

My Peer-Reviewed Publications*

Wolfgang Utschick @ TUM

IEEE Fellow

h-index: 40, i10-index: 200, citations: > 9k

Professur für Methoden der Signalverarbeitung

Status as of September 2022

*Articles published in journals, book chapters and books are highlighted in bold font

References

- [1] C. Zou, A. Müller, W. Utschick, D. Rückert, P. Müller, M. Becker, A. Steger, and E. Martens. Heartbeat classification by random forest with a novel context feature: a segment label. **IEEE Journal of Translational Engineering in Health and Medicine**, 10:1–8, 2022.
- [2] M. Koller, B. Fesl, N. Turan, and W. Utschick. An asymptotically MSE-optimal estimator based on Gaussian mixture models. **IEEE Transactions on Signal Processing**, 70:4109–4123, 2022.
- [3] O. De Candido, M. Koller, and W. Utschick. Encouraging validatable features in machine learning-based highly automated driving functions. **IEEE Transactions on Intelligent Vehicles**, 2022. *Accepted for publication*.
- [4] M. Baur, M. Reisbeck, O. Hayden, and W. Utschick. Joint particle detection and analysis by a CNN and adaptive norm minimization approach. **IEEE Transactions on Biomedical Engineering**, 69(8):2468–2479, 2022.
- [5] M. Koller and W. Utschick. Learning a compressive sensing matrix with structural constraints via maximum mean discrepancy optimization. **ELSEVIER Signal Processing**, 197:108553, 2022.
- [6] W. Utschick, V. Rizzello, M. Joham, Z. Ma, and L. Piazzzi. Learning the CSI recovery in FDD systems. **IEEE Transactions on Wireless Communications**, 21(8):6495–6507, 2022.
- [7] M. Baur, B. Fesl, M. Koller, and W. Utschick. Variational autoencoder leveraged MMSE channel estimation. In *Proceedings of the 56th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2022.
- [8] B. Fesl, M. Joham, S. Hu, M. Koller, N. Turan, and W. Utschick. Channel estimation based on Gaussian mixture models with structured covariances. In *Proceedings of the 56th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2022.
- [9] N. Turan, M. Koller, B. Fesl, S. Bazzi, W. Xu, and W. Utschick. GMM-based codebook construction and feedback encoding in FDD systems. In *Proceedings of the 56th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2022.
- [10] M. Turan, B. Fesl, M. Grundei, M. Koller, and W. Utschick. Evaluation of a Gaussian mixture model-based channel estimator using measurement data. In *Proceedings of the 18th International Symposium on Wireless Communication Systems*, Hangzhou, China, Oktober 2022.
- [11] L. Balasubramanian, J. Wurst, M. Botsch, W. Utschick, and K. Deng. ExAgt: Expert-guided augmentation for representation learning of traffic scenarios. In *Proceedings of the 25th International Conference on Intelligent Transportation Systems*, Macau, China, October 2022.

- [12] T. Elter, T. Dirndorfer, M. Botsch, and W. Utschick. Interaction-aware prediction of occupancy regions based on a POMDP framework. In *Proceedings of the 25th International Conference on Intelligent Transportation Systems*, Macau, China, October 2022.
- [13] M. Neumeier, A. Tollkühn, M. Botsch, and W. Utschick. A multidimensional graph fourier transformation neural network for vehicle trajectory prediction. In *Proceedings of the 25th International Conference on Intelligent Transportation Systems*, Macau, China, October 2022.
- [14] J. Russer and W. Utschick. Josephson circuits for quantum radar. In *Proceedings of the Kleinheubacher Tagung*, Miltenberg, Germany, September 2022.
- [15] P. Joppich, S. Dorn, O. De Candido, J. Knollmüller, and W. Utschick. Classification and uncertainty quantification of corrupted data using supervised autoencoders. In *Proceedings of the 41st International Conference on Bayesian and Maximum Entropy methods in Science and Engineering*, Paris, France, July 2022.
- [16] D. Semmler, M. Joham, and W. Utschick. Linear precoding in the intelligent reflecting surface assisted MIMO broadcast channel. In *Proceedings of the 23th International Workshop on Signal Processing Advances in Wireless Communications*, Oulo, Finland, July 2022.
- [17] J. Wurst, L. Balasubramanian, M. Botsch, and W. Utschick. Expert-LaSTS: expert-knowledge guided latent space for traffic scenarios. In *Proceedings of the 33th Intelligent Vehicles Symposium*, Aachen, Germany, June 2022.
- [18] O. De Candido, X. Li, and W. Utschick. An analysis of distributional shifts in automated driving functions in highway scenarios. In *Proceedings of the 95th IEEE Vehicular Technology Conference*, Helsinki, Finland, June 2022.
- [19] R. Wiesmayr, M.L. Honig, M. Joham, and W. Utschick. Distributed joint multi-cell optimization of IRS parameters with linear precoders. In *Proceedings of the International Conference on Communications / Communication Theory Symposium*, Seoul, South Korea, June 2022.
- [20] V. Rizzello and W. Utschick. Compression techniques for MIMO channels in FDD systems. In *IEEE Data Science and Learning Workshop*, Singapore, May 2022.
- [21] M. Baur, M. Würth, M. Koller, V. Andrei, and W. Utschick. CSI clustering with variational autoencoding. In *Proceedings of the 47th International Conference on Acoustics, Speech, and Signal Processing*, Singapore, May 2022.
- [22] M. Joham, Hangze Gao, and W. Utschick. Estimation of channels in systems with intelligent reflecting surfaces. In *Proceedings of the 47th International Conference on Acoustics, Speech, and Signal Processing*, Singapore, May 2022.
- [23] M. Koller, B. Fesl, N. Turan, and W. Utschick. An asymptotically optimal approximation of the conditional mean channel estimator based on Gaussian mixture models. In *Proceedings of the 47th International Conference on Acoustics, Speech, and Signal Processing*, Singapore, May 2022.

- [24] A. Barthelme and W. Utschick. A machine learning approach to DoA estimation and model order selection for antenna arrays with subarray sampling. **IEEE Transactions on Signal Processing**, 69:3075–3087, 2021.
- [25] A. Barthelme and W. Utschick. DoA estimation using neural network-based covariance matrix reconstruction. **IEEE Signal Processing Letters**, 28:783–787, 2021.
- [26] F. Askerbeyli, C. Hellings, and W. Utschick. Improper signaling versus time-sharing in the MISO Z-interference channel. **IEEE Communications Letters**, 27(7):2181–2185, 2021.
- [27] C. Hellings, P. Gest, T. Wiegart, and W. Utschick. Maximizing the partial decode-and-forward rate in the Gaussian MIMO relay channel. **IEEE Transactions on Signal Processing**, 69:1548–1562, 2021.
- [28] B. Fesl, N. Turan, M. Koller, M. Joham, and W. Utschick. Centralized learning of the distributed downlink channel estimators in FDD systems using uplink data. In *Proceedings of the 24th International ITG Workshop on Smart Antennas*, Eurecom, French Riviera, November 2021.
- [29] N. Turan, M. Koller, V. Rizzello, B. Fesl, S. Bazzi, W. Xu, and W. Utschick. On distributional invariances between downlink and uplink MIMO channels. In *Proceedings of the 24th International ITG Workshop on Smart Antennas*, Eurecom, French Riviera, November 2021.
- [30] F. Weißer, T. Mayer, B. Baccouche, and W. Utschick. Generative-AI methods for channel impulse response generation. In *Proceedings of the 24th International ITG Workshop on Smart Antennas*, Eurecom, French Riviera, November 2021.
- [31] D. Ben Amor, F. Strasser, M. Joham, and W. Utschick. Uplink downlink duality for multi-cell massive MISO FDD systems with per base station power constraints. In *Proceedings of the 24th International ITG Workshop on Smart Antennas*, Eurecom, French Riviera, November 2021.
- [32] N. Turan, M. Koller, S. Bazzi, W. Xu, and W. Utschick. Unsupervised learning of adaptive codebooks for deep feedback encoding in FDD systems. In *Proceedings of the 55th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2021.
- [33] V. Rizzello and W. Utschick. Learning the CSI denoising and feedback without supervision. In *Proceedings of the 22th International Workshop on Signal Processing Advances in Wireless Communications*, Lucca, Italy, September 2021.
- [34] B. Fesl, N. Turan, M. Koller, and W. Utschick. A low-complexity MIMO channel estimator with implicit structure of a convolutional neural network. In *Proceedings of the 22th International Workshop on Signal Processing Advances in Wireless Communications*, Lucca, Italy, September 2021.
- [35] V. Rizzello, N. Turan, M. Joham, and W. Utschick. Two-sample tests for validating the UL-DL conjecture in FDD systems. In *Proceedings of the 17th International Symposium on Wireless Communication Systems*, Berlin, Germany, September 2021.

- [36] N. Turan, M. Koller, and W. Utschick. One-bit quantized channel prediction with neural networks. In *Proceedings of the 32th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, Oulu, Finland, September 2021.
- [37] O. Gallitz, O. De Candido, M. Botsch, and W. Utschick. Interpretable early prediction of lane changes using a constrained neural network architecture. In *Proceedings of the 24th International Conference on Intelligent Transportation Systems*, Indianapolis, Indiana, USA, September 2021.
- [38] F. Konstantinidis, M. Sackmann, O. De Candido, U. Hofmann, J. Thielecke, and W. Utschick. Parameter sharing reinforcement learning for modeling multi-agent driving behavior in roundabout scenarios. In *Proceedings of the 24th International Conference on Intelligent Transportation Systems*, Indianapolis, Indiana, USA, September 2021.
- [39] J. A. Russer, M. Würth, W. Utschick, F. Bischeltsrieder, and M. Peichl. Performance considerations for quantum radar. In *Proceedings of the 2021 International Applied Computational Electromagnetics Society Symposium*, August 2021.
- [40] O. De Candido, M. Binder, and W. Utschick. An interpretable lane change detector algorithm based on deep autoencoder anomaly detection. In *Proceedings of the 2021 IEEE Intelligent Vehicles Symposium*, Nagoya, Japan, July 2021.
- [41] J. Wessner and W. Utschick. Online orientation prior for dynamic grid-maps. In *Proceedings of the 2021 IEEE Intelligent Vehicles Symposium*, Nagoya, Japan, July 2021.
- [42] J. Wurst, L. Balasubramanian, M. Botsch, and W. Utschick. Traffic scenario novelty detection and analysis in the latent space of a vision transformer-based autoencoder triplet network. In *Proceedings of the 2021 IEEE Intelligent Vehicles Symposium*, Nagoya, Japan, July 2021.
- [43] C. Kaulich, M. Joham, and W. Utschick. Rate-splitting for the weighted sum rate maximization under minimum rate constraints in the MIMO BC. In *Proceedings of the International Conference on Communications / Workshop on Rate-Splitting (Multiple Access) for 6G.*, Montreal, Canada, June 2021.
- [44] B. Matthiesen, C. Hellings, E. Jorswieck, and W. Utschick. Mixed monotonic programming for fast global optimization. In *Proceedings of the 46th International Conference on Acoustics, Speech, and Signal Processing*, Toronto, Ontario, Canada, June 2021.
- [45] M. Botsch and W. Utschick. **Fahrzeugsicherheit und automatisiertes Fahren: Methoden der Signalverarbeitung und des maschinellen Lernens.** Hanser Verlag, Juni 2020. *Gebunde Ausgabe.*
- [46] C. Hellings, F. Askerbeyli, and W. Utschick. Two-user SIMO interference channel with treating interference as noise: improper signaling versus time-sharing. **IEEE Transactions on Signal Processing**, 68:6467–6480, 2020.
- [47] B. Matthiesen, C. Hellings, E. Jorswieck, and W. Utschick. Mixed monotonic programming for fast global optimization. **IEEE Transactions on Signal Processing**, 68:2529–2544, 2020.

- [48] C. Stöckle, S. Herrmann, T. Dirndorfer, and W. Utschick. Robust function and sensor design for automated vehicular safety systems. **IEEE Signal Processing Magazine**, 37(4):24–33, 2020.
- [49] C. Hellings and W. Utschick. Improper signaling versus time-sharing in the two-user Gaussian interference channel with TIN. **IEEE Transactions on Information Theory**, 66(5):2988–2999, May 2020.
- [50] L. P. M. I. Sampath, M. Hotz, H. B. Gooi, and W. Utschick. Network-constrained thermal unit commitment for hybrid AC/DC transmission grids under wind power uncertainty. **ELSEVIER Applied Energy**, 258, January 2020.
- [51] M. Hotz and W. Utschick. *hynet*: an optimal power flow framework for hybrid AC/DC power systems. **IEEE Transactions on Power Systems**, 35(2):1036–1047, March 2020.
- [52] B. Fesl, M. Koller, N. Turan, and W. Utschick. Learning a low-complexity channel estimator for one-bit quantization. In *Proceedings of the 54th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2020.
- [53] C. Kaulich, M. Joham, and W. Utschick. Efficient rate splitting method using successive beamforming techniques. In *Proceedings of the 31th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, London, United Kingdom, August 2020.
- [54] O. De Candido, M. Koller, O. Gallitz, R. Melz, M. Botsch, and W. Utschick. Towards feature validation in time to lane change classification using deep neural networks. In *Proceedings of the 23th International Conference on Intelligent Transportation Systems*, Rhodes, Greece, September 2020.
- [55] M.L. Leyrer, C. Stöckle, S. Herrmann, T. Dirndorfer, and W. Utschick. An efficient approach to simulation-based robust function and sensor design applied to an automatic emergency braking system. In *Proceedings of the 31th Intelligent Vehicles Symposium*, Las Vegas, NV, USA, June 2020.
- [56] K.-F. Lin, C. Stöckle, S. Herrmann, T. Dirndorfer, and W. Utschick. Robust function and sensor design considering sensor measurement errors applied to automatic emergency steering. In *Proceedings of the 31th Intelligent Vehicles Symposium*, Las Vegas, NV, USA, June 2020.
- [57] J. Wurst, A. Flores Fernandez, M. Botsch, and W. Utschick. An entropy based outlier score and its application to novelty detection for road infrastructure images. In *Proceedings of the 31th Intelligent Vehicles Symposium*, Las Vegas, NV, USA, June 2020.
- [58] N. Turan and W. Utschick. Learning the MMSE channel predictor. In *Proceedings of the International Conference on Communications / Open Workshop on Machine Learning in Communications*, Dublin, Ireland, June 2020.

