei, Taiwan, R.O.C., pp. 2561–2564, April 2009.
36. G. Tauböck and F. Hlawatsch, “A compressed sensing technique for OFDM channel estimation in mobile environments: Exploiting channel sparsity for reducing pilots,” in *Proc. IEEE ICASSP-08*, Las Vegas, NV, pp. 2885–2888, March–April 2008.
35. C. Novak, G. Matz, and F. Hlawatsch, “A factor graph approach to joint iterative data detection and channel estimation in pilot-assisted IDMA transmissions,” in *Proc. IEEE ICASSP-08*, Las Vegas, NV, pp. 2697–2700, March–April 2008.

34. D. Seethaler, G. Matz, and F. Hlawatsch, "Low-complexity MIMO data detection using Seysen's lattice reduction algorithm," in *Proc. IEEE ICASSP-07*, Honolulu, HI, vol. III, pp. 53–56, April 2007.
33. C. Novak, F. Hlawatsch, and G. Matz, "MIMO-IDMA: Uplink multiuser MIMO communications using interleave-division multiple access and low-complexity iterative receivers," in *Proc. IEEE ICASSP-07*, Honolulu, HI, vol. III, pp. 225–228, April 2007.
32. D. Seethaler, G. Matz, and F. Hlawatsch, "Efficient soft demodulation in MIMO-OFDM systems with BICM and constant modulus alphabets," in *Proc. IEEE ICASSP-06*, Toulouse, France, vol. IV, pp. 105–108, May 2006.
31. M. Jachan, G. Matz, and F. Hlawatsch, "Least-squares and maximum-likelihood TFAR parameter estimation for nonstationary processes," in *Proc. IEEE ICASSP-06*, Toulouse, France, vol. III, pp. 492–495, May 2006.
30. M. Jachan, G. Matz, and F. Hlawatsch, "TFARMA models: Order estimation and stabilization," in *Proc. IEEE ICASSP-05*, Philadelphia, PA, vol. IV, pp. 301–304, March 2005.
29. D. Seethaler, H. Artés, and F. Hlawatsch, "Dynamic nulling-and-cancelling with near-ML performance for MIMO communication systems," in *Proc. IEEE ICASSP-04*, Montreal, Canada, vol. IV, pp. 777–780, May 2004.
28. M. Jachan, G. Matz, and F. Hlawatsch, "Time-frequency-moving-average processes: Principles and cepstral methods for parameter estimation," in *Proc. IEEE ICASSP-04*, Montreal, Canada, vol. II, pp. 757–760, May 2004.
27. H. Artés and F. Hlawatsch, "Space-time matrix modulation: Extension to unknown doubly selective MIMO channels," in *Proc. IEEE ICASSP-03*, Hong Kong, vol. IV, pp. 41–44, April 2003.
26. D. Schafhuber, G. Matz, and F. Hlawatsch, "Adaptive Wiener filters for time-varying channel estimation in wireless OFDM systems," in *Proc. IEEE ICASSP-03*, Hong Kong, vol. IV, pp. 688–691, April 2003.
25. M. Jachan, G. Matz, and F. Hlawatsch, "Time-frequency-autoregressive random processes: Modeling and fast parameter estimation," in *Proc. IEEE ICASSP-03*, Hong Kong, vol. VI, pp. 125–128, April 2003.
24. F. Hlawatsch, G. Matz, and M. Jachan, "Robust methods for stable statistical signal processing: Principles and application to nonstationary signal estimation," in *Proc. IEEE ICASSP-03*, Hong Kong, vol. VI, pp. 649–652, April 2003.
23. H. Artés and F. Hlawatsch, "Space-time matrix modulation: Rank-deficient channels and multi-user case," in *Proc. IEEE ICASSP-02*, Orlando, FL, pp. 2225–2228, May 2002.
22. G. Matz and F. Hlawatsch, "Time-frequency projection filters: Online implementation, subspace tracking, and application to interference excision," in *Proc. IEEE ICASSP-02*, Orlando, FL, pp. 1213–1216, May 2002.
21. D. Schafhuber, G. Matz, and F. Hlawatsch, "Adaptive prediction of time-varying channels for coded OFDM systems," in *Proc. IEEE ICASSP-02*, Orlando, FL, pp. 2549–2552, May 2002.
20. M. Chabert, F. Hlawatsch, and J.-Y. Tournet, "Improved multiedge detection and reflectivity estimation for SAR images," in *Proc. IEEE ICASSP-02*, Orlando, FL, pp. 1301–1304, May 2002.
19. H. Artés and F. Hlawatsch, "Blind equalization of MIMO channels using deterministic precoding," in *Proc. IEEE ICASSP-01*, Salt Lake City, UT, pp. 2153–2156, May 2001.
18. G. Matz, F. Hlawatsch, and A. Raidl, "Signal-adaptive robust time-varying Wiener filters: Best subspace selection and statistical analysis," in *Proc. IEEE ICASSP-01*, Salt Lake City, UT, pp. 3945–3948, May 2001.
17. G. Matz and F. Hlawatsch, "Minimax robust time-frequency filters for nonstationary signal estimation," in *Proc. IEEE ICASSP-99*, Phoenix, AZ, pp. 1333–1336, Mar. 1999.
16. G. Matz and F. Hlawatsch, "Extending the transfer function calculus of time-varying linear systems: A generalized underspread theory," in *Proc. IEEE ICASSP-98*, Seattle, WA, pp. 2189–2192, May 1998.
15. H. Bölcskei and F. Hlawatsch, "Oversampled filter banks: Optimal noise shaping, design freedom, and noise analysis," in *Proc. IEEE ICASSP-97*, Munich, Germany, vol. 3, pp. 2453–2456, Apr. 1997.

