

Prof. Dr.-Ing. Dorothea KOLOSSA
Cognitive Signal Processing Group, Ruhr-Universität Bochum

Office address:

Ruhr-Universität Bochum
Faculty of Electrical Engineering and Information Technology
Building ID2/325
Universitätsstraße 150
D - 44801 Bochum, Germany

Phone: +49 234 32-28965

Fax: +49 234 32-14165

Email: dorothea.kolossa@rub.de

Web: http://www.rub.de/ika/mitarbeiter/kolossa_en.htm

Professional Experience

- since 03/2014 Head of Cognitive Signal Processing Group, Associate Professor,
Ruhr-Universität Bochum, Germany
- 06/2017 - 07/2017 Research Visit, Kavli Institute of Theoretical Physics, UC Santa Barbara*
06/2015 - 07/2015 Research Visit, ICSI, UC Berkeley
- 09/2010 – 02/2014 Junior Professor, Digital Signal Processing Group
Ruhr-Universität Bochum, Germany
- 12/2004 -08/2010 Lecturer and Postdoctoral Research Fellow (C1),
Technische Universität Berlin, Germany
- 11/2009 - 04/2010 Visiting Faculty, UC Berkeley*
- 03/2007 - 04/2007 Visiting Researcher, NTT Communications Science Laboratories,
Kyoto, Japan*
- 07/2005 - 08/2005 Visiting Faculty, University of Hong Kong*
- 05/2000 - 11/2004 Research Assistant,
Technische Universität Berlin
- 05/1999 - 05/2000 Research Engineer,
DaimlerChrysler Research & Technology

Research Interests

Statistical signal processing:

Blind source separation

Model-based signal processing, e.g. using (audiovisual) speech recognition models

Signal processing for robust speech recognition

Speech and pattern recognition:

Automated fault diagnostics

Audiovisual speech recognition

Speech intelligibility assessment and optimization

Education

12/2007 **PhD** in Electrical Engineering, TU Berlin (Germany)
"Independent Component Analysis for Environmentally Robust
Speech Recognition" (summa cum laude)

03/1999 **Dipl.-Ing.** (MSc) in Computer Engineering, TU Berlin (summa cum laude)

Scientific Activities

- Third-Party-Funding: PI in Cluster of Excellence "Cyber security in the age of large-scale adversaries (CASA)" January 2019 - December 2025
- DFG Research Grant "Structured hybrid models for audiovisual speech processing," KO3434/4-2, July 2018 - July 2020
- PI of project funded by Honda Research Institute Europe GmbH "Models for Personalized and Situation Dependent Object Referencing Resolution", December 2017 – November 2020
- Workpackage Leader, BMWi-Project "KoMoM: Konzepte zur sicheren Inbetriebnahme, erweiterter Nutzung und umfassender Überwachung moderner Mehrpunktstromrichter," October 2017 - September 2020
- PI EFRE-Project "AVATAR: Audiovisuelles individualisiertes Assistenzsystem als Therapieunterstützung bei kindlichen phonetisch-phonologischen Artikulationsstörungen," August 2017- July 2020
- PI NRW-funded Research Training Group "Schöne neue Welt: Sicherheit für Menschen im Cyberspace (SecHuman)", July 2016 – January 2021
- Individual project funded by Honda Research Institute Europe GmbH "Situating Driver-Car Dialog Modelling", February 2016 – February 2019
- DFG Research Grant "Strukturierte probabilistische Modelle für die audiovisuelle Sprachverarbeitung" KO3434/4-1, August 2014 - März 2016
- EU-FET-Open Project „Reading the World with TWO!EARS“ co-PI, December 2013 - November 2016, Grant Agreement 618075,
- EU Marie Curie Initial Training Network "Improved Communication through Applied Hearing Research", Grant Agreement 317521, co-PI, Workpage Leader, January 2013 - December 2016
- DFG Research Training Group "New Challenges for Cryptography in Ubiquitous Computing", co-PI, Workpackage Leader October 2012 - March 2017
- PI of industrially funded project "Acoustic detection of mechanical wear," June 2011- June 2013
- Co-PI of TU-Berlin-funded initiative "Impetus": Project oriented summer school for female engineering students, April 2007 - March 2009
- Significant Participation in acquisition and implementation of DFG-Project GZ: OR 99/4-1: "Weiterentwicklung von Methoden der Datenanalyse zur räumlichen und zeitlichen Charakterisierung von MEG- und EEG-Daten bei sensorischer Stimulation" in Cooperation with PTB Berlin, October 2007 - October 2010

Collaborative
Projects:

Workpackage leader in project „WFBO 009 - Ausbau des Bochumer Kompetenzschwerpunkts Eingebettete Systeme und IT Sicherheit“ for the sub-project „Audiovisuelle Mensch-Maschine-Schnittstelle für die barrierefreie Kommunikation,“
May 2011 – April 2014

„Inventory-based audiovisual speech enhancement“
Cooperation with Prof. Robert Nickel, Bucknell University,
since March 2011

„Entwurf und Implementierung von Verfahren und Algorithmen zur Optimierung der Empfangseigenschaften von LF-Transponderlesegeräten,“
Cooperation with Fraunhofer IMS / Univ. Duisburg-Essen,
since February 2011.

„Robust speech recognition by beamforming and uncertainty-based discriminative transforms“,
Cooperation with Dr. Ramon Astudillo, INESC-ID, Portugal, and Dr. Rahim Saeidi, Radboud Universiteit Nijmegen,
since December 2010

“Multi-speaker recognition using maximum SNR beamforming and missing feature techniques”, Collaboration during research visit at NTT Communications Science Laboratories, Kyoto, Aug.-Sept. 2007.