- [59] A. Barthelme, R. Wiesmayr, and W. Utschick. Model order selection in DOA scenarios via cross-entropy based machine learning techniques. In *Proceedings of the 45th International Conference on Acoustics, Speech, and Signal Processing*, Barcelona, Catalonia, Mai 2020.
- [60] A. Barthelme, J. Kunz, and W. Utschick. An MSE approximation for grid-based maximum likelihood direction-of-arrival estimators. In *Proceedings of the 24th International ITG Workshop on Smart Antennas*, Hamburg, Germany, February 2020.
- [61] D. Ben Amor, M. Joham, and W. Utschick. Bilinear precoding for FDD massive MIMO system with imperfect covariance matrices. In *Proceedings of the 24th International ITG Workshop on Smart Antennas*, Hamburg, Germany, February 2020.
- [62] C. Hellings, Y. Yushu, and W. Utschick. Minimax solution to the partial decode-and-forward rate maximization in the MIMO relay channel. In *Proceedings of the 24th International ITG Workshop on Smart Antennas*, Hamburg, Germany, February 2020.
- [63] N. Turan and W. Utschick. Reproducible evaluation of neural network based channel estimators and predictors using a generic dataset. In *Proceedings of the 24th International ITG Workshop on Smart Antennas*, Hamburg, Germany, February 2020.
- [64] V. Rizzello, I. Brayek, M. Joham, and W. Utschick. Learning the channel state information across the frequency division gap in wireless communications. In *Proceedings of the 24th International ITG Workshop on Smart Antennas*, Hamburg, Germany, February 2020.
- [65] C. Lameiro, I. Santamaria, P. Schreier, and W. Utschick. Maximally improper signaling in underlay MIMO cognitive radio networks. **IEEE Transactions on Signal Processing**, 67(24):6241–6255, December 2019.
- [66] C. Hellings and W. Utschick. Measuring impropriety in complex and real representations. **ELSEVIER Signal Processing**, 164:267–283, November 2019.
- [67] J. P. González Coma, W. Utschick, and L. Castedo. Hybrid LISA for wideband multiuser millimeter wave communication systems under beam squint. **IEEE Transactions on Wireless Communications**, 18(2):1277–1288, February 2019.
- [68] O. Gallitz, O. De Candido, M. Botsch, and W. Utschick. Interpretable feature generation using deep neural networks and its application to lane change detection. In *Proceedings of the 22th International Conference on Intelligent Transportation Systems*, Auckland, New Zealand, October 2019.
- [69] A. Chaulwar, H. Al-Hashimi, M. Botsch, and W. Utschick. Efficient hybrid machine learning algorithm for trajectory planning in critical traffic-scenarios. In *Proceedings of the 4th International Conference on Intelligent Transportation Engineering*, Singapore, September 2019.
- [70] C. Hellings, B. Matthiesen, E. Jorswieck, and W. Utschick. Globally optimal TIN strategies with time-sharing in the MISO interference channel. In *Proceedings of the 27th European Signal Processing Conference*, A Coruna, Spain, September 2019.

- [71] M. Koller, C. Hellings, and W. Utschick. Learning-based channel estimation for various antenna array configurations. In *Proceedings of the 20th International Workshop on Signal Processing Advances in Wireless Communications*, Cannes, France, July 2019.
- [72] M. Newinger and W. Utschick. Interference management in cellular full-duplex MIMO systems with statistical CSI. In *Proceedings of the 20th International Workshop on Signal Processing Advances in Wireless Communications*, Cannes, France, July 2019.
- [73] C. Stöckle, W. Utschick, S. Herrmann, and T. Dirndorfer. Robust function and sensor design considering sensor measurement errors applied to automatic emergency braking. In *Proceedings of the 30th Intelligent Vehicles Symposium*, Paris, France, June 2019.
- [74] C. Hellings and W. Utschick. Combining linear estimation with scalar widely linear estimation. In *Proceedings of the 44th International Conference on Acoustics, Speech, and Signal Processing*, Brighton, United Kingdom, Mai 2019.
- [75] V. Rizzello, M. Joham, A. Matera, W. Utschick, and U. Spagnolini. Precoding design for the MIMO-ROC downlink. In *Proceedings of the 44th International Conference on Acoustics, Speech, and Signal Processing*, Brighton, United Kingdom, Mai 2019.
- [76] C. Hellings, A. Dehmani, S. Wesemann, M. Koller, and W. Utschick. Evaluation of neural-network-based channel estimators using measurement data. In *Proceedings of the 23th International ITG Workshop on Smart Antennas*, Vienna, Austria, April 2019.
- [77] S. Günther, M. Leclaire, M. Riemensberger, W. Utschick, and G. Carle. Bidirectional network coding in wireless networks. In *International Conference on Networked Systems*, Munich, Germany, March 2019.
- [78] C. Hellings, F. Weißer, and W. Utschick. High-SNR analysis of improper signaling in the MIMO broadcast channel with TIN. In *Proceedings of the 12th International ITG Conference on Systems, Communications and Coding*, Rostock, Germany, February 2019.
- [79] M. Newinger, C. Sommerauer, and W. Utschick. Sum-rate maximization by iterative user selection in cellular full-duplex MIMO systems. In *Proceedings of the 12th International ITG Conference on Systems, Communications and Coding*, Rostock, Germany, February 2019.
- [80] D. Neumann, T. Wiese, M. Joham, and W. Utschick. A bilinear equalizer for massive MIMO systems. **IEEE Transactions on Signal Processing**, 66(14):3740–3751, May 2018.
- [81] D. Neumann, M. Joham, and W. Utschick. Covariance matrix estimation in massive MIMO. **IEEE Signal Processing Letters**, 25(6):863–867, April 2018.
- [82] D. Neumann, T. Wiese, and W. Utschick. Learning the MMSE channel estimator. **IEEE Transactions on Signal Processing**, 66(11):2905–2917, January 2018.
- [83] M. Müller, M. Botsch, D. Böhländer, and W. Utschick. Machine learning based prediction of crash severity distributions for mitigation strategies. **Journal of Advances in Information Technology**, 9(1):15–24, February 2018.

- [84] W. Utschick, C. Stöckle, M. Joham, and J. Luo. Hybrid LISA precoding for multiuser millimeter-wave communications. **IEEE Transactions on Wireless Communications**, 17(2):752–765, February 2018.
- [85] M. Müller, M. Botsch, D. Böhmländer, and W. Utschick. A simulation framework for vehicle safety testing – Ein Simulationsframework für die Absicherung von Fahrzeugsicherheitsfunktionen. In *Aktive Sicherheit und Automatisiertes Fahren – 3. Interdisziplinärer Expertendialog (IEDAS) 2017*, chapter 5.2 Effectiveness – Wirksamkeit, pages 135–154. Expert Verlag, 2018.
- [86] M. Müller, X. Long, M. Botsch, D. Böhmländer, and W. Utschick. Real-time crash severity estimation with machine learning and 2D mass-spring-damper model. In *Proceedings of the 21th International Conference on Intelligent Transportation Systems*, Maui, Hawaii, 2018.
- [87] C. Stöckle, W. Utschick, S. Herrmann, and T. Dirndorfer. Robust design of an automatic emergency braking system considering sensor measurement errors. In *Proceedings of the 21th International Conference on Intelligent Transportation Systems*, Maui, Hawaii, November 2018.
- [88] A. Chaulwar, M. Botsch, and W. Utschick. Generation of reference trajectories for safe trajectory planning. In *Proceedings of the 27th International Conference on Artificial Neural Networks*, Rhodes, Greece, October 2018.
- [89] M. Koller, C. Hellings, M. Knödseder, T. Wiese, D. Neumann, and W. Utschick. Machine learning for channel estimation from compressed measurements. In *Proceedings of the 15th International Symposium on Wireless Communication Systems*, Lisbon, Portugal, August 2018.
- [90] L. Weiland, C. Stöckle, M. Würth, T. Weinberger, and W. Utschick. OMP with grid-less refinement steps for compressive mmWave MIMO channel estimation. In *Proceedings of the 10th IEEE Sensor Array and Multichannel Signal Processing Workshop*, Sheffield, United Kingdom, July 2018.
- [91] C. Hellings, P. Gest, and W. Utschick. Capacity of the two-user MIMO broadcast channel under a shaping constraint in closed form. In *Proceedings of the 19th International Workshop on Signal Processing Advances in Wireless Communications*, Kalamata, Greece, June 2018.
- [92] J. Wessner and W. Utschick. Extending occupancy grid mapping for dynamic environments. In *Proceedings of the 29th Intelligent Vehicles Symposium*, Changshu, Suzhou, China, June 2018.
- [93] L. P. M. I. Sampath, M. Hotz, H. B. Gooi, and W. Utschick. Unit commitment problem with AC power flow constraints for a hybrid transmission grid. In *Proceedings of the 20th Power Systems Computation Conference*, Dublin, Ireland, June 2018.
- [94] C. Hellings and W. Utschick. Proper time-sharing as a baseline for studying improper signaling in interference channels. In *Proceedings of the 22th International ITG Workshop on Smart Antennas*, Bochum, Germany, March 2018.

- [95] M. Iwanow, S. Bazzi, and W. Utschick. A greedy approach for multiuser mmWave hybrid precoding with subarray architectures. In *Proceedings of the 22th International ITG Workshop on Smart Antennas*, Bochum, Germany, March 2018.
- [96] M. Koller, T. Wiese, and W. Utschick. A generalized hard thresholding pursuit on infinite unions of subspaces. In *Proceedings of the 22th International ITG Workshop on Smart Antennas*, Bochum, Germany, March 2018.
- [97] T. Wiese, K. Shibli, and W. Utschick. MSE analysis of the projected gradient algorithm on unions of subspaces. In *Proceedings of the 22th International ITG Workshop on Smart Antennas*, Bochum, Germany, March 2018.
- [98] M. Müller, M. Botsch, D. Böhmländer, and W. Utschick. Machine learning based prediction of crash severity distributions for mitigation strategies. In *Proceedings of the 7th International Conference on Intelligent Computing and Applications*, Sidney, Australia, January 2018.
- [99] M. Hotz and W. Utschick. The hybrid transmission grid architecture: benefits in nodal pricing. **IEEE Transactions on Power Systems**, 33(2):1431–1442, March 2018.
- [100] C. Hellings and W. Utschick. Improper signaling versus time-sharing in the SISO Z-interference channel. **IEEE Communications Letters**, 21(11):2432–2435, November 2017.
- [101] C. Lameiro, W. Utschick, and I. Santamaria. Spatial interference shaping for underlay MIMO cognitive networks. **ELSEVIER Signal Processing**, 134:174–184, May 2017.
- [102] L. Weiland, T. Wiese, and W. Utschick. Multipath mitigation using OMP and Newton’s method for multi-antenna GNSS receivers. In *Proceedings of the 7th IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing*, Curacao, Dutch Antilles, December 2017.
- [103] M. Newinger and W. Utschick. Interference shaping for sum-rate maximization in cellular full-duplex MIMO networks. In *Proceedings of the IEEE Global Telecommunications Conference*, Singapore, December 2017.
- [104] R. Strobel, A. Barthelme, and W. Utschick. Weighted sum-rate optimization for rate and reach enhancement in G.fast. In *Proceedings of the IEEE Global Telecommunications Conference*, Singapore, December 2017.
- [105] M. Hotz, W. Utschick, I. Boiarchuk, D. Hewes, and R. Witzmann. An alternative network development strategy for Germany: the hybrid transmission grid architecture. In *Proceedings of the ETG Congress, The Energiewende - Blueprints for the new energy age*, Bonn, Germany, November 2017.
- [106] A. Barthelme, M. Joham, R. Strobel, and W. Utschick. Zero-forcing precoding using generalized inverses for G.fast DSL systems. In *Proceedings of the 51th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2017.

- [107] M. Iwanow, N. Vucic, S. Bazzi, J. Luo, and W. Utschick. A greedy approach for mmWave hybrid precoding with subarray architectures. In *Proceedings of the 51th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2017.
- [108] R. Strobel, A. Barthelme, and W. Utschick. Implementation aspects of nonlinear precoding for G.fast – coding and legacy receivers. In *Proceedings of the 25th European Signal Processing Conference*, Kos Island, Greece, August 2017.
- [109] M. Iwanow, N. Vucic, W. Utschick, M. Castaneda, W. Xu, and J. Luo. Data rate bound for mmWave hybrid beamforming systems with subarrays. In *Proceedings of the 18th International Workshop on Signal Processing Advances in Wireless Communications*, Sapporo, Japan, July 2017.
- [110] A. Chaulwar, M. Botsch, and W. Utschick. A machine learning based biased-sampling approach for planning safe trajectories in complex, dynamic traffic-scenarios. In *Proceedings of the 2017 IEEE Intelligent Vehicles Symposium*, Redondo Beach, CA, USA, June 2017.
- [111] M. Hotz and W. Utschick. Hybrid transmission grid architecture enabling efficient optimal power flow. In *Proceedings of the General Meeting of the IEEE Power & Energy Society*, Chicago, Illinois, USA, July 2017.
- [112] M. Klügel, M. Newinger, W. Utschick, and W. Kellerer. The relaxed power control algorithm. In *Proceedings of the European Conference on Networks and Communications*, Oulu, Finland, June 2017.
- [113] T. Wiese, L. Weiland, and W. Utschick. Inexact projected gradients on unions of subspaces. In *Proceedings of the IEEE International Symposium on Information Theory*, Aachen, Germany, June 2017.
- [114] D. Neumann, K. Shibli, M. Joham, and W. Utschick. Joint covariance matrix estimation and pilot allocation in massive MIMO systems. In *Proceedings of the International Conference on Communications*, Paris, France, May 2017.
- [115] C. Hellings and W. Utschick. On the worst-case noise in Gaussian MIMO systems with proper and with improper signaling. In *Proceedings of the 21th International ITG Workshop on Smart Antennas*, Berlin, Germany, March 2017.
- [116] D. Neumann, T. Wiese, and W. Utschick. Deep channel estimation. In *Proceedings of the 21th International ITG Workshop on Smart Antennas*, Berlin, Germany, March 2017.
- [117] J. Pickart, C. Stöckle, M. Joham, and W. Utschick. Low-complexity sum rate maximization for millimeter-wave communications. In *Proceedings of the 21th International ITG Workshop on Smart Antennas*, Berlin, Germany, March 2017.
- [118] C. Stöckle, W. Utschick, M. Joham, and J. Luo. Multi-user hybrid precoding for millimeter-wave communications based on a linear successive allocation method. In *Proceedings of the 21th International ITG Workshop on Smart Antennas*, Berlin, Germany, March 2017.