14. F. Hlawatsch and T. Twaroch, "Extending the characteristic function method for joint  $a$ - $b$  and time-frequency analysis," in *Proc. IEEE ICASSP-97*, Munich, Germany, vol. 3, pp. 2049–2052, Apr. 1997.
13. H. Bölcskei, F. Hlawatsch, and H. G. Feichtinger, "Oversampled FIR and IIR DFT filter banks and Weyl-Heisenberg frames," in *Proc. IEEE ICASSP-96*, Atlanta, GA, vol. 3, pp. 1391–1394, May 1996.
12. F. Hlawatsch, T. Twaroch, and H. Bölcskei, "Wigner-type  $a$ - $b$  and time-frequency analysis based on conjugate operators," in *Proc. IEEE ICASSP-96*, Atlanta, GA, vol. 3, pp. 1395–1398, May 1996.
11. A. Papandreou, F. Hlawatsch, and G. F. Boudreaux-Bartels, "A unified framework for the scale covariant affine, hyperbolic, and power class quadratic time-frequency representations using generalized time shifts," in *Proc. IEEE ICASSP-95*, Detroit, MI, vol. 2, pp. 1017–1020, May 1995.
10. F. Hlawatsch and H. Bölcskei, "Displacement-covariant time-frequency energy distributions," in *Proc. IEEE ICASSP-95*, Detroit, MI, vol. 2, pp. 1025–1028, May 1995.
9. H. Kirchauer, F. Hlawatsch, and W. Kozek, "Time-frequency formulation and design of nonstationary Wiener filters," in *Proc. IEEE ICASSP-95*, Detroit, MI, vol. 3, pp. 1549–1552, May 1995.
8. F. Hlawatsch, A. Papandreou, and G. F. Boudreaux-Bartels, "Regularity and unitarity of affine and hyperbolic time-frequency representations," in *Proc. IEEE ICASSP-93*, Minneapolis, MN, vol. 3, pp. 245–248, April 1993.
7. W. Kozek and F. Hlawatsch, "Time-frequency filter banks with perfect reconstruction," in *Proc. IEEE ICASSP-91*, Toronto, Ontario, Canada, pp. 2049–2052, May 1991.
6. F. Hlawatsch and W. Kozek, "Time-frequency analysis of linear signal spaces," in *Proc. IEEE ICASSP-91*, Toronto, Ontario, Canada, pp. 2045–2048, May 1991.
5. W. Krattenthaler and F. Hlawatsch, "General signal synthesis algorithms for smoothed versions of Wigner distribution," in *Proc. IEEE ICASSP-90*, Albuquerque, NM, pp. 1611–1614, April 1990.
4. F. Hlawatsch, W. Kozek, and W. Krattenthaler, "Time-frequency subspaces and their application to time-varying filtering," in *Proc. IEEE ICASSP-90*, Albuquerque, NM, pp. 1607–1610, April 1990.
3. W. Krattenthaler and F. Hlawatsch, "Two signal synthesis algorithms for pseudo Wigner distribution," in *Proc. IEEE ICASSP-88*, New York, NY, pp. 1550–1553, April 1988.
2. F. Hlawatsch and W. Krattenthaler, "Time-frequency signal synthesis on signal subspaces," in *Proc. IEEE ICASSP-87*, Dallas, TX, pp. 685–688, April 1987.
1. F. Hlawatsch, "Transformation, inversion and conversion of bilinear signal representations," in *Proc. IEEE ICASSP-85*, Tampa, FL, pp. 1029–1032, March 1985.