“Missing feature speech recognition for ICA-separated sources”, Collaboration during research visit at NTT Communications Science Laboratories, Kyoto, March - Apr. 2006.

„Quellentrennung und Beamforming für Sprache im Kfz“
Cooperation with DaimlerChrysler Research & Technology, Ulm,
2001 - 2006.

„Speech Recognition for PDA devices“
University of Hong Kong, July-Sept. 2001.

Professional
Organizations

IEEE Senior Member,
Membership in ISCA, VDE, ITG Working Group Speech Acoustics,
German Society of Acoustics (DEGA)

elected Member of the IEEE Technical Committee for Audio and Acoustic Signal Processing, since January 2013

co-Chair of DEGA Working Group Speech Acoustics,
March 2013 - March 2015.

Scientific advisory board, Institut für angewandte Gesundheitsforschung, HSG, Bochum, from January 2017.

Council member, EAA TC on Audio Signal Processing, since May 2017

Board Member of the ITG-VDE (Information Technology Group of the VDE) Jan. 2018 - Dec. 2020

Scientific advisory board, science magazine RUBIN,
Jan 2018-Dez 2020

Conference Organization	<p>Technical Program Chair, IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA) 2019.</p> <p>Tutorial Chair, Interspeech 2019</p> <p>Scientific Committee ITG Meeting Speech Communication 2012, 2014, 2016, 2018</p> <p>co-Chair, special session "Applications of Bayesian methods to acoustic model identification and classification", Acoustics'17, Boston.</p> <p>co-Chair, special session " Iterative Algorithms & Machine Learning for Speech Enhancement" ITG Conference on Speech Communication 2016.</p> <p>co-Chair, special sessions "Active perception in human and machine speech communication" & "Robust Speech Processing using Observation Uncertainty and Uncertainty Propagation," Interspeech 2015.</p> <p>Finance Chair, IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA) 2015.</p> <p>co-Organizer of the special session "Functional Impact of Speech Degradations" DAGA 2015</p> <p>co-Organizer of the special session "Robust Speech Recognition" DAGA 2010, DAGA 2011, DAGA 2012, AIA-DAGA 2013, DAGA 2014</p> <p>Tutorial Chair, IEEE Conference on Industrial Informatics (INDIN 2013)</p> <p>co-Organizer of the special session "Multi-X Recognition" at ITG Meeting Speech Communication 2012</p>
Journal Reviewer for	<p>IEEE Transactions on Audio, Speech and Language Processing</p> <p>IEEE Transactions on Multimedia</p> <p>IEEE Transactions on Neural Networks and Learning Systems</p> <p>IEEE Transactions on Emerging Topics in Computational Intelligence</p> <p>IEEE Signal Processing Letters</p> <p>IEEE Journal of Selected Topics in Signal Processing</p> <p>Acta Acustica united with Acustica</p> <p>Computer Speech and Language</p> <p>Elsevier Signal Processing</p> <p>Elsevier Speech Communication</p> <p>EURASIP Journal on Advances in Signal Processing</p> <p>Springer Signal, Image and Video Processing</p> <p>Springer Journal of Real-Time Image Processing</p>
Conference Reviews	<p>ASRU 2017</p> <p>EUSIPCO (2009, 2011, 2012, 2017)</p> <p>HSCMA (2014, 2017)</p> <p>IEEE ICASSP (2008, 2009, 2013, 2014, 2015, 2017, 2018)</p> <p>Interspeech (2014, 2017, 2018)</p> <p>IROS (2012, 2013)</p> <p>ITG Fachtagung Sprachkommunikation (2008, 2012, 2014, 2016, 2018)</p>

LVA/ ICA 2015
Machine Learning in Signal Processing (MLSP) 2018
REVERB Workshop 2014
IEEE IWAENC 2018
WASPAA (2007, 2009, 2011, 2013, 2015, 2017)

Honors and Awards

07/2018	Co-author of paper winning best student paper award of ICA/LVA, for C. Schymura, P. Guo, Y. Maymon, B. Rafaely, D. Kolossa: "Exploiting Structures of Temporal Causality for Robust Speaker Localization in Reverberant Environments," Sheffield, UK, July 2018.
12/2014	Outstanding paper award of ACSAC 2014, for: H. Meutzner, V. H. Nguyen, T. Holz, D. Kolossa, "Using Automatic Speech Recognition for Attacking Acoustic CAPTCHAs: The Trade-off between Usability and Security".
03/2013	Co-author of paper winning the EAA Best Paper and Presentation Award: H. Meutzner, S. Malik and D. Kolossa: "SVM-Based Preprocessing for Automatic Speech Recognition," Proc. DAGA-AIA 2013, Merano, March 2013.
10/2012	Senior Member, IEEE
04/2000	Erwin-Stephan-Award (Best Diploma, TU Berlin)
04/1997 - 12/1999	DaimlerChrysler Scholarship Research and Technology

List of Publications, Prof. Dr.-Ing. Dorothea Kolossa

Journal Articles

D. Kolossa, M. A. Bin Azhar, C. Rasche, S. Endler, F. Hanakam, A. Ferrauti, M. Pfeiffer: "Performance Estimation using the Fitness-Fatigue Model with Kalman Filter Feedback" International Journal of Computer Science in Sport, November 2017.