- [119] T. Wiese, M. Knödlseeder, and W. Utschick. On the size of the DOA manifold. In *Proceedings of the 21th International ITG Workshop on Smart Antennas*, Berlin, Germany, March 2017.
- [120] D. Neumann, M. Joham, and W. Utschick. On MSE based receiver design for massive MIMO. In *Proceedings of the 11th International ITG Conference on Systems, Communications and Coding*, Hamburg, Germany, February 2017.
- [121] M. Hotz and W. Utschick. A hybrid transmission grid architecture enabling efficient optimal power flow. **IEEE Transactions on Power Systems**, 31(6):4504–4516, November 2016.
- [122] W. Utschick, editor. **Communications in Interference Limited Networks**. Signals and Communication Technology. Springer International Publishing, 2016.
- [123] A. Gründinger, L. Gerdes, M. Joham, and W. Utschick. Bounds on the outage constrained capacity of the Gaussian relay channel. In **Communications in Interference Limited Networks**, Signals and Communication Technology, chapter 6. Springer International Publishing, 2016.
- [124] A. Gründinger, M. Joham, and W. Utschick. Balancing for interference-limited multi-user satellite communications. In *Communications in Interference Limited Networks*, Signals and Communication Technology, chapter 7. Springer International Publishing, 2016.
- [125] M. Riemensberger and W. Utschick. Multicast in networks of broadcast channels—Part I: Submodular models and optimization. In *Communications in Interference Limited Networks*, Signals and Communication Technology, chapter 10. Springer International Publishing, 2016.
- [126] M. Riemensberger and W. Utschick. Multicast in networks of broadcast channels—Part II: Representation of bounds on the multicast capacity region. In *Communications in Interference Limited Networks*, Signals and Communication Technology, chapter 10. Springer International Publishing, 2016.
- [127] A. Dotzler, M. Riemensberger, and W. Utschick. Minimax duality for MIMO interference networks. <https://www.mdpi.com/2078-2489/7/2/19>, *Special Issue on Communication Theory*, March 2016.
- [128] Q. Kuang, W. Utschick, and A. Dotzler. Optimal joint user association and multi-pattern resource allocation in heterogeneous networks. **IEEE Transactions on Signal Processing**, 64(13):3388–3401, July 2016.
- [129] Q. Kuang and W. Utschick. Energy management in heterogeneous networks with cell activation, user association and interference coordination. **IEEE Transactions on Wireless Communications**, 15(6):3868–3879, February 2016.
- [130] T. Wiese, M. Riemensberger, and W. Utschick. Scheduling for network-coded multicast with interference. **IEEE Transactions on Signal Processing**, pages 2245–2254, May 2016.

- [131] A. Chaulwar, M. Botsch, W. Utschick, and A. Reinhold. A hybrid machine learning approach for planning safe trajectories in complex traffic-scenarios. In *Proceedings of the 15th IEEE International Conference on Machine Learning and Applications*, Los Angeles, CA, USA, December 2016.
- [132] A. Barthelme, R. Strobel, M. Joham, and W. Utschick. Weighted MMSE Tomlinson-Harashima precoding for G.fast. In *Proceedings of the IEEE Global Telecommunications Conference*, Washington, DC, USA, December 2016.
- [133] J. P. González Coma, A. Gründinger, M. Joham, L. Castedo, and W. Utschick. Multi-stream MIMO MSE balancing with generalized power constraints. In *Proceedings of the 17th International Workshop on Signal Processing Advances in Wireless Communications*, Edinburgh, United Kingdom, June 2016.
- [134] T. Wiese, L. Weiland, and W. Utschick. Exact recovery of structured block-sparse signals with model-aware orthogonal matching pursuit. In *Proceedings of the 17th International Workshop on Signal Processing Advances in Wireless Communications*, Edinburgh, United Kingdom, June 2016.
- [135] Q. Kuang, X. Yu, and W. Utschick. Network topology adaptation and interference coordination for energy saving in heterogeneous networks. In *Proceedings of the 41th International Conference on Acoustics, Speech, and Signal Processing*, Shanghai, China, March 2016.
- [136] C. Lameiro, I. Santamaria, W. Utschick, and P. Schreier. Maximally improper interference in underlay cognitive radio networks. In *Proceedings of the 41th International Conference on Acoustics, Speech, and Signal Processing*, Shanghai, China, March 2016.
- [137] R. Strobel and W. Utschick. Discontinuous operation for precoded G.fast. In *Proceedings of the 41th International Conference on Acoustics, Speech, and Signal Processing*, Shanghai, China, March 2016.
- [138] J. P. González Coma, A. Gründinger, M. Joham, L. Castedo, and W. Utschick. On MSE balancing in the MIMO broadcast channel with unequal targets. In *Proceedings of the 20th International ITG Workshop on Smart Antennas*, Munich, Germany, March 2016.
- [139] M. Iwanow, A. Gründinger, M. Joham, and W. Utschick. A study on source-relay cooperation for the outage constrained relay channel. In *Proceedings of the 20th International ITG Workshop on Smart Antennas*, Munich, Germany, March 2016.
- [140] M. Iwanow, N. Vucic, M. Castaneda, J. Luo, and W. Utschick. Wideband transceiver design for mmWave communication systems. In *Proceedings of the 20th International ITG Workshop on Smart Antennas*, Munich, Germany, March 2016. *Invited Paper*.
- [141] D. Neumann, A. Gründinger, M. Joham, and W. Utschick. CDI rate-balancing with per-base-station constraints. In *Proceedings of the 20th International ITG Workshop on Smart Antennas*, Munich, Germany, March 2016.
- [142] F. Steiner, A. Mezghani, L. Swindlehurst, J.A. Nossek, and W. Utschick. Turbo-like joint data-and-channel estimation in quantized massive MIMO systems. In *Proceedings*

- of the 20th International ITG Workshop on Smart Antennas, Munich, Germany, March 2016.
- [143] T. Wiegart, C. Hellings, and W. Utschick. Close-to-optimal partial decode-and-forward rate in the MIMO relay channel via convex programming. In *Proceedings of the 20th International ITG Workshop on Smart Antennas*, Munich, Germany, March 2016.
- [144] T. Wiese, L. Weiland, and W. Utschick. Low-rank approximations for spatial channel models. In *Proceedings of the 20th International ITG Workshop on Smart Antennas*, Munich, Germany, March 2016.
- [145] S. Zoppi, M. Joham, D. Neumann, and W. Utschick. Pilot coordination in CDI precoded massive MIMO systems. In *Proceedings of the 20th International ITG Workshop on Smart Antennas*, Munich, Germany, March 2016.
- [146] L. Gerdes, C. Hellings, L. Weiland, and W. Utschick. On the maximum achievable partial decode-and-forward rate for the Gaussian MIMO relay channel. **IEEE Transactions on Information Theory**, 61(12):6751–6758, December 2015.
- [147] S. Bazzi, G. Dietl, and W. Utschick. Large system analysis of interference alignment achievable rates for the MIMO interference channel. **IEEE Transactions on Signal Processing**, 63(6):1490–1499, March 2015.
- [148] C. Hellings and W. Utschick. Block-skew-circulant matrices in complex-valued signal processing. **IEEE Transactions on Signal Processing**, 63(8):2093–2107, April 2015.
- [149] L. Weiland, T. Wiese, and W. Utschick. Coherent MIMO radar imaging with model-aware block sparse recovery. In *Proceedings of the 6th IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing*, Cancun, Mexico, December 2015.
- [150] R. Strobel, A. Barthelme, and W. Utschick. Zero-forcing and MMSE precoding for G.fast. In *Proceedings of the IEEE Global Telecommunications Conference*, San Diego, CA, USA, December 2015.
- [151] M. Heinrich, I. Heiser, T. Maul, A. Herkersdorf, and W. Utschick. A quality management approach on student dropout reduction in an Electrical and Computer Engineering undergraduate program at Technische Universität München. In *Proceedings of the 8th Annual International Conference of Education, Research and Innovation*, Seville, Spain, November 2015.
- [152] M. Newinger and W. Utschick. Covariance shaping for interference coordination in cellular wireless communication systems. In *Proceedings of the 49th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2015. *Invited Paper*.
- [153] L. Weiland, T. Wiese, and W. Utschick. Coherent MIMO radar with sparse recovery: joint vs. separate range and azimuth estimation. In *Proceedings of the 49th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2015.

- [154] L. Weiland, T. Wiese, and W. Utschick. Coherent MIMO radar range imaging with block sparse recovery. In *Proceedings of the 34th International Conference for Military Communications*, Tampa, Florida, USA, October 2015.
- [155] S. Herrmann, W. Utschick, M. Botsch, and F. Keck. Supervised learning via optimal control labeling for criticality classification in vehicle active safety. In *Proceedings of the 18th International Conference on Intelligent Transportation Systems*, Las Palmas de Gran Canaria, Spain, September 2015.
- [156] C. Hellings and W. Utschick. Two different real representations of complex matrices for describing widely linear systems. In *Proceedings of the 12th International Symposium on Wireless Communication Systems*, Brussels, Belgium, August 2015. *Invited Paper*.
- [157] C. Hellings, P. Gögler, and W. Utschick. Composite real principal component analysis of complex signals. In *Proceedings of the 23th European Signal Processing Conference*, Nice, France, September 2015.
- [158] R. Strobel and W. Utschick. Coexistence of G.fast and VDSL in FTTdp and FTTC deployments. In *Proceedings of the 23th European Signal Processing Conference*, Nice, France, September 2015.
- [159] C. Hellings and W. Utschick. Separability of parallel Gaussian MIMO broadcast channels with shaping constraints. In *Proceedings of the 16th International Workshop on Signal Processing Advances in Wireless Communications*, Stockholm, Sweden, June 2015.
- [160] D. Neumann, A. Gründinger, M. Joham, and W. Utschick. Rate balancing in massive MIMO with precoding based on channel statistics. In *Proceedings of the 16th International Workshop on Signal Processing Advances in Wireless Communications*, Stockholm, Sweden, June 2015. *Invited Paper*.
- [161] T. Wiese, L. Weiland, and W. Utschick. DOA estimation and array registration with joint sparse reconstruction methods. In *Proceedings of the 16th International Workshop on Signal Processing Advances in Wireless Communications*, Stockholm, Sweden, June 2015.
- [162] M. Jobst, S. Günther, M. Riemensberger, G. Carle, and W. Utschick. Adaptive suppression of inter-packet delay variations in coded packet networks. In *Proceedings of the International Symposium on Network Coding*, Sydney, Australia, June 2015.
- [163] A. Krebs, M. Joham, and W. Utschick. Comparative performance evaluation of error regularized turbo-MIMO MMSE-SIC detectors in Gaussian channels. In *Proceedings of the 40th International Conference on Acoustics, Speech, and Signal Processing*, Brisbane, Australia, April 2015.
- [164] A. Gründinger, L. Gerdes, M. Joham, and W. Utschick. Bounds on the outage constrained capacity of the single-antenna Gaussian relay channel. In *Proceedings of the Conference on Information Sciences and Systems*, Baltimore, USA, March 2015.
- [165] A. Gründinger, J. Pickart, M. Joham, and W. Utschick. A probabilistic downlink beamforming approach with multiplicative and additive channel errors. In *Proceedings of the Conference on Information Sciences and Systems*, Baltimore, USA, March 2015.

- [166] H. Brunner, A. Dotzler, W. Utschick, and J.A. Nossek. Weighted sum rate maximization with multiple linear conic constraints. In *Proceedings of the International Conference on Communications*, London, United Kingdom, June 2015.
- [167] A. Krebs, M. Joham, and W. Utschick. Soft detection constrained achievable rates for nonlinear MIMO-BICM receivers. In *Proceedings of the International Conference on Communications*, London, United Kingdom, June 2015.
- [168] M. Newinger, A. Dotzler, and W. Utschick. Interference shaping for device-to-device communication in cellular networks. In *Proceedings of the International Conference on Communications*, London, United Kingdom, June 2015.
- [169] R. Strobel, M. Joham, and W. Utschick. Achievable rates with implementation limitations for G.fast-based hybrid copper/fiber networks. In *Proceedings of the International Conference on Communications*, London, United Kingdom, June 2015.
- [170] S. Bazzi, G. Dietl, and W. Utschick. How many transmit antennas emulate the performance of noise-limited systems? In *Proceedings of the 19th International ITG Workshop on Smart Antennas*, Ilmenau, Germany, March 2015.
- [171] A. Dotzler, M. Newinger, and W. Utschick. Covariance shapes as a cognitive radio concept for receivers with multiple antennas. In *Proceedings of the 19th International ITG Workshop on Smart Antennas*, Ilmenau, Germany, March 2015.
- [172] L. Gerdes, M. Riemensberger, and W. Utschick. On the equivalence of degraded Gaussian MIMO broadcast channels. In *Proceedings of the 19th International ITG Workshop on Smart Antennas*, Ilmenau, Germany, March 2015.
- [173] C. Hellings, M. Koller, and W. Utschick. An impropriety test based on block-skew-circulant matrices. In *Proceedings of the 19th International ITG Workshop on Smart Antennas*, Ilmenau, Germany, March 2015.
- [174] Q. Kuang, W. Utschick, and A. Dotzler. Multi-pattern resource allocation in heterogeneous cellular networks. In *Proceedings of the 19th International ITG Workshop on Smart Antennas*, Ilmenau, Germany, March 2015.
- [175] A. Krebs, M. Joham, and W. Utschick. Error regularized turbo-MIMO MMSE-SIC detection with imperfect channel state information. In *Proceedings of the 19th International ITG Workshop on Smart Antennas*, Ilmenau, Germany, March 2015.
- [176] D. Neumann, M. Joham, and W. Utschick. Low-complexity approximative LMMSE channel estimation in massive MIMO. In *Proceedings of the 19th International ITG Workshop on Smart Antennas*, Ilmenau, Germany, March 2015.
- [177] L. Weiland and W. Utschick. On receive filter design for coherent MIMO radar with non-ideal waveforms. In *Proceedings of the 19th International ITG Workshop on Smart Antennas*, Ilmenau, Germany, March 2015.
- [178] S. Bazzi, G. Dietl, and W. Utschick. Maximum ratio transmission for massive MIMO: non-asymptotic analysis with limited CSIR. In *Proceedings of the 10th International ITG Conference on Systems, Communications and Coding*, Hamburg, Germany, February 2015.

- [179] C. Hellings and W. Utschick. Iterative algorithms for transceiver design in MIMO broadcast channels with improper signaling. In *Proceedings of the 10th International ITG Conference on Systems, Communications and Coding*, Hamburg, Germany, February 2015.
- [180] D. Neumann, M. Joham, and W. Utschick. CDI precoding for massive MIMO. In *Proceedings of the 10th International ITG Conference on Systems, Communications and Coding*, Hamburg, Germany, February 2015.
- [181] M. Riemensberger and W. Utschick. On carrier sense multiple access in coded wireless packet networks. In *Proceedings of the 10th International ITG Conference on Systems, Communications and Coding*, Hamburg, Germany, February 2015.
- [182] C. Hellings, L. Gerdes, L. Weiland, and W. Utschick. On optimal Gaussian signaling in MIMO relay channels with partial decode-and-forward. **IEEE Transactions on Signal Processing**, 62(12):3153–3164, June 2014.
- [183] M. Riemensberger and W. Utschick. A polymatroid flow model for network coded multicast in wireless networks. **IEEE Transactions on Information Theory**, 60(1):443–460, January 2014.
- [184] A. Gründinger, M. Joham, and W. Utschick J. P. González Coma, L. Castedo. Average sum MSE minimization in the multi-user downlink with multiple power constraints. In *Proceedings of the 48th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2014.
- [185] C. Hellings and W. Utschick. On carrier-cooperation in parallel Gaussian MIMO relay channels with partial decode-and-forward. In *Proceedings of the 48th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2014.
- [186] C. Lameiro, W. Utschick, and I. Santamaria. Interference-temperature limit for cognitive radio networks with MIMO primary users. In *Proceedings of the 48th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2014.
- [187] A. Gründinger, M. Joham, A. Barthelme, and W. Utschick. Mean square error beamforming in SatCom: uplink-downlink duality with per-feed constraints. In *Proceedings of the 11th International Symposium on Wireless Communication Systems*, Barcelona, Catalonia, August 2014.
- [188] S. Günther, M. Riemensberger, and W. Utschick. Efficient GF arithmetic for linear network coding using hardware SIMD extensions. In *Proceedings of the International Symposium on Network Coding*, Aalborg, Denmark, June 2014.
- [189] L. Gerdes, L. Weiland, and W. Utschick. Optimal partial decode-and-forward rates for the Gaussian MIMO relay channel using the GSVD. In *Proceedings of the 15th International Workshop on Signal Processing Advances in Wireless Communications*, Toronto, Canada, June 2014.