*IEEE Global Telecommunications Conference (GLOBECOM)*

6. D. Seethaler, G. Matz, and F. Hlawatsch, "An efficient MMSE-based demodulator for MIMO bit-interleaved coded modulation," in *Proc. IEEE GLOBECOM-2004*, Dallas, TX, pp. 2455–2459, Nov.–Dec. 2004.
5. D. Seethaler, H. Artés, and F. Hlawatsch, "Efficient near-ML detection for MIMO channels: The Sphere-Projection Algorithm," in *Proc. IEEE GLOBECOM-2003*, San Francisco, CA, pp. 2089–2093, Dec. 2003.
4. H. Artés, K. Kopsa, and F. Hlawatsch, "A multi-antenna detection algorithm for UMTS/TDD receivers in strong interference environments," in *Proc. IEEE GLOBECOM-2003*, San Francisco, CA, pp. 819–823, Dec. 2003.
3. K. Kopsa, G. Matz, H. Artés, and F. Hlawatsch, "Space-time synchronization algorithms for UMTS/TDD systems with strong co-channel interference," in *IEEE GLOBECOM-2002*, Taipei, Taiwan, R.O.C., pp. 254–258, Nov. 2002.
2. H. Artés, F. Hlawatsch, and G. Matz, "Efficient POCS algorithms for deterministic blind equalization of time-varying channels," in *Proc. IEEE GLOBECOM-2000*, San Francisco, CA, pp. 1031–1035, Nov./Dec. 2000.

1. D. Schafhuber, G. Matz, and F. Hlawatsch, "Predictive equalization of time-varying channels for coded OFDM/BFDM systems," in *Proc. IEEE GLOBECOM-2000*, San Francisco, CA, pp. 721–725, Nov./Dec. 2000.

*IEEE Int. Conference on Communications (ICC)*

3. C. Novak, F. Hlawatsch, and G. Matz, "Low-complexity factor graph receivers for spectrally efficient MIMO-IDMA," in *Proc. IEEE ICC-2008*, Beijing, China, pp. 770–774, May 2008.
2. D. Seethaler, G. Matz, and F. Hlawatsch, "Low-complexity soft demodulation of MIMO-BICM using the line-search detector," in *Proc. IEEE ICC-2005*, Seoul, Korea, vol. 4, pp. 2447–2451, May 2005.
1. K. Kopsa, H. Artés, G. Matz, and F. Hlawatsch, "Space-time algorithms for multiuser channel estimation in the downlink of UMTS/TDD," in *Proc. IEEE ICC-2003*, Anchorage, AK, pp. 2406–2410, May 2003.

*European Signal Processing Conference (EUSIPCO)*

6. G. Tauböck and F. Hlawatsch, "Compressed sensing based estimation of doubly selective channels using a sparsity-optimized basis expansion," in *Proc. EUSIPCO-08*, Lausanne, Switzerland, Aug. 2008.
5. G. Matz and F. Hlawatsch, "Time-varying communication channels: Fundamentals, recent developments, and open problems," invited paper in *Proc. EUSIPCO-06*, Florence, Italy, Sept. 2006.
4. D. Seethaler, H. Artés, and F. Hlawatsch, "Dynamic versus conventional layer sorting for nulling-and-cancelling based MIMO detection," invited paper in *Proc. EUSIPCO-05*, Antalya, Turkey, Sept. 2005.
3. D. Schafhuber, G. Matz, F. Hlawatsch, and P. Loubaton, "MMSE estimation of time-varying channels for DVB-T systems with strong co-channel interference," invited paper in *Proc. EUSIPCO-02*, Toulouse, France, vol. III, pp. 25–28, Sept. 2002.
2. F. Hlawatsch, "Unitary time-frequency signal representations," in *Proc. EUSIPCO-86*, The Hague, The Netherlands, pp. 33–36, Sept. 1986.
1. F. Hlawatsch and W. Krattenthaler, "Signal synthesis from unitary time-frequency signal representations," in *Proc. EUSIPCO-86*, The Hague, The Netherlands, pp. 37–40, Sept. 1986.

