

CURRICULUM VITAE

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EDUCATION & CAREER PROFILE

since 10/2020 Senior scientist at the Signal Processing & Speech Communication Laboratory (SPSC)
– Graz University of Technology (TU Graz)
10/2009 – 10/2020 Project-senior scientist at the Signal Processing & Speech Communication Laboratory (SPSC) – Graz University of Technology (TU Graz)
06/2012 – 08/2012 Parental leave
09/2005 – 11/2006 Parental leave
10/2003 – 09/2009 Doctoral study – electrical engineering at TU Graz
Thesis Title: *Enhancement for Disordered and Substitution Voices*
03/2002 – 09/2009 Research assistant at SPSC, TU Graz
10/1994 – 06/2001 Diploma study in electrical engineering – sound engineering at TU Graz

RESEARCH INTERESTS

Speech Signal Processing, Voice Analysis, Distant Speech Recognition, Disordered Voice Processing, Augmented Speech Communication, Medical Acoustics, Audio Signal Processing, Ethics and Diversity Aspects in Speech and Language Processing

COMMUNITY ACTIVITIES

since 2024 Scientific Advisor for Uhura Bionics
since 01/2024 Member of the TU Graz Ethics Commission
since 01/2014 Deputy General Secretary of the Austrian Acoustics Association

Conference Organization

2026 Forum Acusticum. Local Organization Committee
2019 Interspeech. Local Organizing Chair
2019 Pluricentric Languages in Speech Technology. Scientific Committee
2019 2nd Workshop of the Austrian Acoustic Association, Graz. Organizing Chair

PROJECTS (SELECTION)

Ongoing

- 2025 – 2028 Voice conversion for the processing of pathological speech
National Project Partner – *FWF PAT 5948223*
- 2017 – 2026 PipeSense – Distributed acoustic sensing with optical fibres
Collaborator – Industry Project

Completed

- 2019 – 2024 Cross-layer language models for conversational speech
Collaborator – *FWF P 32700-N*
- 2018 – 2024 Objective differentiation of dysphonic voice quality types
Collaborator – *FWF - KLI 722*
- 2018 – 2020 PI at SPSC KONDE – Digitale Editionen
Collaborator – *Hochschulraumstrukturmittel-Projekt*
- 2017 – 2018 Evaluation tool for plain language
Collaborator – *FFG Impact Innovation*
- 2015-2018 HumanEVoice – - Gender-appropriate human voice using an artificial larynx
Consortium leader – *FFG FemTech Forschungsprojekt 849824*
- 2011-2018 Electronic speech aid for laryngectomized people
Project manager – *Industry project with Heimomed, Kerpen, Germany*
- 2014-2018 CULA – Computerized Lung Sound Analysis
Land Steiermark
- 2013-2017 ASD – Acoustic Sensing & Design (WP Leader)
COMET K-Project FFG 836632
- 2012-2014 DIRHA – Distant-speech Interaction for Robust Home Applications (WP Leader)
EU FP7-ICT-2011-7

Master's Theses Supervision (Selection)

- 2024 Modeling backchannels for human-robot interaction
- 2024 Broadband Noise Source Direction Estimation using Flow-Sensing MEMS Microphones on a Miniature Array
- 2024 From Silence to Sound: Exploring the Potential of State of the Art Voice Conversion Models for Pathological Speech Enhancement
- 2023 Version Control for Speech Corpora
- 2023 Use of Hand Gestures for F0 Contour Generation for Electro-Larynx Speech
- 2021 Acoustic Scene Classification for Improved Bionic Voice
- 2021 Time-frequency adaptive room optimization
- 2020 Forced Alignment Speech Recognition for Conversational Speech
- 2020 Multichannel Speech Separation of Dinner Talks at an Antarctic Research Station
- 2018 Investigation on Compact Microphone and Loudspeaker Arrangements for Vehicle Handsfree and Voice Control Systems
- 2018 Binaural Beamforming for Hearing Aids using Differential Microphone Arrays
- 2016 Circular Differential Microphone Arrays
- 2016 Excitation Signal Analysis - Gender Differences
- 2015 Learning Effects for Electromyographically Controlled Electrolarynx Speech
- 2015 Parametrization of a Transducer for Electro-Larynx Speech Production
- 2015 Multichannel Voice Activity Detection for ASR
- 2014 Electrolarynx Control using Electromyographic Signals
- 2013 Acoustic Source Localization with a Single Microphone using Reflected Signals