- [190] D. Neumann, M. Joham, and W. Utschick. Suppression of pilot-contamination in massive MIMO systems. In *Proceedings of the 15th International Workshop on Signal Processing Advances in Wireless Communications*, Toronto, Canada, June 2014. *Invited Paper*.
- [191] M. Riemensberger and W. Utschick. Submodular structure and optimal quantization in Gaussian multiple access relay networks. In *Proceedings of the 16th International Workshop on Signal Processing Advances in Wireless Communications*, Toronto, Canada, June 2014.
- [192] S. Bazzi, G. Dietl, and W. Utschick. Subspace precoding with limited feedback for the massive MIMO interference channel. In *Proceedings of the 8th IEEE Sensor Array and Multichannel Signal Processing Workshop*, A Coruna, Spain, June 2014.
- [193] D. Neumann, A. Gründinger, M. Joham, and W. Utschick. On the amount of training in coordinated massive MIMO systems. In *Proceedings of the 8th IEEE Sensor Array and Multichannel Signal Processing Workshop*, A Coruna, Spain, June 2014.
- [194] C. Hellings, L. Weiland, and W. Utschick. Optimality of proper signaling in Gaussian MIMO broadcast channels with shaping constraints. In *Proceedings of the 39th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Florence, Italy, May 2014.
- [195] A. Krebs, M. Joham, and W. Utschick. An adaptive MMSE-SIC soft detector with error regularization for iterative MIMO receivers. In *Proceedings of the 39th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Florence, Italy, May 2014.
- [196] C. Lameiro, W. Utschick, and I. Santamaria. Interference shaping constraints for underlay MIMO interference channels. In *Proceedings of the 39th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Florence, Italy, May 2014.
- [197] L. Gerdes, L. Weiland, M. Riemensberger, and W. Utschick. Optimal partial decode-and-forward rates for stochastically degraded Gaussian relay channels. In *Proceedings of the Conference on Information Sciences and Systems*, Princeton University, USA, March 2014.
- [198] H. Brunner, A. Dotzler, W. Utschick, and J.A. Nossek. Intercell interference robustness tradeoff with loosened covariance shaping. In *Proceedings of the 18th International ITG Workshop on Smart Antennas*, Erlangen, Germany, March 2014.
- [199] A. Dotzler, C. Dietrich, G. Dietl, and W. Utschick. Fractional reuse for LTE-Advanced MIMO networks. In *Proceedings of the 18th International ITG Workshop on Smart Antennas*, Erlangen, Germany, March 2014.
- [200] C. Hellings, S. Herrmann, and W. Utschick. A deterministic initialization for optimizing carrier-cooperative transmit strategies. In *Proceedings of the 18th International ITG Workshop on Smart Antennas*, Erlangen, Germany, March 2014.
- [201] C. Lameiro, W. Utschick, and I. Santamaria. Spatial shaping and precoding design for underlay MIMO interference channels. In *Proceedings of the 18th International ITG Workshop on Smart Antennas*, Erlangen, Germany, March 2014.

- [202] D. Neumann, A. Gründinger, M. Joham, and W. Utschick. Pilot coordination for large-scale multi-cell TDD systems. In *Proceedings of the 18th International ITG Workshop on Smart Antennas*, Erlangen, Germany, March 2014.
- [203] C. Hellings, M. Joham, and W. Utschick. QoS feasibility in MIMO broadcast channels with widely linear transceivers. **IEEE Signal Processing Letters**, 20(11):1134–1137, September 2013. *Selected for presentation at ICASSP 2014 in Florence, Italy.*
- [204] D. Schmidt, C. Shi, R. Berry, M.L. Honig, and W. Utschick. Comparison of distributed beamforming algorithms for MIMO interference networks. **IEEE Transactions on Signal Processing**, 61(13):3476–3489, April 2013.
- [205] C. Hellings, S. Herrmann, and W. Utschick. Carrier cooperation can reduce the transmit power in parallel MIMO broadcast channels with zero-forcing. **IEEE Transactions on Signal Processing**, 61(12):3021–3027, March 2013.
- [206] L. Gerdes, M. Riemensberger, and W. Utschick. Bounds on the capacity regions of half-duplex Gaussian MIMO relay channels. **EURASIP Journal on Advances in Signal Processing**, *Special Issue on Advanced Distributed Wireless Communication Techniques Theory and Practice*, 2013.
- [207] C. Guthy, W. Utschick, and M. L. Honig. Large system analysis of sum capacity in the Gaussian MIMO broadcast channel. **IEEE Journal on Selected Areas of Communications**, 31(2):149–159, February 2013.
- [208] S. Günther, M. Riemensberger, and W. Utschick. Feedback in coded wireless packet networks. In *Proceedings of the 14th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, London, United Kingdom, September 2013.
- [209] R. Strobel, R. Stolle, and W. Utschick. Wideband modeling of twisted-pair cables for MIMO applications. In *Proceedings of the IEEE Global Telecommunications Conference*, Atlanta, Georgia, USA, December 2013.
- [210] C. Hellings and W. Utschick. Energy efficiency optimization in the multiantenna downlink with linear transceivers. In *Proceedings of the 23th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, London, United Kingdom, September 2013.
- [211] C. Hellings and W. Utschick. Three kinds of inseparability in parallel MIMO broadcast channels with linear transceivers. In *Proceedings of the 10th International Symposium on Wireless Communication Systems*, Ilmenau, Germany, August 2013.
- [212] A. Gründinger, R. Bethenod, M. Joham, M. Riemensberger, and W. Utschick. Optimal power allocation for the chance-constrained vector broadcast channel and rank-one channel approximation. In *Proceedings of the 14th International Workshop on Signal Processing Advances in Wireless Communications*, Darmstadt, Germany, June 2013.
- [213] C. Hellings and W. Utschick. Energy efficiency optimization in MIMO broadcast channels with fairness constraints. In *Proceedings of the 14th International Workshop on Signal Processing Advances in Wireless Communications*, Darmstadt, Germany, June 2013.

- [214] M. Riemensberger and W. Utschick. A Markov model for carrier sense multiple access in coded wireless packet networks. In *Proceedings of the 14th International Workshop on Signal Processing Advances in Wireless Communications*, Darmstadt, Germany, June 2013.
- [215] L. Weiland, L. Gerdes, and W. Utschick. Partial decode-and-forward rates for the Gaussian MIMO relay channel: inner approximation of non-convex rate constraints. In *Proceedings of the 14th International Workshop on Signal Processing Advances in Wireless Communications*, Darmstadt, Germany, June 2013.
- [216] A. Gründinger, D. Leiner, M. Joham, C. Hellings, and W. Utschick. Ergodic robust rate balancing for rank-one vector broadcast channels via sequential approximations. In *Proceedings of the 38th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Vancouver, Canada, May 2013.
- [217] C. Hellings and W. Utschick. Performance gains due to improper signals in MIMO broadcast channels with widely linear transceivers. In *Proceedings of the 38th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Vancouver, Canada, May 2013.
- [218] M. Joham, A. Gründinger, A. Pastore, J.R. Fonollosa, and W. Utschick. Rate balancing in the vector BC with erroneous CSI at the receivers. In *Proceedings of the Conference on Information Sciences and Systems*, Johns Hopkins University, Baltimore, USA, March 2013.
- [219] C. Hellings and W. Utschick. Linear precoding in parallel MIMO broadcast channels: separable and inseparable scenarios. In *Proceedings of the 17th International ITG Workshop on Smart Antennas*, Stuttgart, Germany, March 2013.
- [220] D. Neumann, A. Dotzler, G. Dietl, and W. Utschick. Optimal utility-based multi-user scheduling and low-complexity alternatives. In *Proceedings of the 9th International ITG Conference on Systems, Communications and Coding*, Munich, Germany, January 2013.
- [221] M. Riemensberger, Thomas Wiese, and W. Utschick. Network coded wireless multicast with advanced receiver capabilities. In *Proceedings of the 9th International ITG Conference on Systems, Communications and Coding*, Munich, Germany, January 2013.
- [222] L. Gerdes, M. Riemensberger, and W. Utschick. On achievable rate regions for half-duplex Gaussian MIMO relay channels: a decomposition approach. **IEEE Journal on Selected Areas of Communications**, 30(8):1319–1330, September 2012.
- [223] D. Kotzor and W. Utschick. Kernel methods for ill-posed range based localization problems. **IEEE Transactions on Signal Processing**, 60(8):4151–4162, August 2012.
- [224] C. Hellings, M. Joham, M. Riemensberger, and W. Utschick. Minimal transmit power in parallel vector broadcast channels with linear precoding. **IEEE Transactions on Signal Processing**, 60(4):1890–1898, April 2012.
- [225] M. Joham, P. Castro, L. Castedo, and W. Utschick. Robust precoding with limited feedback design based on precoding MSE for MU-MISO systems. **IEEE Transactions on Signal Processing**, 60(6):3101–3111, June 2012.

- [226] W. Utschick and J. Brehmer. Monotonic optimization framework for coordinated beamforming in multi-cell networks. **IEEE Transactions on Signal Processing**, 60(4):1899–1909, April 2012.
- [227] C. Hellings, M. Joham, and W. Utschick. Gradient-based power minimization in MIMO broadcast channels with linear precoding. **IEEE Transactions on Signal Processing**, 60(2):877–890, February 2012.
- [228] K. Kusume, G. Bauch, and W. Utschick. IDMA vs. CDMA: analysis and comparison of two multiple access schemes. **IEEE Transactions on Wireless Communications**, 11(1):78–87, January 2012.
- [229] A. Dotzler, W. Utschick, and G. Dietl. Unitary precoding for MIMO interference networks. In *Proceedings of the IEEE Global Telecommunications Conference*, Anaheim, California, USA, December 2012.
- [230] J. Ellenbeck, A. Dotzler, and W. Utschick. Interference robustness for MIMO networks—system-level performance evaluation for LTE-Advanced. In *Proceedings of the IEEE Global Telecommunications Conference Workshop on Emerging Technologies for LTE-Advanced and Beyond-4G*, Anaheim, California, USA, December 2012.
- [231] A. Gründinger, A. Butabayeva, M. Joham, and W. Utschick. Chance constrained and ergodic robust QoS power minimization in the satellite downlink. In *Proceedings of the 46th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2012.
- [232] S. Herrmann, C. Hellings, and W. Utschick. Carrier-cooperative zero-forcing for power minimization in parallel MIMO broadcast channels. In *Proceedings of the 46th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2012.
- [233] S. Bazzi, G. Dietl, and W. Utschick. Interference alignment with imperfect channel state information at the transmitter. In *Proceedings of the 9th International Symposium on Wireless Communication Systems*, Paris, France, August 2012.
- [234] C. Hellings and W. Utschick. Energy-efficient rate balancing in vector broadcast channels with linear transceivers. In *Proceedings of the 9th International Symposium on Wireless Communication Systems*, Paris, France, August 2012.
- [235] S. Bazzi, G. Dietl, and W. Utschick. Interference alignment via minimizing projector distances of interfering subspaces. In *Proceedings of the 13th International Workshop on Signal Processing Advances in Wireless Communications*, Cesme, Turkey, June 2012.
- [236] S. Bazzi, G. Dietl, and W. Utschick. Power signaling based cooperative precoding for the MISO interference channel. In *Proceedings of the 13th International Symposium on Wireless Personal Multimedia Communications*, Cesme, Turkey, June 2012.
- [237] A. Dotzler, M. Riemensberger, and W. Utschick. Interference robustness for cellular MIMO networks. In *Proceedings of the 13th International Symposium on Wireless Personal Multimedia Communications*, Cesme, Turkey, June 2012. *Invited Paper*.

- [238] C. Hellings, P. Kiefer, and W. Utschick. Rate prediction and receding horizon power minimization in block-fading broadcast channels. In *Proceedings of the 13th International Symposium on Wireless Personal Multimedia Communications*, Cesme, Turkey, June 2012.
- [239] A. Gründinger, M. Joham, and W. Utschick. Bounds on optimal power minimization and rate balancing in the satellite downlink. In *Proceedings of the International Conference on Communications*, Ottawa, Canada, June 2012.
- [240] L. Gerdes, M. Riemensberger, and W. Utschick. Utility maximization in the half-duplex two-way MIMO relay channel. In *Proceedings of the 37th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Kyoto, Japan, March 2012.
- [241] A. Gründinger, M. Joham, and W. Utschick. Feasibility test and globally optimal beamformer design in the satellite downlink based on instantaneous and ergodic rates. In *Proceedings of the 16th International ITG Workshop on Smart Antennas*, Dresden, Germany, March 2012.
- [242] C. Hellings, N. Damak, and W. Utschick. Energy-efficient zero-forcing with user selection in parallel vector broadcast channels. In *Proceedings of the 16th International ITG Workshop on Smart Antennas*, Dresden, Germany, March 2012.
- [243] C. Hellings and W. Utschick. On the inseparability of parallel MIMO broadcast channels with linear transceivers. **IEEE Transactions on Signal Processing**, 59(12):6273–6278, December 2011.
- [244] D. Nisar and W. Utschick. Minimax robust a-priori information aware equalizer design. **IEEE Transactions on Signal Processing**, 59(4):1734–1745, April 2011.
- [245] C. Hellings and W. Utschick. Carrier-cooperative transmission in parallel MIMO broadcast channels: potential gains and algorithms. In *Proceedings of the 8th International Symposium on Wireless Communication Systems*, Aachen, Germany, November 2011.
- [246] D. A. Schmidt and W. Utschick. Algorithms for improper single-stream MIMO interference networks. In *Proceedings of the 8th International Symposium on Wireless Communication Systems*, Aachen, Germany, November 2011. *Invited Paper*.
- [247] A. Gründinger, M. Joham, and W. Utschick. Design of beamforming in the satellite downlink with static and mobile users. In *Proceedings of the 45th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2011.
- [248] C. Hellings, W. Utschick, and M. Joham. Power minimization in parallel vector broadcast channels with separate linear precoding. In *Proceedings of the 19th European Signal Processing Conference*, Barcelona, Catalonia, September 2011.
- [249] M. D. Nisar and W. Utschick. Minimax robust power allocation over parallel communication channels. In *Proceedings of the 19th European Signal Processing Conference*, Barcelona, Catalonia, September 2011.