*IEEE Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*

7. D. Eiuwen, G. Tauböck, F. Hlawatsch, and H. G. Feichtinger, "Group sparsity methods for compressive channel estimation in doubly dispersive multicarrier systems," in *Proc. IEEE SPAWC-10*, Marrakech, Morocco, June 2010.
6. M. Hampejs, P. Švač, G. Tauböck, K. Gröchenig, F. Hlawatsch, and G. Matz, "Sequential LSQR-based ICI equalization and decision-feedback ISI cancelation in pulse-shaped multicarrier systems," in *Proc. IEEE SPAWC-09*, Perugia, Italy, pp. 1–5, June 2009.
5. G. Tauböck, M. Hampejs, G. Matz, F. Hlawatsch, and K. Gröchenig, "LSQR-based ICI equalization for multicarrier communications in strongly dispersive and highly mobile environments," in *Proc. IEEE SPAWC-07*, Helsinki, Finland, June 2007.
4. N. Czink, G. Matz, D. Seethaler, and F. Hlawatsch, "Improved MMSE estimation of correlated MIMO channels using a structured correlation estimator," in *Proc. IEEE SPAWC-05*, New York, NY, pp. 595–599, June 2005.
3. D. Schafhuber, M. Rupp, G. Matz, and F. Hlawatsch, "Adaptive identification and tracking of doubly selective fading channels for wireless MIMO-OFDM systems," in *Proc. IEEE SPAWC-03*, Rome, Italy, pp. 417–421, June 2003.
2. H. Artés and F. Hlawatsch, "Blind multiuser equalization for time-varying channels," in *Proc. IEEE SPAWC-01*, Taoyuan, Taiwan, R.O.C., pp. 102–105, Mar. 2001.

1. H. Artés, G. Matz, and F. Hlawatsch, “An unbiased scattering function estimator for fast time-varying channels,” in *Proc. IEEE SPAWC-99*, Annapolis, MD, pp. 411–414, May 1999.

*IEEE International Symposium on Signal Processing and Information Technology (ISSPIT)*

1. D. Seethaler, H. Artés, and F. Hlawatsch, “Efficient approximate-ML detection for MIMO spatial multiplexing systems by using a 1-D nearest neighbor search,” invited paper in *Proc. IEEE ISSPIT-03*, Darmstadt, Germany, pp. 290–293, Dec. 2003.

*IEEE Int. Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC)*

1. D. Schafhuber, G. Matz, and F. Hlawatsch, “Pulse-shaping OFDM/BFDM systems for time-varying channels: ISI/ICI analysis, optimal pulse design, and efficient implementation,” in *Proc. IEEE PIMRC-02*, Lisbon, Portugal, pp. 1012–1016, Sept. 2002.

*Allerton Conference on Communication, Control, and Computing*

1. H. Artés, G. Matz, D. Schafhuber, and F. Hlawatsch, “Space-time multicarrier matrix modulation for unknown dispersive MIMO channels,” invited paper in *Proc. 39th Allerton Conf. on Commun., Control, Comput.*, Urbana, IL, pp. 466–475, Oct. 2001.

*International Conference on Wireless Networks, Communications, and Mobile Computing (WirelessCom)*

1. A. Skupch, D. Seethaler, and F. Hlawatsch, “Free probability based capacity calculation for MIMO channels with transmit or receive correlation,” in *Proc. WirelessCom-05*, Maui, HI, pp. 1041–1046, June 2005.

*IEEE Vehicular Technology Conference (VTC)*

2. G. Matz, A. F. Molisch, M. Steinbauer, F. Hlawatsch, I. Gaspard, and H. Artés, “Bounds on the systematic measurement errors of channel sounders for time-varying mobile radio channels,” in *Proc. IEEE Vehicular Technology Conference 1999/Fall*, Amsterdam, The Netherlands, pp. 1465–1470, Sept. 1999.
1. H. Artés, G. Matz, and F. Hlawatsch, “Unbiased scattering function estimation during data transmission,” in *Proc. IEEE Vehicular Technology Conference 1999/Fall*, Amsterdam, The Netherlands, pp. 1535–1539, Sept. 1999.