H. Meutzner, S. Gupta, V.-H. Nguyen, T. Holz, **D. Kolossa**: "Towards Improved Audio CAPTCHAs Based on Auditory Perception and Language Understanding," ACM Transactions on Information and System Security, vol. 19, no. 4, February 2017.

A. Hussen Abdelaziz, **D. Kolossa**: "General Hybrid Framework for Uncertainty-decoding-based Automatic Speech Recognition Systems," Elsevier Speech Communication, vol. 79, pp. 1-13, May 2016.

R. Jacobi, G. vom Bögel, A. Grabmaier, **D. Kolossa**: "Analysis of Time Variant Reliability Information Used in a Multilevel Decoding Scheme for RFID and Sensor Signals", International Journal of RF Technologies, vol. 153, pp. 153-173, 2016.

R. Saeidi, R. Astudillo, **D. Kolossa**: "Uncertain LDA: Including observation uncertainties in discriminative transforms," IEEE Trans. on Pattern Analysis and Machine Intelligence, vol. 38, no. 7, pp. 1479-1488, July 2016.

A. Hussen Abdelaziz, S. Zeiler and **D. Kolossa**: "Learning Dynamic Stream Weights For Coupled-HMM-based Audio-visual Speech Recognition", IEEE Trans. Audio Speech and Language Processing, vol. 23, no. 5, pp. 863-876, May 2015.

D. Schmid, G. Enzner, S. Malik, **D. Kolossa**, R. Martin: "Variational Bayesian Inference for Multichannel Dereverberation and Noise Reduction," IEEE Trans. on Audio, Speech and Language Processing, vol. 22, no. 8, pp. 1320-1335, Aug. 2014.

D. Kolossa, S. Zeiler, R. Saeidi, R.F. Astudillo: "Noise-Adaptive LDA: A New Approach for Speech Recognition Under Observation Uncertainty, IEEE Signal Processing Letters, vol. 20, no. 11, pp. 1018-1021, 2013.

R. Nickel, R. Fernandez Astudillo, **D. Kolossa**, R. Martin: "Corpus-Based Speech Enhancement with Uncertainty Modeling and Cepstral Smoothing", IEEE Trans. on Audio, Speech and Language Processing, vol. 21, no. 5, May 2013.

R. Fernandez Astudillo, **D. Kolossa**, A. Abad, S. Zeiler, R. Saeidi, P. Mowlae, J. P. da Silva Neto, R. Martin: "Integration of Beamforming and Uncertainty-of-Observation Techniques for Robust ASR in Multi-Source Environments", Computer Speech and Language, Special Issue on Multisource Environments, vol. 27, no. 3, pp. 837-850, May 2013.

E. Hoffmann, **D. Kolossa**, B.-U. Köhler, R. Orglmeister: "Using Information Theoretic Distance Measures for Solving the Permutation Problem of Blind Source Separation of Speech Signals" , EURASIP Journal on Audio, Speech, and Music Processing, vol. 2012:14, April 2012.

R. Fernandez Astudillo, **D. Kolossa**, Philipp Mandelartz and R. Orglmeister: "An Uncertainty Propagation Approach to Robust ASR using the ETSI Advanced Front-End", IEEE Journal of Selected Topics in Signal Processing, Special issue on Natural Interaction with Intelligent Environments, vol. 4, pp. 824 – 833, October 2010.

F. Kohl, G. Wübbeler, **D. Kolossa**, M. Bär, R. Orglmeister and C. Elster: "Shifted factor analysis for the separation of evoked dependent MEG signals", Phys. Med. Biol., vol. 55, pp. 4219–4230, 2010.

D. Kolossa, R. Fernandez Astudillo, E. Hoffmann and R. Orglmeister: „ Independent Component Analysis and Time-Frequency Masking for Speech Recognition in Multitalker Conditions“, EURASIP Journal on Audio, Speech, and Music Processing. vol. 2010, Article ID 651420, 13 pages, 2010.

Book Chapters

S. Watanabe, **D. Kolossa**, and T. Virtanen: "Application of Source Separation to Robust Speech Analysis and Recognition," in E. Vincent, T. Virtanen, and S. Gannot (ed.) "Audio Source Separation and Speech Enhancement," John Wiley & Sons, 2018.

A. Kohlrausch, J. Braasch, **D. Kolossa**, and J. Blauert: „An introduction to binaural processing”, in J. Blauert (ed.) The technology of binaural listening, Springer, Berlin–Heidelberg–New York, 2013.

J. Blauert, **D. Kolossa**, K. Obermayer, and K. Adiloglu: “Further challenges and the road ahead”, in J. Blauert (ed.) The technology of binaural listening, Springer, Berlin–Heidelberg–New York, 2013.

R. Martin and **D. Kolossa**: “Voice activity detection, noise estimation, and adaptive filters for acoustic signal enhancement”, in: T. Virtanen, R. Singh, B. Raj (eds.): “Techniques for Noise Robustness in Automatic Speech Recognition”, John Wiley & Sons, September 2012.

R. Fernandez Astudillo and **D. Kolossa**: “Uncertainty Propagation”, in: **D. Kolossa**, R. Haeb-Umbach (eds.): „Robust Speech Recognition of Uncertain or Missing Data - Theory and Applications“, Springer, pp. 35-64, July 2011.

E. Hoffmann, **D. Kolossa** and R. Orglmeister: “Recognition of Multiple Speech Sources using ICA”, in: **D. Kolossa**, R. Haeb-Umbach (eds.): „Robust Speech Recognition of Uncertain or Missing Data - Theory and Applications“, Springer Verlag, pp. 319-344, July 2011.