- [250] K. Kusume, K. Khashaba, G. Dietl, and W. Utschick. Hybrid single/multi-user MIMO transmission based on implicit channel feedback. In *Proceedings of the International Conference on Communications*, Kyoto, Japan, June 2011.
- [251] P. de Kerret, R. Hunger, M. Joham, W. Utschick, and R. Mathar. MIMO broadcast channel rate region with linear filtering at high SNR: full multiplexing. In *Proceedings of the International Conference on Communications*, Kyoto, Japan, June 2011.
- [252] A. Gründinger, M. Joham, and W. Utschick. Stochastic transceiver design in multi-antenna channels with statistical channel state information. In *Proceedings of the 36th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Prague, Czech Republic, May 2011.
- [253] L. Gerdes and W. Utschick. Optimized capacity bounds for the MIMO relay channel. In *Proceedings of the 36th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Prague, Czech Republic, May 2011.
- [254] A. Dotzler, W. Utschick, and G. Dietl. Efficient zero-forcing based interference coordination for MISO networks. In *Proceedings of the 73th IEEE Vehicular Technology Conference*, Budapest, Hungary, May 2011.
- [255] K. Kusume, K. Khashaba, T. Abe, and W. Utschick. Constrained optimization of universal codebook for MIMO precoding. In *Proceedings of the 73th IEEE Vehicular Technology Conference*, Budapest, Hungary, May 2011.
- [256] M. Riemensberger and W. Utschick. Random access in coded wireless packet networks: feasibility and distributed optimization. In *Proceedings of the 9th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks*, Princeton, USA, March 2011.
- [257] A. Dotzler, W. Utschick, and G. Dietl. Linear successive user allocation in the multi-cell MIMO environment. In *Proceedings of the IEEE Wireless Communications and Networking Conference*, Cancun Quintana-Roo, Mexico, March 2011.
- [258] A. Gründinger, M. Joham, and W. Utschick. Stochastic transceiver design in point-to-point MIMO channels with imperfect CSI. In *Proceedings of the 15th International ITG Workshop on Smart Antennas*, Aachen, Germany, February 2011.
- [259] C. Hellings, M. Joham, and W. Utschick. Gradient-based rate balancing for MIMO broadcast channels with linear precoding. In *Proceedings of the 15th International ITG Workshop on Smart Antennas*, Aachen, Germany, February 2011.
- [260] L. Gerdes and W. Utschick. Optimized capacity bounds for the half-duplex Gaussian MIMO relay channel. In *Proceedings of the 15th International ITG Workshop on Smart Antennas*, Aachen, Germany, February 2011.
- [261] W. Utschick and A. Brack. Computing upper bounds for coordinated multipoint transmission. In *Proceedings of the 15th International ITG Workshop on Smart Antennas*, Aachen, Germany, February 2011.

- [262] C. Guthy, W. Utschick, R. Hunger, and M. Joham. Efficient weighted sum rate maximization with linear precoding. **IEEE Transactions on Signal Processing**, 58(4):2284–2297, April 2010.
- [263] M. Joham, P. Castro, L. Castedo, and W. Utschick. Robust precoding with Bayesian error modeling for limited feedback MU-MISO systems. **IEEE Transactions on Signal Processing**, 58(9):4954–4960, September 2010.
- [264] D. Nisar, W. Utschick, and T. Hindelang. Maximally robust 2-d channel estimation in multi-carrier systems. **IEEE Transactions on Signal Processing**, 58(6):3163–3172, June 2010.
- [265] M. Yukawa and W. Utschick. A fast stochastic gradient algorithm: maximal use of sparsification benefits under computational constraints. **IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences**, E93-A(2):467–475, February 2010.
- [266] A. Dotzler, W. Utschick, and G. Dietl. Fractional reuse partitioning for MIMO networks. In *Proceedings of the IEEE Global Telecommunications Conference*, Miami, Florida, USA, December 2010.
- [267] C. Hellings, M. Joham, and W. Utschick. Power minimization in parallel vector broadcast channels with zero-forcing beamforming. In *Proceedings of the IEEE Global Telecommunications Conference*, Miami, Florida, USA, December 2010.
- [268] D. A. Schmidt, W. Utschick, and M. L. Honig. Large system performance of interference alignment in single-beam MIMO networks. In *Proceedings of the IEEE Global Telecommunications Conference*, Miami, Florida, USA, December 2010.
- [269] M. Barrenechea, M. Joham, M. Mendicute, and W. Utschick. Analysis of vector precoding at high SNR: rate bounds and ergodic results. In *Proceedings of the IEEE Global Telecommunications Conference*, Miami, Florida, USA, December 2010.
- [270] G. Dietl, O. Labreche, and W. Utschick. Limited feedback schemes for multiuser MIMO downlink transmission. In *Proceedings of the IEEE Global Telecommunications Conference*, Miami, Florida, USA, December 2010.
- [271] P. de Kerret, M. Joham, W. Utschick, and R. Mathar. MIMO broadcast channel rate region with linear precoding at high SNR without full multiplexing. In *Proceedings of the International Symposium on Information Theory and Its Applications*, Taichung, Taiwan, October 2010.
- [272] D. A. Schmidt, W. Utschick, and M. L. Honig. Beamforming techniques for single-beam MIMO interference networks. In *Proceedings of the 48th Annual Allerton Conference on Communication, Control, and Computing*, Monticello, Illinois, USA, September 2010. *Invited Paper*.
- [273] M. D. Nisar and W. Utschick. Robust turbo equalization – a minimax perspective. In *Proceedings of the 6th International Symposium on Turbo Codes & Iterative Information Processing*, Brest, France, September 2010.

- [274] C. Guthy, W. Utschick, and M.L. Honig. Large system analysis of projection based algorithms for the MIMO broadcast channel. In *Proceedings of the IEEE International Symposium on Information Theory*, Austin, USA, June 2010.
- [275] N. Riemensberger, M. Heindlmaier, A. Dotzler, D. Traskov, and W. Utschick. Optimal slotted random access in coded wireless packet networks. In *Proceedings of the 6th Workshop on Resource Allocation, Cooperation and Competition in Wireless Networks*, Avignon, France, June 2010.
- [276] A. Awada, M. Joham, W. Utschick, S. Goldyrjew, W. Mulder, and T. Kaiser. A sorted parallel detector for coded MIMO systems. In *Proceedings of the 11th International Workshop on Signal Processing Advances in Wireless Communications*, Marrakech, Morocco, June 2010.
- [277] M. Joham, M. Vonbun, and W. Utschick. MIMO BC/MAC MSE duality with imperfect transmitter and perfect receiver CSI. In *Proceedings of the 6th International Workshop on Signal Processing Advances in Wireless Communications*, Marrakech, Morocco, June 2010.
- [278] P. Breun and W. Utschick. Optimal transmitters for control over a noisy link with imperfect feedback. In *Proceedings of the American Control Conference*, Baltimore, Maryland, USA, June 2010.
- [279] D. Kotzor and W. Utschick. A kernel-approach for estimating the position of moving objects. In *Proceedings of the 35th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Dallas, USA, March 2010.
- [280] C. Guthy, W. Utschick, and G. Dietl. Spatial resource allocation for the multiuser multicarrier MIMO broadcast channel: a QOS optimization perspective. In *Proceedings of the 35th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Dallas, USA, March 2010.
- [281] W. Utschick and J. Brehmer. Optimal interference management in multi-antenna, multi-cell systems. In *Proceedings of the International Zürich Seminar on Communications*, Zürich, Switzerland, March 2010.
- [282] A. Dotzler and W. Utschick. Gradient projection based interference alignment for the MIMO X channel. In *Proceedings of the 14th International ITG Workshop on Smart Antennas*, Bremen, Germany, February 2010.
- [283] G. Guthy, W. Utschick, and M.L. Honig. Large system analysis of the successive encoding successive allocation method for the MIMO BC. In *Proceedings of the 14th International ITG Workshop on Smart Antennas*, Bremen, Germany, February 2010.
- [284] D. A. Schmidt, C. Shi, R. Berry, M.L. Honig, and W. Utschick. Minimum mean squared error interference alignment. In *Proceedings of the Workshop on Information Theory and Applications*, San Diego, USA, January 2010. *Invited Paper*.
- [285] J. Brehmer and W. Utschick. Nonconcave utility maximization in the MIMO broadcast channel. **EURASIP Journal on Advances in Signal Processing** (*open access*),

Special Issue for Cross-Layer Design for the Physical, MAC, and Link Layer in Wireless Systems, 2009.

- [286] C. Guthy, W. Utschick, and G. Dietl. Low complexity linear zero-forcing for the MIMO broadcast channel. **IEEE Journal on Selected Topics in Signal Processing**, 3(6):1106–1117, December 2009.
- [287] R. Hunger, M. Joham, and W. Utschick. On the MSE-duality of the broadcast channel and the multiple access channel. **IEEE Transactions on Signal Processing**, 57(2):698–713, February 2009.
- [288] M. Riemensberger, Y. E. Sagduyu, M.L. Honig, and W. Utschick. Training overhead for decoding random linear network codes in wireless networks. **IEEE Journal on Selected Topics in Communications**, 27(5):729–737, June 2009.
- [289] D. A. Schmidt, C. Shi, R.A. Berry, M.L. Honig, and W. Utschick. Pricing algorithms for power control and beamformer design in interference networks. **IEEE Signal Processing Magazine**, 26(5):53–63, September 2009.
- [290] P. Tejera, W. Utschick, G. Bauch, and J. A. Nossek. Rate balancing in multiuser MIMO OFDM systems. **IEEE Transactions on Communications**, 57(5):1370–1380, June 2009.
- [291] S. Vorobyov, S. Cuy, K. Ma, Y. Eldar, and W. Utschick. Optimization techniques in wireless communications. **EURASIP Journal on Wireless Communications and Networking**, 2009.
- [292] C. Guthy, W. Utschick, R. Hunger, and M. Joham. Weighted sum rate maximization in the MIMO MAC with linear transceivers: algorithmic solutions. In *Proceedings of the 43th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2009.
- [293] R. Hunger, M. Joham, C. Guthy, and W. Utschick. Weighted sum rate maximization in the MIMO MAC with linear transceivers: asymptotic results. In *Proceedings of the 43th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2009.
- [294] M. Riemensberger, I. Abdelghani, J. Lenz, and W. Utschick. Weighted sum rate maximization on two user Gaussian interference channels with rate splitting. In *Proceedings of the 43th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2009.
- [295] D. A. Schmidt, C. Shi, R. Berry, M.L. Honig, and W. Utschick. Minimum mean squared error interference alignment. In *Proceedings of the 43th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2009.
- [296] K. Kusume, G. Bauch, and W. Utschick. IDMA versus CDMA: Detectors, performance and complexity. In *Proceedings of the IEEE Global Telecommunications Conference*, Honolulu, Hawaii, USA, 2009. *Best Paper Award*.

- [297] C. Mensing, S. Sand, A. Dammann, and W. Utschick. Data-aided location estimation in cellular OFDM communications systems. In *Proceedings of the IEEE Global Telecommunications Conference*, Honolulu, Hawaii, USA, 2009.
- [298] G. Dietl, O. Labreche, and W. Utschick. Channel vector quantization for multiuser mimo systems aiming at maximum sum rate. In *Proceedings of the IEEE Global Telecommunications Conference*, Honolulu, Hawaii, USA, 2009.
- [299] K. Kusume, G. Dietl, and W. Utschick. On the unbiased constraint for iterative minimum mean square error detection. In *Proceedings of the 12th Wireless Personal Multimedia Communications Symposium*, Sendai, Japan, September 2009.
- [300] M. D. Nisar, H. Nottensteiner, and W. Utschick. Iterative suppression of co-channel interference. In *Proceedings of the 17th European Signal Processing Conference*, Glasgow, Scotland, August 2009.
- [301] G. Dietl, O. Labreche, and W. Utschick. Enhanced channel quality indication for limited feedback multiuser MIMO systems. In *Proceedings of the 14th International OFDM-Workshop 2009*, Hamburg, August 2009.
- [302] M. Riemensberger, A. Dotzler, and W. Utschick. Factorization for advanced physical layer techniques in network-coded wireless communication networks. In *IEEE International Workshop on Wireless Network Coding*, June 2009.
- [303] J. Brehmer and W. Utschick. Bargaining over fading interference channels. In *Proceedings of the 5th workshop on Resource Allocation, Cooperation and Competition in Wireless Networks*, Seoul, Korea, June 2009.
- [304] C. Guthy, A. Krebs, and W. Utschick. Reduced entropy parameterization of MIMO channel matrices for finite-rate feedback. In *Proceedings of the 10th International Workshop on Signal Processing Advances in Wireless Communications*, Perugia, Italy, June 2009.
- [305] J. Brehmer and W. Utschick. Utility maximization in the multi-user MISO downlink with linear precoding. In *Proceedings of the International Conference on Communications*, Dresden, Germany, June 2009.
- [306] C. Guthy, W. Utschick, and G. Dietl. A user grouping method for maximum weighted sum capacity gain. In *Proceedings of the International Conference on Communications*, Dresden, Germany, June 2009.
- [307] C. Mensing, S. Sand, A. Dammann, and W. Utschick. Interference-aware location estimation in cellular OFDM communications systems. In *Proceedings of the International Conference on Communications*, Dresden, Germany, June 2009.
- [308] M. Riemensberger, Y. Sagduyu, M. L. Honig, and W. Utschick. Comparison of analog and digital relay methods with network coding for wireless multicast. In *Proceedings of the International Conference on Communications*, Dresden, Germany, June 2009.
- [309] C. Shi, D. A. Schmidt, R. Berry, M.L. Honig, and W. Utschick. Distributed interference pricing for the MIMO interference channel. In *Proceedings of the International Conference on Communications*, Dresden, Germany, June 2009.