*IST Mobile & Wireless Telecommunications Summit*

2. K. Kopsa, G. Matz, H. Artés, and F. Hlawatsch, “Bit error rate estimation for a joint detection receiver in the downlink of UMTS/TDD,” in *Proc. IST Mobile & Wireless Commun. Summit*, Aveiro, Portugal, pp. 256–260, June 2003.
1. K. Kopsa, J.-M. Chaufray, P. Loubaton, F. Pipon, G. Matz, H. Artés, and F. Hlawatsch, “Spatial and space-time algorithms for synchronisation in the downlink of the UMTS FDD and TDD modes,” in *Proc. IST Mobile & Wireless Telecommun. Summit*, Thessaloniki, Greece, pp. 503–507, June 2002.

*IEEE Workshop on Statistical Signal Processing (SSP); formerly IEEE Workshop on Statistical Signal and Array Processing (SSAP)*

8. A. Jung, G. Tauböck, and F. Hlawatsch, "Compressive nonstationary spectral estimation using parsimonious random sampling of the ambiguity function," in *Proc. IEEE SSP-09*, Cardiff, Wales, UK, pp. 642–645, Aug.–Sept. 2009.
7. G. Kail, F. Hlawatsch, and C. Novak, "Efficient Bayesian detection of multiple events with a minimum-distance constraint," in *Proc. IEEE SSP-09*, Cardiff, Wales, UK, pp. 73–76, Aug.–Sept. 2009.
6. M. Jachan, F. Hlawatsch, and G. Matz, "Linear methods for TFARMA parameter estimation and system approximation," in *Proc. IEEE SSP-05*, Bordeaux, France, pp. 909–914, July 2005.
5. M. Jachan, F. Hlawatsch, and G. Matz, "Stable adaptive nonstationary signal detection based on the robuston scheme," in *Proc. IEEE SSP-03*, St. Louis, MO, pp. 621–624, Sept./Oct. 2003.
4. D. Schaflhuber, G. Matz, and F. Hlawatsch, "Simulation of wideband mobile radio channels using subsampled ARMA models and multistage interpolation," in *Proc. IEEE SSP-01*, Singapore, pp. 571–574, Aug. 2001.
3. G. Matz and F. Hlawatsch, "Time-frequency coherence analysis of nonstationary random processes," in *Proc. IEEE SSAP-00*, Pocono Manor, PA, pp. 554–558, Aug. 2000.
2. G. Matz and F. Hlawatsch, "Time-frequency methods for signal detection with application to the detection of knock in car engines," in *Proc. IEEE SSAP-98*, Portland, OR, pp. 196–199, Sept. 1998.
1. A. Papandreou, F. Hlawatsch, and G. F. Boudreaux-Bartels, "Quadratic time-frequency distributions: The new hyperbolic class and its intersection with the affine class," in *Proc. IEEE SSAP-92*, Victoria, B.C., Canada, pp. 26–29, Oct. 1992.

*IEEE Int. Symposium on Circuits and Systems (ISCAS)*

5. H. Bölcskei and F. Hlawatsch, "Oversampled cosine modulated filter banks with linear phase," in *Proc. IEEE ISCAS-97*, Hong Kong, pp. 357–360, June 1997.
4. H. Bölcskei, F. Hlawatsch, and H. G. Feichtinger, "Frame-theoretic analysis and design of oversampled filter banks," in *Proc. IEEE ISCAS-96*, Atlanta, GA, vol. 2, pp. 409–412, May 1996.
3. F. Hlawatsch and W. Kozek, "Time-frequency weighting and displacement effects in linear, time-varying systems," in *Proc. IEEE ISCAS-92*, San Diego, CA, pp. 1455–1458, May 1992.
2. F. Hlawatsch, "Wigner distribution analysis of linear, time-varying systems," in *Proc. IEEE ISCAS-92*, San Diego, CA, pp. 1459–1462, May 1992.
1. F. Hlawatsch and W. Krattenthaler, "A new approach to time-frequency signal decomposition," in *Proc. IEEE ISCAS-89*, Portland, OR, pp. 1248–1251, May 1989.