A. Vorwerk, S. Zeiler, **D. Kolossa**, R. Fernandez Astudillo and D. Lerch: “Use of Missing and Unreliable Data for Audiovisual Speech Recognition”, in: **D. Kolossa**, R. Haeb-Umbach (eds.): „Robust Speech Recognition of Uncertain or Missing Data - Theory and Applications“, Springer Verlag, pp. 345-375, July 2011.

Edited Book

D. Kolossa and R. Haeb-Umbach (eds.): „Robust Speech Recognition of Uncertain or Missing Data - Theory and Applications“, Springer Verlag, 380 pages, July 2011.

Peer-Reviewed Conference Articles

L. Schönherr, K. Kohls, S. Zeiler, T. Holz, **D. Kolossa**: "Adversarial Attacks Against Automatic Speech Recognition Systems via Psychoacoustic Hiding," accepted for publication, NDSS 2019.

D. Orth, N. Steinhardt, B. Bolder, M. Dunn, **D. Kolossa**, M. Heckmann: "Analysis of a Speech-Based Intersection Assistant in Real Urban Traffic", accepted for publication," Proc. IEEE Intelligent Transportation Systems Conference (ITSC), Maui, Hawaii, USA, Nov. 2018.

J. Freiwald, M. Karbasi, S. Zeiler, J. Melchior, V. Kompella, L. Wiskott, **D. Kolossa**: "Utilizing Slow Feature Analysis for Lipreading," ITG Conference on Speech Communication, Oldenburg, Germany, Oct. 2018.

M. Heckmann, D. Orth, **D. Kolossa**: ""Gap after the next two vehicles": A Spatio-temporally Situated Dialog for a Cooperative Driving Assistant," ITG Conference on Speech Communication, Oldenburg, Germany, Oct. 2018.

C. Schymura, T. Isenberg, **D. Kolossa**: "Extending linear dynamical systems with dynamic stream weights for audiovisual speaker localization," International Workshop on Acoustic Signal Enhancement (IWAENC), Tokyo, Sept. 2018.

C. Schymura, P. Guo, Y. Maymon, B. Rafaely, **D. Kolossa**: "Exploiting Structures of Temporal Causality for Robust Speaker Localization in Reverberant Environments," **best student paper award**, Proc. LVA/ICA, Guildford, UK, July 2018.

D. Orth, B. Bolder, N. Steinhardt, M. Dunn, **D. Kolossa**, M. Heckmann: "A Speech-Based On-Demand Intersection Assistant Prototype," Proc. IEEE Intelligent Vehicles Symposium, IV 2018, Changshu, Suzhou, China, June 2018.

C. Schymura, **D. Kolossa**: "Potential-field-based active exploration for acoustic simultaneous localization and mapping," ICASSP 2018, Calgary, Canada, April 2018.

L. Schönherr, S. Zeiler, **D. Kolossa**: "Spoofing Detection via Simultaneous Verification of Audio-Visual Synchronicity and Transcription", IEEE ASRU, Okinawa, Japan, Dec. 2017.

D. Orth, **D. Kolossa**, M. Heckmann: "Predicting Driver Left-Turn Behavior from Few Training Samples Using a Maximum-a-posteriori Method", Proc. IEEE Intelligent Transportation Systems Conference (ITSC), Yokohama, Japan, October 2017.

D. Orth, **D. Kolossa**, M. Sarria Paja, K. Schaller, A. Pech, M. Heckmann: "A Maximum Likelihood Method for Driver-Specific Critical-Gap Estimation", IEEE Intelligent Vehicles Symposium (IV 2017), Redono Beach, CA, June 2017.

B. Rafaely, **D. Kolossa**, Y. Maymon: "Towards acoustically robust localization of speakers in a reverberant environment", Proc. HSCMA, San Francisco, CA, March 2017.

H. Meutzner, N. Ma, R. Nickel, C. Schymura, **D. Kolossa**: "Improving audio-visual speech recognition using deep neural networks with dynamic stream reliability estimates", Proc. ICASSP, New Orleans, March 2017.

B. Rafaely, **D. Kolossa**: "Speaker localization in reverberant rooms based on direct path dominance test statistics", Proc. ICASSP, New Orleans, March 2017.

C. Schymura, J. Rios Grajales, **D. Kolossa**: "Monte Carlo exploration for active binaural localization", Proc. ICASSP, New Orleans, March 2017.

L. Schönherr, D. Orth, M. Heckmann, **D. Kolossa**: "Environmentally Robust Audio-Visual Speaker Identification", Proc. IEEE Workshop on Spoken Language Technology (SLT 2016), San Diego, USA, December 2016

B. Bönninghoff, R. Nickel, S. Zeiler, **D. Kolossa**: "Unsupervised Classification of Voiced Speech and Pitch Tracking using Forward-Backward Kalman Filtering", ITG Fachtagung Sprachkommunikation, Paderborn, Germany, October 2016.

S. Gergen, S. Zeiler, A. Hussen Abdelaziz, **D. Kolossa**: "New Insights into Turbo-Decoding-Based AVSR with Dynamic Stream Weights", ITG Fachtagung Sprachkommunikation, Paderborn, Germany, October 2016.

J. Taghia, **D. Kolossa** and R. Martin: "ALE for Robots! A Single-channel Approach to Robot Self-noise Cancellation," 2016, Xi'an, China, September 2016.