- [310] M. D. Nisar, W. Utschick, and J. Forster. Robust 2-D channel estimation for staggered pilot grids in multi-carrier systems: LTE downlink as an example. In *Proceedings of the Workshop on Multi-Carrier Systems and Solutions*, Herrsching, Germany, May 2009.
- [311] M. D. Nisar, W. Utschick, and T. Hindelang. Robust 2-D channel estimation for multi-carrier systems with finite dimensional pilot grid. In *Proceedings of the 34th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Taipei, Taiwan, April 2009.
- [312] M. Yukawa and W. Utschick. Proportionate adaptive algorithm for nonsparse systems based on Krylov subspace and constrained optimization. In *Proceedings of the 34th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Taipei, Taiwan, April 2009.
- [313] J. Brehmer and W. Utschick. On proportional fairness in nonconvex wireless systems. In *Proceedings of the 13th International ITG Workshop on Smart Antennas*, Berlin, Germany, February 2009.
- [314] A. Dotzler and W. Utschick. Advanced physical layer techniques for wireless mesh networks with network coding. In *Proceedings of the 13th International ITG Workshop on Smart Antennas*, Berlin, Germany, February 2009.
- [315] C. Hellings, D. A. Schmidt, and W. Utschick. Optimized beamforming for the two stream MIMO interference channel at high SNR. In *Proceedings of the 13th International ITG Workshop on Smart Antennas*, Berlin, Germany, February 2009.
- [316] D. A. Schmidt and W. Utschick. Limited transmitter cooperation in adjacent broadcast channels. In *Proceedings of the 13th International ITG Workshop on Smart Antennas*, Berlin, Germany, February 2009.
- [317] W. Utschick, P. Tejera, C. Guthy, and G. Bauch. Transmission in MIMO OFDM point to multipoint networks. In **Handbook on Advancements in Smart Antenna Technologies for Wireless Networks**. Idea Group Inc., 2008.
- [318] F. Antreich, J. A. Nossek, and W. Utschick. Maximum likelihood delay estimation in a navigation receiver for aeronautical applications. **Aerospace Science and Technology**, 12(3):256–267, 2008.
- [319] C. Guthy, W. Utschick, G. Bauch, and J. A. Nossek. Sum throughput enhancements in quality of service constrained multiuser MIMO OFDM systems. **Wireless Personal Communications**, March 2008.
- [320] M. Riemensberger, Y. E. Sagduyu, M. L. Honig, and W. Utschick. Training overhead for decoding random linear network codes. In *Proceedings of the 27th International Conference for Military Communications*, San Diego, USA, November 2008.
- [321] C. Guthy, W. Utschick, G. Dietl, and P. Tejera. Efficient linear successive allocation for the MIMO broadcast channel. In *Proceedings of the 42th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2008.

- [322] M. Joham, P. Castro, J. Zhen, L. Castedo, and W. Utschick. Joint design of limited feedback and multiuser precoding based on a precoding MSE metric. In *Proceedings of the 42th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2008.
- [323] J. Karjalainen, T. Matsumoto, and W. Utschick. Convergence analysis of MMSE based multiuser MIMO turbo detector with linear precoding strategies. In *Proceedings of the 5th International Symposium on Turbo Codes and Related Topics*, Lausanne, Switzerland, September 2008.
- [324] P. Castro, M. Joham, L. Castedo, and W. Utschick. Robust MMSE linear precoding for multiuser MISO systems with limited feedback and channel prediction. In *Proceedings of the 18th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, Cannes, France, September 2008.
- [325] I. Groh and W. Utschick. High resolution reduced complexity synchronization in spread spectrum systems. In *Proceedings of the 16th European Signal Processing Conference*, Lausanne, Switzerland, September 2008.
- [326] C. Guthy, W. Utschick, J. A. Nossek, G. Dietl, and G. Bauch. Rate-invariant user preselection for complexity reduction in multiuser MIMO systems. In *Proceedings of the IEEE Vehicular Technology Conference*, Calgary, Canada, September 2008.
- [327] R. Hunger, D. A. Schmidt, M. Joham, and W. Utschick. A general covariance-based optimization framework using orthogonal projections. In *Proceedings of the 9th International Workshop on Signal Processing Advances in Wireless Communications*, July 2008.
- [328] P. Breun and W. Utschick. On transmitter design in power constrained LQG control. In *Proceedings of the American Control Conference*, Seattle, USA, June 2008.
- [329] M. Joham, P. Castro, L. Castedo, and W. Utschick. MMSE optimal feedback of correlated CSI for multi-user precoding. In *Proceedings of the 33th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Las Vegas, USA, April 2008.
- [330] M. Joham, H. Brunner, R. Hunger, D. A. Schmidt, and W. Utschick. Point-to-point MIMO MMSE vector precoding and THP achieving capacity. In *Proceedings of the 33th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Las Vegas, USA, April 2008.
- [331] J. Brehmer, C. Vaas, and W. Utschick. Nonconcave utility maximization in the OFDMA downlink. In *Proceedings of the 6th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks*, Berlin, Germany, April 2008.
- [332] J. Brehmer, Q. Bai, and W. Utschick. Time-sharing solutions in MIMO broadcast channel utility maximization. In *Proceedings of the 12th International ITG Workshop on Smart Antennas*, Darmstadt, Germany, February 2008.
- [333] P. Castro, M. Joham, W. Utschick, and L. Castedo. Robust downlink SINR balancing based on MMSE optimal CSI feedback. In *Proceedings of the 12th International ITG Workshop on Smart Antennas*, Darmstadt, Germany, February 2008.

- [334] C. Guthy, W. Utschick, and G. Dietl. Finite rate feedback schemes for the MIMO OFDM broadcast channel. In *Proceedings of the 12th International ITG Workshop on Smart Antennas*, Darmstadt, Germany, February 2008.
- [335] M. Joham, L. Barbero, T. Lang, W. Utschick, J. Thompson, and T. Ratnarajah. FPGA implementation of MMSE metric based efficient near-ML detection. In *Proceedings of the 12th International ITG Workshop on Smart Antennas*, Darmstadt, Germany, February 2008.
- [336] D. A. Schmidt, A. Gründinger, W. Utschick, and M.L. Honig. Distributed precoder optimization for interfering MISO channels. In *Proceedings of the 12th International ITG Workshop on Smart Antennas*, Darmstadt, Germany, February 2008.
- [337] G. Dietl, C. Guthy, W. Utschick, G. Bauch, and J. A. Nossek. Subspace beamforming and scheduling for the multiuser MIMO broadcast channel. In *Proceedings of the 7th International ITG Conference on Source and Channel Coding*, Ulm, Germany, January 2008.
- [338] P. Tejera and W. Utschick. Delay-limited feedback of channel state information in OFDM systems. In *Proceedings of the 7th International ITG Conference on Source and Channel Coding*, Ulm, Germany, January 2008.
- [339] G. Bauch, P. Tejera, C. Guthy, W. Utschick, J. A. Nossek, M. Herdin, J. Nielsen, J. Bach Andersen, E. Steinbach, and S. Khan. Aspects of multiuser MIMO for cell throughput maximization. **Frequenz**, 61:31–35, 2007.
- [340] F. A. Dietrich, P. Breun, and W. Utschick. Robust Tomlinson-Harashima precoding for the wireless broadcast channel. **IEEE Transactions on Signal Processing**, 55(2):631–644, February 2007.
- [341] G. Dietl and W. Utschick. Complexity reduction for iterative receivers using low-rank equalization. **IEEE Transactions on Signal Processing**, 55(3):1035–1046, March 2007.
- [342] M. Joham, D. A. Schmidt, J. Brehmer, and W. Utschick. Finite-length MMSE Tomlinson-Harashima precoding for frequency selective vector channels. **IEEE Transactions on Signal Processing**, 55(6):3073–3088, June 2007.
- [343] K. Kusume, Michael Joham, W. Utschick, and G. Bauch. Cholesky factorization with symmetric permutation applied to detecting and precoding spatially multiplexed data streams. **IEEE Transactions on Signal Processing**, 55(6):3089–3103, June 2007.
- [344] D. A. Schmidt, M. Joham, and W. Utschick. Minimum mean square error vector precoding. **European Transactions on Telecommunications**, 2007.
- [345] P. Castro, M. Joham, L. Castedo, and W. Utschick. Optimized CSI feedback for robust THP design. In *Proceedings of the 41th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2007.

- [346] R. Hunger, M. Joham, and W. Utschick. Efficient MSE balancing for the multi-user MIMO downlink. In *Proceedings of the 41th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2007.
- [347] J. Brehmer and W. Utschick. Utility maximization strategies in the multi-user MIMO downlink. In *Proceedings of the 1st International Workshop on Cross layer Design*, Jinan, P.R. China, September 2007.
- [348] R. Hunger, D. A. Schmidt, and W. Utschick. Sum-capacity and MMSE for the MIMO broadcast channel without eigenvalue decompositions. In *Proceedings of the IEEE International Symposium on Information Theory*, Nice, France, June 2007.
- [349] R. Hunger, D. A. Schmidt, M. Joham, A. Schwing, and W. Utschick. Design of single-group multicasting-beamformers. In *Proceedings of the International Conference on Communications*, Glasgow, Scotland, June 2007.
- [350] K. Kusume, G. Dietl, W. Utschick, and G. Bauch. Performance of interleave division multiple access based on minimum mean square error detection. In *Proceedings of the International Conference on Communications*, Glasgow, Scotland, June 2007.
- [351] P. Tejera and W. Utschick. Feedback of channel state information in wireless systems. In *Proceedings of the International Conference on Communications*, Glasgow, Scotland, June 2007.
- [352] G. Bauch, C. Guthy, J. A. Nossek, P. Tejera, and W. Utschick. Sum capacity, rate distribution and scenarios for multiuser diversity in MIMO-OFDMA. In *International Wireless Communications and Mobile Computing Conference*, Honolulu, Hawaii, April 2007.
- [353] G. Bauch, P. Tejera, C. Guthy, W. Utschick, J. A. Nossek, M. Herdin, J. Bach Andersen, J. Nielsen, E. Steinbach, and S. Khan. Multiuser MIMO: principle, performance in measured channels and applicable service. In *Proceedings of the 65th IEEE Vehicular Technology Conference*, Dublin, Ireland, April 2007.
- [354] M. D. Nisar, W. Utschick, H. Nottensteiner, and T. Hindelang. On channel estimation and equalization of OFDM systems with insufficient cyclic prefix. In *Proceedings of the 65th IEEE Vehicular Technology Conference*, Dublin, Ireland, April 2007.
- [355] G. Bauch, J. Bach Andersen, C. Guthy, M. Herdin, J. Nielsen, J. A. Nossek, P. Tejera, and W. Utschick. Multiuser MIMO channel measurements and performance in a large office environment. In *Proceedings of the IEEE Wireless Communications and Networking Conference*, Hong-Kong, March 2007.
- [356] J. Brehmer and W. Utschick. A decomposition of the downlink utility maximization problem. In *Proceedings of the Conference on Information Sciences and Systems*, Johns Hopkins University, Baltimore, USA, March 2007.
- [357] P. Castro, M. Joham, L. Castedo, and W. Utschick. Robust precoding for multi-user MISO systems with limited-feedback channels. In *Proceedings of the 11th International ITG Workshop on Smart Antennas*, Vienna, Austria, February 2007. *Best Paper Award*.

- [358] C. Guthy, W. Utschick, G. Bauch, and J. A. Nossek. Sum throughput maximization in quality of service constraint multiuser MIMO systems based on perturbation analysis. In *Proceedings of the 11th International ITG Workshop on Smart Antennas*, Vienna, Austria, February 2007.
- [359] R. Hunger, M. Riemensberger, and W. Utschick. Near capacity Tomlinson Harashima precoding with uniform stream properties. In *Proceedings of the 11th International ITG Workshop on Smart Antennas*, Vienna, Austria, February 2007.
- [360] M. Joham, D.A. Schmidt, H. Brunner, and W. Utschick. Symbol-wise order optimization for THP. In *Proceedings of the 11th International ITG Workshop on Smart Antennas*, Vienna, Austria, February 2007.
- [361] P. Tejera, W. Utschick, and C. Schmid. Rate balancing in the broadcast channel with independent encoding. In *Proceedings of the 11th International ITG Workshop on Smart Antennas*, Vienna, Austria, February 2007.
- [362] H. Boche, A. Bourdoux, J. Fonollosa, T. Kaiser, A. Molisch, and W. Utschick. Smart antennas - State of the art. **IEEE Vehicular Technology Magazine**, 1(1):8–17, 2006.
- [363] G. Dietl and W. Utschick. MMSE turbo equalization for real-valued symbols. **European Transactions on Telecommunications**, 17:351–359, 2006.
- [364] P. Tejera, W. Utschick, G. Bauch, and J. A. Nossek. Subchannel Allocation in Multiuser Multiple-Input–Multiple-Output Systems. **IEEE Transactions on Information Theory**, 52(10):4721–4733, October 2006.
- [365] W. Utschick and F. A. Dietrich. On estimation of structured covariance matrices. In **Informationsfusion in der Mess- und Sensortechnik**, pages 51–62. Universitätsverlag Karlsruhe, 2006.
- [366] B. Zerlin, M. Joham, W. Utschick, and J. A. Nossek. Covariance based linear precoding. **IEEE Journal on Selected Areas of Communications**, 24(1):190–199, January 2006.
- [367] B. Zerlin, M. Ivrlač, W. Utschick, and J. A. Nossek. Joint optimization of radio parameters - a top-down approach. **EURASIP Signal Processing Journal**, 86(8):1773–1791, September 2006.
- [368] G. Psaltopoulos, M. Joham, and W. Utschick. Generalized MMSE detection techniques for multipoint-to-point systems. In *Proceedings of the IEEE Global Telecommunications Conference*, San Francisco, CA, USA, 2006.
- [369] D. A. Schmidt, R. Hunger, M. Joham, and W. Utschick. Near maximum sum-rate non-zero-forcing linear precoding with successive user selection. In *Proceedings of the 40th Asilomar Conference on Signals, Systems and Computers*, Asilomar Conference Grounds, Pacific Grove, California, USA, November 2006.
- [370] C. Guthy, W. Utschick, G. Bauch, and J. A. Nossek. Maximization of sum capacity under minimum rate requirements in MIMO OFDM systems. In *Proceedings of the 17th Wireless World Research Forum Meeting*, Heidelberg, Germany, November 2006.