*IEEE Int. Conference on Image Processing (ICIP)*

1. H. Bölcskei, T. Stranz, F. Hlawatsch, and R. Sucher, "Subband image coding using cosine modulated filter banks with perfect reconstruction and linear phase," in *Proc. IEEE ICIP-97*, Santa Barbara, CA, vol. 2, pp. 594–597, Oct. 1997.

*IEEE Int. Symposium on Time-Frequency and Time-Scale Analysis (TFTS)*

13. G. Matz and F. Hlawatsch, "Robust time-varying Wiener filters: Theory and time-frequency formulation," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Pittsburgh, PA, pp. 401–404, Oct. 1998.
12. H. Bölcskei and F. Hlawatsch, "Quantization noise reduction in oversampled filter banks," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Pittsburgh, PA, pp. 509–512, Oct. 1998.

11. T. Twaroch and F. Hlawatsch, "Modulation and warping operators in joint signal analysis," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Pittsburgh, PA, pp. 9–12, Oct. 1998.
10. G. Matz and F. Hlawatsch, "Time-frequency formulation and design of optimal detectors," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Paris, France, pp. 213–216, June 1996.
9. H. Bölcskei, H. G. Feichtinger, K. Gröchenig, and F. Hlawatsch, "Discrete-time Wilson expansions," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Paris, France, pp. 525–528, June 1996.
8. F. Hlawatsch and T. Twaroch, "Covariant  $(\alpha, \beta)$ , time-frequency, and  $(a, b)$  representations," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Paris, France, pp. 437–440, June 1996.
7. A. Papandreou-Suppappola, F. Hlawatsch, and G. F. Boudreaux-Bartels, "Power class time-frequency representations: Interference geometry, smoothing, and implementation," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Paris, France, pp. 193–196, June 1996.
6. F. Hlawatsch and H. Bölcskei, "Unified theory of displacement-covariant time-frequency analysis," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Philadelphia, PA, pp. 524–527, Oct. 1994.
5. F. Hlawatsch and H. Bölcskei, "Time-frequency analysis of frames," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Philadelphia, PA, pp. 52–55, Oct. 1994.
4. W. Kozek, F. Hlawatsch, H. Kirchauer, and U. Trautwein, "Correlative time-frequency analysis and classification of nonstationary random processes," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Philadelphia, PA, pp. 417–420, Oct. 1994.
3. F. Hlawatsch and G. S. Edelson, "The ambiguity function of a linear signal space and its application to maximum-likelihood range/Doppler estimation," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Victoria, B.C., Canada, pp. 489–492, Oct. 1992.
2. W. Kozek and F. Hlawatsch, "A comparative study of linear and nonlinear time-frequency filters," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Victoria, B.C., Canada, pp. 163–166, Oct. 1992.
1. A. Papandreou, F. Hlawatsch, and G. F. Boudreaux-Bartels, "A unified framework for the Bertrand distribution and the Altes distribution: The new hyperbolic class of quadratic time-frequency distributions," in *Proc. IEEE Int. Sympos. Time-Frequency Time-Scale Analysis*, Victoria, B.C., Canada, pp. 27–30, Oct. 1992.

#### *IEEE Digital Signal Processing Workshop*

3. F. Hlawatsch and W. Krattenthaler, "Subspace signal synthesis from unitary time-frequency signal representations," in *Proc. IEEE Digital Signal Processing Workshop*, Chatham, MA, pp. 7.4.1–7.4.2, Oct. 1986.
2. W. Krattenthaler, F. Hlawatsch, and W. Mecklenbräuker, "An iterative algorithm for signal synthesis from modified pseudo Wigner distributions," in *Proc. IEEE Digital Signal Processing Workshop*, Chatham, MA, pp. 7.3.1–7.3.2, Oct. 1986.
1. F. Hlawatsch, "Theory of bilinear time-frequency signal representations," in *Proc. IEEE Digital Signal Processing Workshop*, Chatham, MA, pp. 7.5.1–7.5.2, Oct. 1984.