M. Karbasi, A. Hussen Abdelaziz, H. Meutzner and **D. Kolossa**: "Blind Non-Intrusive Speech Intelligibility Prediction using Twin-HMMs," in Proc. Interspeech, San Francisco, Sept. 2016.

S. Gergen, S. Zeiler, A. Hussen Abdelaziz, R. Nickel and **D. Kolossa**: "Dynamic Stream Weighting for Turbo-Decoding-Based Audiovisual ASR," in Proc. Interspeech 2016, San Francisco, Sept. 2016.

S. Zeiler, H. Meutzner, A. Hussen Abdelaziz and **D. Kolossa**: "Introducing the Turbo-Twin-HMM for Audio-Visual Speech Enhancement," Proc. Interspeech 2016, San Francisco, Sept. 2016.

H. Meutzner, **D. Kolossa**, "A Non-speech Audio CAPTCHA Based on Acoustic Event Detection and Classification", EUSIPCO 2016, Budapest, Hungary, Aug. 2016.

K. Kohls, T. Holz, **D. Kolossa**, C. Pöpper: "Skype-Line: Robust Hidden Data Transmission

for VoIP,” Proc. ACM Symposium on Information, Computer and Communications Security (ASIACCS), Xi’an, May 2016.

S. Zeiler, R. Nickel, N. Ma, G. J. Brown, **D. Kolossa**: “Robust audiovisual speech recognition using noise-adaptive linear discriminant analysis,” Proc. ICASSP 2016, Shanghai, March 2016.

M. Karbasi, A. H. Abdelaziz, **D. Kolossa**: “Twin-HMM-based non-intrusive speech intelligibility prediction,” Proc. ICASSP 2016, Shanghai, March 2016.

A. Hussen Abdelaziz, S. Watanabe, J. Hershey, E. Vincent, **D. Kolossa**: “Uncertainty Propagation through Deep Neural Networks,” in Proc. Interspeech, Dresden, Germany, September 2015.

C. Schymura, F. Winter, **D. Kolossa**, S. Spors: “Binaural Sound Source Localisation and Tracking using a dynamic Spherical Head Model,” in Proc. Interspeech, Dresden, Germany, September 2015.

R. Jacobi, G. vom Bögel, **D. Kolossa**: “Multilevel Decoding Scheme for RFID and Sensor Signals in Inductively Coupled Systems,” Proc. European Conference on Smart Objects, Systems and Technologies (SmartSysTech), Aachen, Germany, June 2015.

R. Jacobi, A. Süß, G. vom Bögel, **D. Kolossa**: “Determination of the Optimal Carrier Frequency in Harsh Environments by Parameter Estimation,” Proc. European Conference on Smart Objects, Systems and Technologies (SmartSysTech), Aachen, Germany, June 2015.

R. Jacobi, A. Süß, G. vom Bögel, **D. Kolossa**: “Carrier Frequency Adaptation Approach,” Proc. IEEE International Conference on RFID, San Diego, USA, April 2015.

H. Meutzner, S. Gupta, **D. Kolossa**: “Constructing Secure Audio CAPTCHAs by Exploiting Differences between Humans and Machines,” Proc. CHI, Seoul, South Korea, April 2015.

D. Kolossa: “Narrowing the gap: Probabilistic interfaces for signal enhancement and pattern recognition”, Proc. IEEE GlobalSIP - Machine Learning Applications in Speech Processing, Atlanta, Georgia, USA, December 2014.

M. Darnstädt, H. Meutzner, **D. Kolossa**: “Reducing the Cost of Breaking Audio CAPTCHAs by Active and Semi-Supervised Learning”, Proc. ICMLA, December 2014.

H. Meutzner, V. H. Nguyen, T. Holz, **D. Kolossa**: “Using Automatic Speech Recognition for Attacking Acoustic CAPTCHAs: The Trade-off between Usability and Security”, **Winner of outstanding paper award**, Proc. ACSAC, December 2014.

A. Hussen Abdelaziz, **D. Kolossa**: „Dynamic Stream Weight Estimation in Coupled-HMM-based Audio-visual Speech Recognition Using Multilayer Perceptrons”, Proc. Interspeech, Singapore, September 2014.

M. Heckmann, P. Mikias, **D. Kolossa**: “The Impact of Word Alignment Accuracy on Audio-visual Word Prominence Detection”, Proc. ITG Conference on Speech Communication, Erlangen, Germany, September 2014.

S. Zeiler, J. Cwiklak, **D. Kolossa**: “Robust Multimodal Human Machine Interaction using the Kinect Sensor”, Proc. ITG Conference on Speech Communication, Erlangen, Germany, September 2014.

R. Jacobi, S. Grey, G. vom Bögel, **D. Kolossa**: “Digitally Controlled Analog Front End for Inductively Coupled Transponder Systems”, Proc. IEEE RFID Technology and Applications, September 2014.

A. Hussen Abdelaziz, S. Zeiler, **D. Kolossa**: “A new EM estimation of dynamic stream weights for coupled-HMM-based audio-visual ASR”, Proc. ICASSP, Florence, May 2014.

A. Hussen Abdelaziz, S. Zeiler, **D. Kolossa**: „Using Twin-HMM-Based Audio-Visual Speech Enhancement as a Front-End for Robust Audio-Visual Speech Recognition”, Proc. Interspeech, Lyon, France, August 2013.

H. Meutzner, A. Schlesinger, S. Zeiler, **D. Kolossa**: „Binaural Signal Processing for Enhanced Speech Recognition Robustness in Complex Listening Environments“, Proc. 2nd CHiME Workshop on Machine Listening in Multisource Environments, Vancouver, Canada, June 2013.