- [371] C. Peel, L. Swindlehurst, and W. Utschick. Multi-user topologies in multi-antenna wireless networks. In *Proceedings of the 14th European Signal Processing Conference*, Florence, Italy, September 2006.
- [372] W. Utschick and M. Joham. On the duality of MIMO transmission techniques for multiuser communications. In *Proceedings of the 11th European Signal Processing Conference*, Florence, Italy, September 2006. *Invited Paper*.
- [373] P. Breun, M. Große-Wentrup, W. Utschick, and M. Buss. Robust MEG source localization of event related potentials: identifying relevant sources by non-Gaussianity. In R. Schäfer, K.-R. Müller, and B. Nickolay, editors, *Pattern Recognition*, volume 4174 of **Lecture Notes in Computer Science**, pages 394–403. Springer, Berlin, Germany, September 2006.
- [374] G. Bauch, P. Tejera, C. Guthy, W. Utschick, J. A. Nossek, M. Herdin, J. Nielsen, J. Bach Andersen, E. Steinbach, and S. Khan. Aspects of multiuser MIMO for cell throughput maximization. In *Proceedings of the 11th International OFDM-Workshop 2006*, Hamburg, August 2006.
- [375] J. Brehmer, A. Molin, P. Tejera, and W. Utschick. A low complexity approximation of the MIMO broadcast channel capacity region. In *Proceedings of the International Conference on Communications*, Istanbul, Turkey, June 2006.
- [376] P. Tejera, W. Utschick, G. Bauch, and J. A. Nossek. Efficient implementation of successive encoding schemes for the MIMO OFDM broadcast channel. In *Proceedings of the International Conference on Communications*, Istanbul, Turkey, June 2006.
- [377] R. El Assir, F. A. Dietrich, M. Joham, and W. Utschick. Min-max MSE precoding for broadcast channels based on statistical channel state information. In *Proceedings of the 7th International Workshop on Signal Processing Advances in Wireless Communications*, Cannes, France, June 2006.
- [378] J. Brehmer, C. Guthy, and W. Utschick. An efficient approximation of the OFDMA outage probability region. In *Proceedings of the Seventh International Workshop on Signal Processing Advances in Wireless Communications*, Cannes, France, June 2006.
- [379] G. Dietl and W. Utschick. Low-complexity equalizers-rank versus order reduction. In *Proceedings of the 7th International Workshop on Signal Processing Advances in Wireless Communications*, Cannes, France, June 2006.
- [380] A. Mezghani, M. Joham, R. Hunger, and W. Utschick. Iterative THP transceiver optimization for multi-user MIMO systems based on weighted Sum-MSE minimization. In *Proceedings of the 7th International Workshop on Signal Processing Advances in Wireless Communications*, Cannes, France, 2006.
- [381] I. Groh, G. Dietl, and W. Utschick. Preconditioned and rank-flexible block conjugate gradient implementations of MIMO Wiener decision feedback equalizers. In *Proceedings of the 31th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Toulouse, France, May 2006.

- [382] R. Hunger, W. Utschick, D. A. Schmidt, and M. Joham. Alternating optimization for MMSE broadcast precoding. In *Proceedings of the 31th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Toulouse, France, May 2006.
- [383] P. Tejera, W. Utschick, G. Bauch, and J. A. Nossek. Analysis of the impact of channel estimation errors on the decomposition of multiuser MIMO channels. In *Proceedings of the 31th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Toulouse, France, May 2006.
- [384] M. Botsch, G. Dietl, and W. Utschick. Iterative multiuser detection using reduced-complexity equalization. In *Proceedings of the 4th International Symposium on Turbo Codes & Related Topics and the 6th International ITG Conference on Source and Channel Coding*, Munich, Germany, April 2006.
- [385] G. Zeitler, G. Dietl, and W. Utschick. MSE comparison of reduced-rank equalizers for iterative multiuser receivers based on EXIT charts. In *Proceedings of the 4th International Symposium on Turbo Codes & Related Topics and the 6th International ITG Conference on Source and Channel Coding*, Munich, Germany, April 2006.
- [386] F. A. Dietrich, T. Ivanov, and W. Utschick. Estimation of channel and noise correlations for MIMO channel estimation. In *Proceedings of the 10th International ITG Workshop on Smart Antennas*, Ulm, Germany, March 2006.
- [387] A. Mezghani, M. Joham, R. Hunger, and W. Utschick. Transceiver design for multiuser MIMO systems. In *Proceedings of the 10th International ITG Workshop on Smart Antennas*, Ulm, Germany, March 2006.
- [388] G. Psaltopoulos, M. Joham, and W. Utschick. Comparison of lattice search techniques for nonlinear precoding. In *Proceedings of the 10th International ITG Workshop on Smart Antennas*, Ulm, Germany, March 2006.
- [389] J. Bach-Andersen, H. Boche, A. Bourdoux, J. Fonollosa, T. Kaiser, and W. Utschick, editors. **Smart Antennas - State-of-the-Art**. EURASIP, Hindawi Publishing Corporation, 2005.
- [390] F. A. Dietrich and W. Utschick. Pilot assisted channel estimation based on second order statistics. **IEEE Transactions on Signal Processing**, 53(3):1178–1193, March 2005.
- [391] F. A. Dietrich, G. Dietl, M. Joham, and W. Utschick. Robust and reduced rank space-time decision feedback equalization. In **Smart Antennas - State-of-the-Art**, chapter 10. EURASIP, Hindawi Publishing Corporation, 2005.
- [392] M. Joham and W. Utschick. Ordered spatial Tomlinson Harashima precoding. In **Smart Antennas - State-of-the-Art**, chapter 20. EURASIP, Hindawi Publishing Corporation, 2005.
- [393] M. Joham, W. Utschick, and J. A. Nossek. Linear transmit processing in MIMO communications systems. **IEEE Transactions on Signal Processing**, 53(8):2700–2712, August 2005.

- [394] F. A. Dietrich, P. Breun, and W. Utschick. Tomlinson-Harashima Precoding: a continuous transition from complete to statistical channel knowledge. In *Proceedings of the IEEE Global Telecommunications Conference*, Saint Louis, USA, November 2005.
- [395] F. A. Dietrich and W. Utschick. Robust Tomlinson-Harashima Precoding. In *Proceedings of the 15th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, Berlin, Germany, September 2005.
- [396] C. Guthy, J. Brehmer, and W. Utschick. Physical layer characterization of a multi-user MISO system by efficient outage probabilities. In *Proceedings of the 16th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, Berlin, Germany, September 2005.
- [397] D. A. Schmidt, M. Joham, and W. Utschick. Minimum mean square error vector precoding. In *Proceedings of the 16th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, Berlin, Germany, September 2005.
- [398] P. Tejera, W. Utschick, G. Bauch, and J. A. Nossek. Sum-rate maximizing decomposition approaches for multiuser MIMO-OFDM. In *Proceedings of the 16th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, Berlin, Germany, September 2005.
- [399] F. A. Dietrich, W. Utschick, and P. Breun. Linear precoding based on a stochastic MSE criterion. In *Proceedings of the 13th European Signal Processing Conference*, Antalya, Turkey, September 2005. *Invited Paper*.
- [400] J. Brehmer and W. Utschick. Modular cross-layer optimization based on layer descriptions. In *Proceedings of the 8th Wireless Personal Multimedia Communications Symposium*, Aalborg, Denmark, September 2005. *Invited Paper*.
- [401] F. Antreich, O. Esbri-Rodriguez, J. A. Nossek, and W. Utschick. Estimation of synchronization parameters using SAGE in a GNSS-receiver. In *Proceedings of the 16th Annual International Technical Meeting of the Satellite Division of the Institute of Navigation (ION) - Global Navigation Satellite System (GNSS)*, Long Beach, CA, USA, September 2005.
- [402] G. Dietl, I. Groh, and W. Utschick. Low-complexity MMSE receivers based on weighted matrix polynomials in frequency-selective MIMO systems. In *Proceedings of the 8th International Symposium on Signal Processing and its Applications*, Sydney, Australia, August 2005.
- [403] F. Antreich, O. Esbri-Rodriguez, J. A. Nossek, and W. Utschick. An approach to synchronization in GNSS-receivers using the SAGE algorithm. In *Proceedings of the European Navigation Conference - Global Navigation Satellite System (GNSS)*, Munich, Germany, July 2005.
- [404] F. A. Dietrich and W. Utschick. Robust signal processing and parameter estimation for wireless communications. In *Proceedings of the IEEE Communication Theory Workshop*, Park City, USA, June 2005. *Invited Paper*.

- [405] G. Dietl, F. A. Dietrich, M. Botsch, and W. Utschick. Robust and reduced-rank matrix Wiener filter based on the block conjugate gradient algorithm. In *Proceedings of the 6th International Workshop on Signal Processing Advances in Wireless Communications*, New York City, USA, June 2005.
- [406] F. A. Dietrich, M. Joham, and W. Utschick. Joint optimization of pilot assisted channel estimation and equalization applied to space-time decision feedback equalization. In *Proceedings of the International Conference on Communications*, Seoul, Korea, May 2005.
- [407] K. Kusume, M. Joham, W. Utschick, and G. Bauch. Efficient Tomlinson-Harashima precoding for spatial multiplexing on flat MIMO channel. In *Proceedings of the International Conference on Communications*, Seoul, Korea, May 2005.
- [408] F. A. Dietrich and W. Utschick. Impact of imperfect channel knowledge on transmit processing concepts. In *Proceedings of the International Conference on Communications*, Seoul, Korea, May 2005.
- [409] R. Hunger, M. Joham, and W. Utschick. Minimax mean-square-error transmit Wiener filter. In *Proceedings of the 61th IEEE Vehicular Technology Conference*, Stockholm, Sweden, May 2005.
- [410] B. Zerlin, M. Ivrlač, W. Utschick, J. A. Nossek, A. Klein, and I. Viering. Joint optimization of radio parameters in HSDPA. In *Proceedings of the 61th IEEE Vehicular Technology Conference*, Stockholm, Sweden, May 2005.
- [411] R. Hunger, M. Joham, and W. Utschick. Achievable MSE/SNR/BER/rate regions for decentralized receivers. In *Proceedings of the 9th International ITG Workshop on Smart Antennas*, Duisburg, Germany, April 2005.
- [412] D. A. Schmidt, M. Joham, F. A. Dietrich, K. Kusume, and W. Utschick. Complexity reduction for MMSE multiuser spatio-temporal Tomlinson-Harashima precoding. In *Proceedings of the 9th International ITG Workshop on Smart Antennas*, Duisburg, Germany, April 2005.
- [413] P. Tejera, W. Utschick, G. Bauch, and J. A. Nossek. A novel decomposition technique for multiuser MIMO. In *Proceedings of the 9th International ITG Workshop on Smart Antennas*, Duisburg, Germany, April 2005.
- [414] B. Zerlin, M. Joham, and W. Utschick. Covariance based linear precoding for full rank channels. In *Proceedings of the 9th International ITG Workshop on Smart Antennas*, Duisburg, Germany, April 2005.
- [415] J. Brehmer and W. Utschick. Physical Layer Characterization of MIMO systems by means of multiobjective optimization. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing*, Philadelphia, PA, USA, March 2005.
- [416] G. Dietl, J. Wang, P. Ding, M.D. Zoltowski, D.J. Love, and W. Utschick. Hybrid transmit waveform design based on beamforming and orthogonal space-time block coding. In *Proceedings of the 30th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Philadelphia, PA, USA, March 2005.

- [417] F. A. Dietrich, F. Hoffmann, and W. Utschick. Conditional mean estimator for the Gramian matrix of complex Gaussian random variables. In *Proceedings of the 30th IEEE International Conference on Acoustics, Speech, and Signal Processing*, Philadelphia, PA, USA, March 2005.
- [418] R. L. Choi, M. T. Ivrlač, R. D. Murch, and W. Utschick. On strategies of multi-user MIMO transmit signal processing. **IEEE Transactions on Wireless Communications**, 3(6):1936–1941, 2004.
- [419] W. Utschick and P. Tejera. The spatial dimension in wireless multicarrier communications. In S. Chandran, editor, **Adaptive Antenna Arrays**, pages 29–45. Springer Verlag, 2004.
- [420] F. Antreich, O. Esbri-Rodriguez, J. A. Nossek, and W. Utschick. Parameter estimation using SAGE in a GNSS-receiver. In *Proceedings of the 2nd ESA Workshop on Satellite Navigation User Equipment Technologies*, Noordwijk, Netherlands, December 2004.
- [421] K. Kusume, M. Joham, and W. Utschick. MMSE block decision-feedback equalizer for spatial multiplexing with reduced complexity. In *Proceedings of the IEEE Global Telecommunications Conference*, Dallas, Texas, USA, November 2004.
- [422] J. Brehmer, G. Dietl, M. Joham, and W. Utschick. Reduced-complexity linear and nonlinear precoding for frequency-selective MIMO channels. In *Proceedings of the 60th IEEE Vehicular Technology Conference*, September 2004.
- [423] G. Dietl, C. Mensing, and W. Utschick. Iterative detection based on reduced-rank equalization. In *Proceedings of the 60th IEEE Vehicular Technology Conference*, September 2004.
- [424] G. Dietl, P. Breun, and W. Utschick. Block Krylov methods in time-dispersive MIMO systems. In *Proceedings of the International Conference on Communications*, Paris, France, June 2004.
- [425] P. Tejera, W. Utschick, J. A. Nossek, and G. Bauch. Extended orthogonal STBC for OFDM with partial channel knowledge at the transmitter. In *Proceedings of the International Conference on Communications*, Paris, France, June 2004.
- [426] J. Brehmer, M. Joham, G. Dietl, and W. Utschick. Reduced complexity transmit wiener filter based on a Krylov subspace multi-stage decomposition. In *Proceedings of the 29th IEEE International Conference on Acoustics, Speech, and Signal Processing*, volume IV, pages 805–808, Montreal, Canada, May 2004.
- [427] T.P. Kurpjuhn, M. Joham, W. Utschick, and J. A. Nossek. Comparison of transmission approaches in vehicular standardization MIMO channels. In *Proceedings of the 59th IEEE Vehicular Technology Conference*, Milan, Italy, May 2004.
- [428] P. Tejera, W. Utschick, G. Bauch, and J. A. Nossek. Spatial multiplexing based on pairwise error probability and partial channel knowledge. In *Proceedings of the 59th IEEE Vehicular Technology Conference*, Milan, Italy, May 2004.