#### *Asilomar Conference on Signals, Systems, and Computers*

8. S. Schmutzhard, A. Jung, F. Hlawatsch, Z. Ben-Haim, and Y. C. Eldar, "A lower bound on the estimator variance for the sparse linear model," in *Proc. 44th Asilomar Conf. Signals, Systems, Computers*, Pacific Grove, CA, pp. 1976–1980, Nov. 2010.
7. O. Hlinka, O. Slučiak, F. Hlawatsch, P. M. Djuric, and M. Rupp, "Likelihood consensus: Principles and application to distributed particle filtering," invited paper in *Proc. 44th Asilomar Conf. Signals, Systems, Computers*, Pacific Grove, CA, pp. 349–353, Nov. 2010.
6. O. Hlinka, P. M. Djuric, and F. Hlawatsch, "Time-space-sequential distributed particle filtering with low-rate communications," invited paper in *Proc. 43rd Asilomar Conf. Signals, Systems, Computers*, Pacific Grove, CA, pp. 196–200, Nov. 2009.

5. D. Schafhuber, G. Matz, and F. Hlawatsch, "Kalman tracking of time-varying channels in wireless MIMO-OFDM systems," invited paper in *Proc. 37th Asilomar Conf. Signals, Systems, Computers*, Pacific Grove, CA, pp. 1261–1265, Nov. 2003.
4. H. Artés and F. Hlawatsch, "Fast iterative decoding of linear dispersion codes for unknown MIMO channels," in *Proc. 36th Asilomar Conf. Signals, Systems, Computers*, Pacific Grove, CA, pp. 284–288, Nov. 2002.
3. G. Matz and F. Hlawatsch, "Time-varying spectra for underspread and overspread nonstationary processes," invited paper in *Proc. 32nd Asilomar Conf. Signals, Systems, Computers*, Pacific Grove, CA, pp. 282–286, Nov. 1998.
2. H. Bölcskei and F. Hlawatsch, "Oversampled Wilson-type cosine modulated filter banks with linear phase," in *Proc. 30th Asilomar Conf. Signals, Systems, Computers*, Pacific Grove, CA, pp. 998–1002, Nov. 1996.
1. F. Hlawatsch, A. Papandreou, and G. F. Boudreaux-Bartels, "The power classes of quadratic time-frequency representations: A generalization of the affine and hyperbolic classes," in *Proc. 27th Asilomar Conf. Signals, Systems, Computers*, Pacific Grove, CA, pp. 1265–1270, Nov. 1993.

#### *Other international conferences*

17. B. Hofer, B. Povazay, B. Hermann, A. Unterhuber, G. Matz, F. Hlawatsch, and W. Drexler, "Signal post processing in frequency domain OCT and OCM using a filter bank approach," in *Proc. SPIE Int. Soc. Opt. Eng.*, San Jose, CA, vol. 6443, no. 1, pp. 64430O–6, Feb. 2007.
16. G. Matz, K. Gröchenig, F. Hlawatsch, A. Klotz, G. Tauböck, and A. Skupch, "Advanced mathematical models for the design and optimization of low-interference wireless multicarrier systems," invited paper in *Proc. MATHMOD 2006*, Vienna, Austria, pp. 3.1–3.9, Feb. 2006.
15. F. Hlawatsch and G. Matz, "Time-frequency signal processing: A statistical perspective," invited paper in *Proc. IEEE Workshop Circuits, Systems, Signal Processing (CSSP-98)*, Mierlo, The Netherlands, pp. 207–219, Nov. 1998.
14. F. Hlawatsch, "Covariant time-frequency analysis: A unifying framework," in *Proc. UK Sympos. Applications of Time-Frequency and Time-Scale Methods*, Univ. of Warwick, Coventry, UK, pp. 110–117, Aug. 1995.
13. F. Hlawatsch and H. Bölcskei, "Time-frequency distributions based on conjugate operators," in *Proc. UK Sympos. Applications of Time-Frequency and Time-Scale Methods*, Univ. of Warwick, Coventry, UK, pp. 187–193, Aug. 1995.
12. G. Matz, F. Hlawatsch, and W. Kozek, "Weyl spectral analysis of nonstationary random processes," in *Proc. UK Sympos. Applications of Time-Frequency and Time-Scale Methods*, Univ. of Warwick, Coventry, UK, pp. 120–127, Aug. 1995.
11. H. Bölcskei, H. G. Feichtinger, and F. Hlawatsch, "Diagonalizing the Gabor frame operator," in *Proc. UK Sympos. Applications of Time-Frequency and Time-Scale Methods*, Univ. of Warwick, Coventry, UK, pp. 249–255, Aug. 1995.
10. H. Bölcskei, F. Hlawatsch, and H. G. Feichtinger, "Equivalence of DFT filter banks and Gabor expansions," in *SPIE Proc. Vol. 2569, "Wavelet Applications in Signal and Image Processing III"*, San Diego, CA, pp. 128–139, July 1995.
9. A. Papandreou, F. Hlawatsch, and G. F. Boudreaux-Bartels, "New classes of quadratic time-frequency representations," in *Proc. Workshop "Time-Frequency, Wavelets and Multiresolution: Theory, Models and Applications"*, Lyon, France, pp. 17.1–17.4, March 1994.
8. F. Hlawatsch, "Optimum time-frequency synthesis of signals, random processes, signal spaces, and time-varying filters: A unified framework," invited paper in *Proc. Workshop "Time-Frequency, Wavelets and Multiresolution: Theory, Models and Applications"*, Lyon, France, pp. 12.1–12.10, March 1994.