A. Hussen Abdelaziz, S. Zeiler, **D. Kolossa**: „Twin-HMM-based Audiovisual Speech Enhancement“, Proc. ICASSP, Vancouver, Canada, May 2013.

A. Hussen Abdelaziz, S. Zeiler, **D. Kolossa**, V. Leutnant, R. Haeb-Umbach: „GMM-based Significance Decoding“, Proc. ICASSP, Vancouver, Canada, May 2013.

A. Hussen Abdelaziz, **D. Kolossa**: “Decoding of Uncertain Features Using the Posterior Distribution of the Clean Data for Robust Speech Recognition”, Proc. Interspeech, Portland, Oregon, USA, September 9-13, 2012.

D. Kolossa, R. Nickel, S. Zeiler, R. Martin: “Inventory-Based Audio-Visual Speech Enhancement”, Proc. Interspeech, Portland, Oregon, USA, September 9-13, 2012.

R. Nickel, R. Fernandez Astudillo, **D. Kolossa**, S. Zeiler, R. Martin: „Inventory-Style Speech Enhancement with Uncertainty-of-Observation Techniques“, Proc. ICASSP, pp. 3877-3880, Kyoto, Japan, March 2012.

D. Kolossa, R. Fernandez Astudillo, A. Abad, S. Zeiler, R. Saeidi, P. Mowlae, J. P. da Silva Neto, R. Martin: “CHiME Challenge: Approaches to Robustness using Beamforming and Uncertainty-of-Observation Techniques”, Proc. CHiME Workshop on Machine Listening in Multisource Environments, Florence, Italy, Sept.1, 2011.

F. Kohl, G. Wübbeler, **D. Kolossa**, C. Elster, M. Bär, R. Orglmeister: „Noise adjusted PCA for finding the subspace of evoked dependent signals from MEG data“, Latent Variable Analysis and Signal Separation (LVA 2010), Lecture Notes in Computer Science, vol. 6365, pp. 442-449, September 2010.

D. Kolossa, J. Chong, S. Zeiler, K. Keutzer: “Efficient Manycore CHMM Speech Recognition for Audiovisual and Multistream Data”, Proc. Interspeech 2010, pp. 2698 – 2701, Makuhari, Japan, September 26-30, 2010.

A. Vorwerk, X. Wang, **D. Kolossa**, S. Zeiler, R. Orglmeister: “WAPUSK20 - A Database for Robust Audiovisual Speech Recognition“, Proc. 7th Int. Conf. on International Language Resources and Evaluation (ELREC), pp. 3016 – 3019, 2010.

R. Fernandez Astudillo, **D. Kolossa** and R. Orglmeister: "Accounting for the Uncertainty of Speech Estimates in the Complex Domain for Minimum Mean Square Error Speech Enhancement", Interspeech 2009, Brighton, UK, September 2009.

D. Kolossa, S. Zeiler, A. Vorwerk, R. Orglmeister: "Audiovisual Speech Recognition with Missing or Unreliable Data", Audiovisual Speech Processing Workshop (AVSP 2009), Brighton, UK, September 10-13, 2009.

F. Kohl, G. Wübbeler, **D. Kolossa**, C. Elster, M. Bär, R. Orglmeister: "Non-Independent BSS: A Model for Evoked MEG Signals with Controllable Dependencies" in: Proceedings of the ICA 2009, pp. 443-450, Paraty, Brazil, March 15-18, 2009.

E. Hoffmann, **D. Kolossa**, R. Orglmeister: "Time Frequency Masking Strategy for Blind Source Separation of Acoustic Signals Based on Optimally-Modified LOG-Spectral Amplitude Estimator" in: Proceedings of the ICA 2009, pp. 581-588, Paraty, Brazil, March 15-18, 2009.

F. Kohl, G. Wübbeler, **D. Kolossa**, R. Orglmeister, C. Elster, M. Bär: "Performance of ICA for MEG data generated from subspaces with dependent sources", Proc. European Biomedical Engineering Congress (EMBEC), Antwerpen, Nov. 2008.

D. Kolossa, S. Araki, M. Delcroix, T. Nakatani, R. Orglmeister and S. Makino: „Missing Feature Speech Recognition in a Meeting Situation with Maximum SNR Beamforming“, invited paper, Proc. ISCAS, pp. 3218-3221, Seattle, WA, May 2008.

E. Hoffmann, **D. Kolossa** and R. Orglmeister: "A Batch Algorithm for Blind Source Separation of Acoustic Signals Using ICA and Time-Frequency Masking", Proc. ICA 2007, pp. 480-487, Springer Verlag, Berlin.

E. Hoffmann, **D. Kolossa** and R. Orglmeister: „A Soft Masking Strategy based on Multichannel Speech Probability Estimation for Source Separation and Robust Speech Recognition", Proc. IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA 2007), pp. 118-121, New Paltz, NY.

R. Fernandez Astudillo, **D. Kolossa** and R. : "Propagation of Statistical Information Through Non-Linear Feature Extractions For Robust Speech Recognition", Proc. MaxEnt2007, pp. 245-252, 27th Int. Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering, Saratoga Springs, July 2007.

D. Kolossa, H. Sawada, R. Fernandez Astudillo, R. Orglmeister and S. Makino: „Recognition of convolutive speech mixtures by missing feature techniques for ICA“, invited paper, in: Proc. 40th Asilomar Conference on Signals, Systems and Computers, pp. 1397-1401, October 29 - November 1, Pacific Grove, USA, 2006.