- [429] P. Tejera, W. Utschick, M. Castaneda, and F. Morcos. Degradation and performance numbers of MIMO/OFDM in the presence of motion. In *Proceedings of the 59th IEEE Vehicular Technology Conference*, Milan, Italy, May 2004.
- [430] J. A. Nossek, M. Joham, and W. Utschick. Transmit processing in MIMO wireless systems. In *Proceedings of the 6th CAS Symposium on Emerging Technologies*, volume I, pages I-18–I-23, May 2004.
- [431] G. Dietl, M. Joham, P. Kreuter, and W. Utschick. A Krylov subspace multi-stage decomposition of the transmit Wiener filter. In *Proceedings of the 8th International ITG Workshop on Smart Antennas*, Munich, Germany, March 2004.
- [432] R. Hunger, F. A. Dietrich, M. Joham, and W. Utschick. Robust transmit zero-forcing filters. In *Proceedings of the 8th International ITG Workshop on Smart Antenna Workshop*, March 2004.
- [433] M. Joham, J. Brehmer, A. Voulgarelis, and W. Utschick. Multiuser spatio-temporal Tomlinson-Harashima precoding for frequency selective vector channels. In *Proceedings of the 8th International ITG Workshop on Smart Antennas*, Munich, Germany, March 2004.
- [434] M. Joham, J. Brehmer, and W. Utschick. MMSE approaches to multiuser spatio-temporal Tomlinson-Harashima precoding. In *Proceedings of 5th International ITG Conference on Source and Channel Coding*, pages 387–394, Erlangen, Germany, January 2004.
- [435] F. A. Dietrich and W. Utschick. Maximum ratio combining of correlated rayleigh fading channels with imperfect channel knowledge. **IEEE Letters on Communications**, 7(9):419–421, September 2003.
- [436] M.T. Ivrlač, W. Utschick, and J. A. Nossek. Fading correlations in wireless MIMO communication systems. **IEEE Journal on Selected Areas in Communications**, 21(5):819–828, 2003.
- [437] G. Dietl and W. Utschick. On reduced-rank approaches to matrix wiener filters in MIMO systems. In *Proceedings of the 3rd International Symposia on Signal Processing and Information Technology*, Darmstadt, Germany, December 2003.
- [438] B. Zerlin, M. Joham, and Wolfgang Utschick et al. Linear precoding in W-CDMA systems based on S-CPICH channel estimation. In *Proceedings of the 3rd International Symposium on Signal Processing and Information Theory*, Darmstadt, Germany, 2003. *Invited Paper*.
- [439] F. A. Dietrich, R. Hunger, M. Joham, and W. Utschick. Robust transmit Wiener filter for time division duplex systems. In *Proceedings of the 3rd International Symposia on Signal Processing and Information Technology*, December 2003.
- [440] G. Dietl, C. Mensing, W. Utschick, J. A. Nossek, and M.D.Zoltowski. Multi-Stage MMSE Decision Feedback Equalization for EDGE. In *Proceedings of the 28th IEEE International Conference on Acoustics, Speech, and Signal Processing*, volume 4, pages 509–513, Hong-Kong, China, 2003.

- [441] F. A. Dietrich, R. Hunger, M. Joham, and W. Utschick. Linear precoding over time-varying channels in TDD Systems. In *Proceedings of the 28th IEEE International Conference on Acoustics, Speech, and Signal Processing*, volume 5, pages 117–120, Hong-Kong, China, 2003.
- [442] A. Voulgarelis, M. Joham, and W. Utschick. Space-time equalization based on V-BLAST and DFE for frequency selective MIMO channels. In *Proceedings of the 28th IEEE International Conference on Acoustics, Speech, and Signal Processing*, volume 4, pages 381–384, Hong-Kong, China, 2003.
- [443] M. Joham, R. Irmer, S. Berger, G. Fettweis, and W. Utschick. Linear precoding approaches for the TDD DS-CDMA downlink. In *Proceedings of the 6th International Symposium on Wireless Personal Multimedia Communications*, volume 3, pages 323–327, Yokosuka, Kanagawa, Japan, October 2003.
- [444] M. Joham, W. Utschick, and J. A. Nossek. Latency time optimization for FIR and block transmit filters. In *Proceedings of the 4th International Symposium on Signal Processing and its Applications*, Paris, France, 2003.
- [445] A. Seeger, M. Sikora, and W. Utschick. Combined beamforming and scheduling for High Speed Downlink Packet Access. In *Proceedings of the IEEE Global Telecommunications Conference*, San Francisco, CA, USA, 2003.
- [446] W. Utschick. Tracking of signal subspace projectors. **IEEE Transactions on Signal Processing**, 50(4):769–778, 2002.
- [447] A. Seeger, M. Sikora, and W. Utschick. Antenna weight verification for closed-loop downlink eigenbeamforming. In *Proceedings of the IEEE Global Telecommunications Conference*, Taipei, Taiwan, 2002.
- [448] I. Viering, H. Hofstetter, and W. Utschick. Validity of spatial covariance matrices over time and frequency. In *Proceedings of the IEEE Global Telecommunications Conference*, Taipei, Taiwan, 2002.
- [449] G. Dietl, M. Joham, W. Utschick, and J. A. Nossek. Long-term Krylov-prefilter for reduced-dimension processing at the receiver in DS-CDMA systems. In *Proceedings of the 56th IEEE Vehicular Technology Conference*, pages 492–495, Vancouver, Canada, 2002.
- [450] M.T. Ivrlač and W. Utschick. On time-switched space-time transmit diversity. In *Proceedings of the 56th IEEE Vehicular Technology Conference*, pages 710–714, Vancouver, Canada, 2002.
- [451] T. Kurpjuhn, M. Joham, and W. Utschick. Experimental studies about eigenbeamforming in standardization MIMO channels. In *Proceedings of the 56th IEEE Vehicular Technology Conference*, volume 1, pages 185–189, Vancouver, Canada, 2002.
- [452] A. Szabo, T.P. Kurpjuhn, and W. Utschick. Linearly precoded OFDM based on long-term properties of the channel covariance matrix. In *Proceedings of the 56th IEEE Vehicular Technology Conference*, pages 2066–2070, Vancouver, Canada, 2002.

- [453] F. A. Dietrich and W. Utschick. On the effective spatio-temporal rank of wireless communication channels. In *Proceedings of the 12th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, pages 1982–1986, Lisbon, Portugal, 2002.
- [454] M. Joham, K. Kusume, W. Utschick, and J. A. Nossek. Transmit matched filter and transmit wiener filter for the downlink of FDD DS-CDMA systems. In *Proceedings of the 13th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, pages 2312–2316, Lisbon, Portugal, 2002.
- [455] T. Kurpjuhn and W. Utschick. Channel sounding taking into account small angular spread. In *Proceedings of 13th IEEE Symposium on Personal, Indoor and Mobile Radio Communications*, volume 4, pages 2302–2306, 2002.
- [456] F. A. Dietrich and W. Utschick. Nonlinear receiver concepts in reduced dimensions for WCDMA. In *Proceedings of 4th International ITG Conference on Source and Channel Coding*, Berlin, Germany, January 2002.
- [457] I. Viering, H. Hofstetter, and W. Utschick. Spatial long-term variation in urban, rural and indoor environments. In *Proceedings of the 5th COST 273 Meeting*, Lisbon, Portugal, 2002.
- [458] H. Hofstetter, I. Viering, and W. Utschick. Evaluation of suburban measurements by eigenvalue statistics. In *Proceedings of the 4th COST 273 Meeting*, Espoo, Finland, 2002.
- [459] M. Joham, K. Kusume, M. H. Gzara, W. Utschick, and J. A. Nossek. Transmit Wiener filter for the downlink of TDD DS-CDMA systems. In *Proceedings of the 7th International Symposium on Spread Spectrum Techniques & Applications*, Prague, Czech Republic, 2002.
- [460] C. Brunner, W. Utschick, and J. A. Nossek. Exploiting the short-term and long-term channel properties in space and time: eigenbeamforming concepts for the BS in WCDMA. **European Transactions on Telecommunications**, 12(5):365–378, 2001. *Invited Paper*.
- [461] M.T. Ivrlač and W. Utschick. On look-direction downlink-beamforming in WCDMA. **Frequenz**, 55(5-6):145–149, 2001. *Invited Paper*.
- [462] M. Haardt, N. Geng, L. Herault, R. Tafazolli, and W. Utschick. Antenna arrays and related Techniques - Smart Antennas. In **Book of Visions 2001 - Visions of the Wireless World**, chapter 2.4.2, pages 180–186. Wireless World Research Forum, 2001. *Invited Paper*.
- [463] M.T. Ivrlač, T.P. Kurpjuhn, C. Brunner, and W. Utschick. Efficient use of fading correlations in MIMO systems. In *Proceedings of the 54th IEEE Vehicular Technology Conference*, pages 2763–2767, Atlantic City, NJ, USA, 2001.
- [464] M. Joham, W. Utschick, and J. A. Nossek. On the Equivalence of Prerake and Transmit Matched Filter. In *Proceedings of the 10th Aachen Symposium on Signal Theory ASST 2001*,, pages 313–318, Aachen, Germany, 2001.

- [465] W. Utschick and F. A. Dietrich. Reduced dimension receiver concepts in the WCDMA uplink. In *Proceedings of the ITG-Diskussionsitzung 'Systeme mit intelligenten Antennen'*, Ilmenau, Germany, 2001.
- [466] W. Utschick and C. Brunner. Efficient tracking and feedback of DL-eigenbeams in WCDMA. In *Proceedings of the 4th European Personal Mobil Communications Conference*, Vienna, Austria, 2001.
- [467] W. Utschick and W. Weichselberger. Stochastic organization of output codes in multi-class learning problems. **Neural Computation**, 13(5):1065–1102, 2001.
- [468] M. Joham and W. Utschick. Symbol rate processing for downlink in DS-CDMA systems. **IEEE Journal on Selected Areas in Communications**, 19(1):61–68, 2001.
- [469] M. Frikel, W. Utschick, and J. A. Nossek. Direct blind multichannel identification. In *Proceedings of the EURASIP EUSIPCO*, pages 295–299, Tampere, Finland, 2000.
- [470] M. Frikel, W. Utschick, and J. A. Nossek. Blind noise and channel estimation. In *Proceedings IEEE SSAP*, pages 141–145, 2000.
- [471] M.T. Ivrlač and W. Utschick. On look-direction downlink-beamforming in WCDMA. In *Proceedings of the European Wireless 2000*, pages 37–42, Dresden, Germany, 2000. *Best Paper Award*.
- [472] M. Joham and W. Utschick. Downlink processing for mitigation of intracell interference in DS-CDMA systems. In *Proceedings of the 6th International Symposium on Spread Spectrum Techniques & Applications*, pages 15–19, New Jersey, NY, USA, 2000.
- [473] M. Treiber, T. Kurpjuhn, and W. Utschick. DSP-implementation of a high-resolution parameter estimating scheme. In *Proceedings of the Third European DSP Education and Research Conference*, Paris, France, 2000.
- [474] W. Utschick, M. Treiber, and T. Kurpjuhn. Comparison of two DOA tracking implementations for SDMA. In *Proceedings of the 10th International Symposium on Personal, Indoor and Mobile Radio Communications*, pages 358–362, London, United Kingdom, 2000.
- [475] M. Joham, W. Utschick, and J. A. Nossek. A symbol-rate multi-user downlink beamforming approach for WCDMA. In *Proceedings of the 9th International Symposium on Personal, Indoor and Mobile Radio Communications*, pages 228–232, Osaka, Japan, 1999.
- [476] J. A. Nossek and W. Utschick. On the downlink beamforming problem. In *Proceedings of the 10th International Symposium on Personal, Indoor and Mobile Radio Communications*, page 227, Osaka, Japan, 1999. *Invited Paper*.
- [477] C. Brunner, M. Joham, W. Utschick, M. Haardt, and J. A. Nossek. Downlink beamforming for WCDMA based on uplink channel parameters. In *Proceedings of the 3rd European Personal Mobil Communications Conference*, pages 375–379, Paris, France, 1999.

- [478] M. Joham, W. Utschick, J. A. Nossek, and M. Zoltowski. Semi-blind channel estimation: a new least-squares approach. In *Proceedings of International Conference on Telecommunications*, pages 416–420, Cheju, Korea, 1999.
- [479] P. Li, W. Utschick, and J. A. Nossek. A new DS-CDMA interference cancellation scheme for space-time rake processing. In *Proceedings of the European Wireless 99 & ITG Mobile Communications*, pages 385–389, Munich, Germany, 1999.
- [480] W. Utschick and M. Joham. Downlink beamforming problem in DS-CDMA systems. In *Proceedings of the Smart Antennas Workshop at the European Microwave Week*, Munich, Germany, 1999. *Invited Paper*.
- [481] W. Utschick and J. A. Nossek. Downlink beamforming for FDD mobile radio systems based on spatial covariances. In *Proceedings of the European Wireless 99 & ITG Mobile Communications*, pages 65–67, Munich, Germany, 1999.
- [482] W. Utschick and W. Weichselberger. A-posteriori codes for multiclass discrimination. In *Proceedings of the European Conference on Circuit Theory and Design*, pages 847–850, Stresa, Italy, 1999.
- [483] W. Utschick. *Error-Correcting Classification Based on Neural Networks*. PhD thesis, Technische Universität München, Shaker Verlag, Aachen, Germany, 1998.
- [484] W. Utschick. A regularization method for non-trivial codes in polychotomous classification. **International Journal of Pattern Recognition and Artificial Intelligence**, 12(4), 1998.
- [485] J. A. Nossek, R. Eigenmann, G. Papoutsis, and W. Utschick. Classification systems based on neural networks. In *Proceedings of the 5th International Workshop on Cellular Neural Networks and Applications*, pages 26–33, London, United Kingdom, 1998.
- [486] W. Utschick and J. A. Nossek. Error-correcting classification via ML-techniques and regularization. In *Proceedings of the International Workshop on Advanced Black-Box Techniques for Nonlinear Modelling*, pages 35–40, Katholieke Universiteit Leuven, Belgium, 1998.
- [487] W. Utschick and J. A. Nossek. How do parallel plug-in classifiers optimally contribute to the overall system. In W. Breuer, editor, *Proceedings of the 5th International Workshop on Computational Intelligence, Fuzzy-Neuro Systems 98*, volume 7, pages 82–89, Munich, Germany, 1998. Infix.
- [488] W. Utschick and J. A. Nossek. Hybrid optimization of feedforward neural networks for handwritten character recognition. In *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing*, pages 147–150, Munich, Germany, 1997. IEEE Computer Society Press. *Invited Paper*.
- [489] W. Utschick, H.-P. Veit, and J. A. Nossek. Non-trivial codes for polychotomous classification in pattern recognition. In *Proceedings of the International Conference on Engineering Applications of Neural Networks*, pages 25–28, Stockholm, Sweden, 1997.

- [490] W. Utschick and J. A. Nossek. Automatischer Entwurf paralleler neuronaler Netze für Mehrklassenprobleme in der Mustererkennung. In B. Jähne, P. Geißler, H. Haußecker, and F. Hering, editors, *Mustererkennung 1996, Informatik aktuell*, pages 466–474. Springer, Heidelberg, Germany, 1996.
- [491] W. Utschick and J. A. Nossek. Bayesian adaptation of hidden layers in boolean feedforward neural networks. In *Proceedings of the 13th International Conference on Pattern Recognition*, pages 229–233, Vienna, Austria, 1996. IAPR.
- [492] W. Utschick, R. Eigenmann, and J. A. Nossek. Hierarchical learning in a multiresolution approach to neural networks. In *Proceedings of the European Conference on Circuit Theory and Design*, pages 327–330, Istanbul, Turkey, 1995. IEEE Computer Society Press.
- [493] W. Utschick, P. Nachbar, C. Knobloch, A. Schuler, and J. A. Nossek. The evaluation of feature extraction criteria applied to neural network classifiers. In *Proceedings of the 3rd International Conference on Document Analysis and Recognition*, pages 315–318, Montreal, Canada, 1995. IEEE Computer Society Press.
- [494] W. Utschick and J. A. Nossek. Computational learning theory applied to discrete-time cellular neural networks. In *Proceedings of the 3rd International Workshop on Cellular Neural Networks and Applications*, pages 159–164, Rome, Italy, 1994. IEEE Computer Society Press.