7. W. Kozek and F. Hlawatsch, "Time-frequency representation of linear time-varying systems using the Weyl symbol," in *Proc. 6th Int. Conf. on Digital Processing of Signals in Communications*, Loughborough, UK, pp. 25–30, Sept. 1991.
6. W. Wokurek, F. Hlawatsch, and G. Kubin, "Wigner distribution analysis of speech signals," in *Proc. Int. Conf. on Digital Signal Processing*, Florence, Italy, pp. 294–298, Sept. 1987.
5. W. Wokurek, G. Kubin, and F. Hlawatsch, "Wigner distribution — A new method for high-resolution time-frequency analysis of speech signals," in *Proc. 11th Int. Congress of Phonetic Sciences (ICPhS-87)*, Tallinn, Estonia, USSR, pp. 44–47, Aug. 1987.
4. P. Flandrin and F. Hlawatsch, "Signal representations geometry and catastrophes in the time-frequency plane," in *Mathematics in Signal Processing*, eds. T.S. Durrani et al., Oxford, UK: Clarendon Press, 1987, pp. 3–14 (Proc. IMA Conf. "Mathematics in Signal Processing," Bath, UK, Sept. 1985).
3. P. Skritek and F. Hlawatsch, "Evaluation of audio companders in the time-frequency plane," *80th AES Convention*, Montreux, Switzerland, March 1986.
2. F. Hlawatsch, "Duality of time-frequency signal representations: Energy density domain and correlation domain," in *Proc. IASTED Int. Sympos. "Applied Signal Processing and Digital Filtering"*, Paris, France, pp. 294–297, June 1985.
1. F. Hlawatsch, "Interference terms in the Wigner distribution," in *Proc. Int. Conf. on Digital Signal Processing*, Florence, Italy, pp. 363–367, Sept. 1984.

## Papers at national conferences

4. F. Hlawatsch and W. Kozek, "Zeit-Frequenz-Filter," in *Proc. ITG-Diskussionsitzung "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

12. “Bayesian estimation theory and methods: An introduction” 4-day block course taught in Sep. 2010 at Brno University of Technology, Czech Republic.
11. “Modulations- und Detektionsverfahren” (“Modulation and Detection Techniques”), 1-semester course taught annually since 2005 at Vienna University of Technology, Austria.
10. “Informationstheorie und Codierung” (“Information Theory and Coding”), 1-semester course 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 (in English) taught annually since 2000 at Vienna University of Technology, Austria.
6. “Parameter estimation methods,” 1-semester course (in English) taught annually since 1997 at Vienna University of Technology, Austria.
5. “Time-frequency methods for signal processing,” 1-semester course (in English) 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 (in English) taught in Aug.-Sept. 1993 at Ecole pré-doctorale de physique “Traitement du signal—développements récents,” Les Houches, France.

### Tutorial and keynote lectures

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*, Univ. 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

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 zeitfrequenz-dispersive Kanäle," Lehrstuhl für Netzwerktheorie und Signalverarbeitung, Munich University of Technology, Germany, March 2007.
34. "Lineare Methoden zur Zeit-Frequenz-Filterung," Festkolloquium anlässlich der Emeritierung von Prof. 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 on "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, 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 (ENSEEIH), 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.