S. Maraboina, **D. Kolossa**, P. Bora and R. Orglmeister: „Multi-Speaker Voice Activity Detection using ICA and Beampattern Analysis“, in: Proc. Eusipco 2006, Florence, Italy, Sept 2006.

D. Kolossa, A. Klimas and R. Orglmeister: „Separation and Robust Recognition of Noisy, Convolutive Speech Mixtures using Time-Frequency Masking and Missing Data Techniques“, in: Proceedings of the WASPAA 2005, pp. 82-85, New Paltz, NY, USA, October 16-19, 2005.

D. Kolossa and R. Orglmeister: „Nonlinear Postprocessing for Blind Speech Separation“, in: Proceedings of the ICA 2004, pp. 832–839, Granada, Spain, September 22-24, 2004.

W. Baumann, **D. Kolossa** and R. Orglmeister: „Beamforming-Based Convolutive Source Separation“, in Proc. ICASSP 2003, pp. 357-360, Hong Kong, China, April 6-10, 2003.

W. Baumann, **D. Kolossa** and R. Orglmeister: „Maximum Likelihood Permutation Correction for Convolutive Source Separation“, in: Proceedings of the ICA 2003, pp. 373-378, Nara, Japan, April 1-4, 2003.

D. Kolossa and Q. Huo: „Using Time-Stretched Pulses for Accurate Splitting of Speech Utterances Played Back in Noisy Reverberant Environments“, in: Proceedings of the International Conference on Spoken Language Processing (ICSLP), pp.1541-1544, September 16-20 2002, Denver, CO, USA.

D. Kolossa, B.-U. Köhler, M. Conrath and R. Orglmeister: „Optimal Permutation Correction by Multiobjective Genetic Algorithms“, in: Proceedings of the ICA2001, pp. 373-378, San Diego, California, USA.

W. Baumann, B.-U. Köhler, **D. Kolossa** and R. Orglmeister: „Real Time Separation of Convolutive Mixtures“, in: Proc. ICA2001, pp.65-69, San Diego, California, USA.

D. Kolossa and G. Grübel: „Evolutionary Computation and Nonlinear Programming in Multi-Model Robust Control Design“, In: Lecture Notes on Computer Science vol. 1803, pp. 147-157, Stefano Cagnoni et al. (Eds.), Springer Verlag, Berlin, Heidelberg, New York, 2000.

Other Conference Papers

M. Heckmann, H. Wersing, D. Orth, **D. Kolossa**, N. Schömig, C. Maag, M. Dunn: "Towards an On-Demand Intersection Assistant: Initial User Acceptance and System Development", 4th International Symposium on Future Active Safety Technology Toward zero traffic accidents (FAST-zero), Nara, Japan, September 2017.

- M. Karbasi, **D. Kolossa**: "ASR-based Measures for Microscopic Speech Intelligibility Prediction", 1st International Workshop on Challenges in Hearing Assistive Technology (CHAT-2017), Stockholm, August 2017.
- C. Schymura, J. Rios Grajales, **D. Kolossa**: "Active localization of sound sources with binaural models," Proc. DAGA, Nürnberg, March 2016.
- M. Karbasi, **D. Kolossa**: "A Microscopic Approach to Speech Intelligibility Prediction using Auditory Models," Proc. DAGA, Nürnberg, March 2015.
- C. Schymura, T. Walther, **D. Kolossa**, N. Ma and G. Brown: "Binaural Sound Source Localisation using a Bayesian-network-based Blackboard System and Hypothesis-driven Feedback," Proc. Forum Acusticum, Krakow, September 2014.
- J. Blauert, **D. Kolossa**, P. Danès: "Feedback loops in engineering models of binaural listening," 167th Meeting of the Acoustical Society of America, Providence, Rhode Island, May 2014, <http://dx.doi.org/10.1121/2.0000033>.
- D. Kolossa**: „Methoden zur robusten Spracherkennung unter Beobachtungsunsicherheit,“ Proc. DAGA, March 2014.
- A. Hussen Abdelaziz, L. Charaf, S. Zeiler, **D. Kolossa**: „On Dynamic Stream Weight Learning for Coupled-HMM-based Audio-visual Speech Recognition,“ Proc. DAGA, March 2014.
- A. Raake, J. Blauert, J. Braasch, G. Brown, P. Danès, T. Dau, B. Gas, S. Argentieri, A. Kohlrausch, **D. Kolossa**, N. Le Goff, T. May, K. Obermayer, S. Spors: „TWO!EARS - integral interactive model of auditory perception and experience,“ Proc. DAGA, March 2014.
- H. Meutzner, S. Malik, **D. Kolossa**: "SVM-Based Preprocessing for Automatic Speech Recognition", *Winner of best presentation and paper award*, invited paper, Proc. DAGA 2013, Meran, Italy, March 18-21, 2013.
- D. Schmid, P. Thüne, **D. Kolossa**, G. Enzner: "Dereverberation preprocessing and training data adjustments for robust speech recognition in reverberant environments", ITG Fachtagung Sprachkommunikation, Braunschweig, Germany, September 26-28, 2012.
- A. Hussen Abdelaziz, S. Zeiler, **D. Kolossa**: "Audio-Visual Speech Recognition for Uncertain Acoustical Observations", ITG Fachtagung Sprachkommunikation, Braunschweig, Germany, September 26-28, 2012.
- R. C. Jacobi, A. Hennig, **D. Kolossa**: „Simulation Methods for Inductively Coupled Sensor Systems in Varying Environments“, Proc. PRIME, Aachen, Germany, June 12-15, 2012
- E. Hoffmann, **D. Kolossa**, R. Orglmeister: „Time-Frequency-Processing for ICA-Supported Speech Recognition in Multitalker Conditions“, invited paper, Proc. DAGA, March 19-22, Darmstadt, Germany, 2012.
- D. Kolossa**: "High-Level Processing of Binaural Features", invited paper, Proc. Forum Acusticum, June 27-July 1, Aalborg, Denmark, 2011.
- D. Kolossa**, R. Fernandez Astudillo, S. Zeiler, A. Vorwerk, D. Lerch, J. Chong, R. Orglmeister: "Missing Feature Audiovisual Speech Recognition under Real-Time Constraints", ITG Fachtagung Sprachkommunikation, paper 22, 4 pages, Bochum, Germany, October 6-8, 2010.
- M. Jeub, **D. Kolossa**, R. Fernandez Astudillo, R. Orglmeister: "Performance Analysis of Wavelet-based Voice Activity Detection", invited paper, Proc. DAGA2009, pp. 407-408, Rotterdam, March 2009.
- R. Fernandez Astudillo, **D. Kolossa**, R. Orglmeister: "Uncertainty Propagation for Speech Recognition using RASTA Features in Highly Nonstationary Noisy Environments", ITG Fachtagung Sprachkommunikation, Aachen, October 2008.

D. Kolossa, E. Hoffman, R. Orglmeister: "ICA-Based Bayesian Time-Frequency Masking", invited paper, ITG Fachtagung Sprachkommunikation, Aachen, October 2008.

F. Kohl, G. Wübbeler, T. Sander, L. Trahms, **D. Kolossa**, R. Orglmeister, C. Elster and M. Bär: "Performance of ICA for Dependent Sources using Synthetic Stimulus Evoked MEG Data", invited paper, Workshop Biosignalverarbeitung, pp. 32-35, Potsdam, July 2008.

D. Kolossa, R. Fernandez Astudillo, and R. Orglmeister: "Spracherkennung im Automobil durch Verwendung von Missing Feature Techniken", invited paper, Proc. DAGA 2007, pp. 301-302.

D. Kolossa, A. Klimas, W. Baumann and R. Orglmeister: „Robuste Erkennung gestörter Sprache im Automobil durch MMSE-Störgeräuschunterdrückung und Missing-Data Spracherkennung“, invited paper, in: Proc. Daga 2006, March 20 - 23, Braunschweig, Germany.

W. Baumann, **D. Kolossa** and R. Orglmeister: „Realtime Implementation of a Beamforming Based Convolutional Source Separation Algorithm“, Tagung der Deutschen Gesellschaft für Akustik, DAGA 2003, Aachen, March 18-20, 2003.

Theses

D. Kolossa: "Independent Component Analysis for Environmentally Robust Speech Recognition", PhD Thesis, TU Berlin, 2008.

D. Kolossa: „Entwurf & Aufbau eines Mikrocontrollersystems mit dem PowerPC MPC821 von Motorola“, Institute for Computer Architecture and Circuit Design, Diploma Thesis, TU Berlin, 1998.

Technical Reports

J. Chong, E. Gonina, **D. Kolossa**, S. Zeiler, K. Keutzer: "An Automatic Speech Recognition Application Framework for Highly Parallel Implementations on the GPU", Technical Report No. UCB/EECS-2012-47, Electrical Engineering and Computer Science, University of California, Berkeley, 2012.

Trade Journals

M. Heckmann, D. Orth, H. Wersing, **D. Kolossa**: "Entwicklung eines personalisierten Kreuzungsassistenten," ATZ-Automobiltechnische Zeitschrift vol. 119, pp. 38-43, May 2017.

M. Heckmann, D. Orth, H. Wersing, **D. Kolossa**: "Development of a personalised intersection assistant," ATZ Worldwide, vol. 119, pp. 36-41, May 2017.

Lecture Notes

D. Kolossa and H. Göckler: „Digitale Signalverarbeitung: Grundlagen, Methoden, Strukturen, Anwendungen“, Ruhr-Universität Bochum, 220 pages, 2014.

D. Kolossa: „Einführung in die automatische Spracherkennung“, TU Berlin, 155 pages, 2010.

Patents

German Patent Number DE 10 2014 225 492.2: R. Jacobi, **D. Kolossa**, A. Süß, G. vom Bögel: „RFID-Tag-Leseeinrichtung zum Aussenden eines Lesesignals, Verfahren zum Einstellen einer Lesesignalfrequenz und Verfahren zum Bereitstellen von Vergleichsübertragungsfunktionen.“ December 2014.

German Patent Number DE 10 2014 213 085: R. Jacobi, **D. Kolossa**, A. Süß, G. vom Bögel: "Entwurf und Implementierung von Verfahren und Algorithmen in Transponderlesegeräten zur Optimierung der Übertragungseigenschaften von LF-Transpondersystemen." July 2014.

European Patent Number EP 2531957 A1, US-Patent Nr. 9320464: A. Volmer, R. Orglmeister, E. Hoffmann, **D. Kolossa**: „Method and measuring device for measuring oxygen saturation in blood.“ March 2012.

German Patent Number DE 10312065.3: W. Baumann, **D. Kolossa** and R. Orglmeister: „Frequenzvariantes Beamforming zur Sprechertrennung im KFZ.“ March 2004.