2013	Differential Microphone Arrays
2012	Real-Time Enhancement of E-Larynx Speech Signals
2008	Comparison of Excitation Signals for an Electronic Larynx

Conference Organization

2019	Interspeech, Graz. Local Organizing Chair
2019	Pluricentric Languages in Speech Technology. Scientific Committee

Review Activities (Selection)

Speech Communication, Computer, Speech & Language, Computers in Biology and Medicine, Medical Engineering & Physics (Elsevier), International Journal of Speech Technology (Springer), PLOS ONE, Transactions on Audio, Speech and Language, Transactions on Biomedical Engineering (IEEE)

Public Science Communication (HumanEVoice)

2020-02-12	Orf Steiermark – Steiermark Heute (Regional TV)
2019-08-23	Kronen Zeitung (National Newspaper)
2019-08-19	Der Kurier (National Newspaper – Print) / Futurezone (Online)

CO-SUPERVISED PHD THESES

Ongoing

2024- Sebastian Handel: *Nonlinear Oscillators for Hearing Models*

Completed

- 2017 Hannes Pessentheiner: *Localization, Characterization, and Tracking of Harmonic Sources: With Applications to Speech Signal Processing*
- 2015 Philipp Aichinger: *Diplophonic Voice - Definitions, models, and detection*
- 2015 Anna Fuchs: *The Bionic Electro-Larynx Speech System; Challenges, Investigations, and Solutions*

INVITED TALKS

- 2018 Diversitätsaspekte einer bionischen Stimme, TU Braunschweig
- 2018 A bionic Voice, Peripatetic Conferences on Cognitive Systems Modeling, Male Ciche

PUBLICATIONS

THESES

- [1] Martin Hagmüller. “Speech Enhancement for Disordered and Substitution Voices”. PhD thesis. Graz University of Technology, 2009.
- [2] Martin Hagmüller. “Recognition of Regional Variants of German using Prosodic Features”. Diploma Thesis. Graz University of Technology, May 2001.

JOURNAL PAPERS

- [3] Stefan Fagner, Lukas Pfeifenberger, Martin Hagmüller, and Franz Pernkopf. “Dataset of directional room impulse responses for realistic speech data”. In: *Data in Brief* 53 (Apr. 2024), p. 110229. ISSN: 2352-3409. DOI: 10.1016/j.dib.2024.110229.
- [4] W. Lienhart, L. Strasser, M. Hagmüller, F. Ainhirn, A. Bolzer, G. Hötzenndorfer, G. Wischenbarth, A. Kainz, K. Maier, N. Samhaber, and C. Schickettmüller. “Development and validation of a third party intrusion detection software based on DAS measurement data”. In: *e+i Elektrotechnik und Informationstechnik* (Dec. 2024). ISSN: 1613-7620. DOI: 10.1007/s00502-024-01284-z.
- [5] Florian B. Pokorny, Julian Linke, Nico Seddiki, Simon Lohrmann, Claus Gerstenberger, Katja Haspl, Marlies Feiner, Florian Eyben, Martin Hagmüller, Barbara Schuppler, Gernot Kubin, and Markus Gugatschka. “VocDoc, what happened to my voice? Towards automatically capturing vocal fatigue in the wild”. In: *Biomedical Signal Processing and Control* 88 (Feb. 2024), p. 105595. ISSN: 1746-8094. DOI: 10.1016/j.bspc.2023.105595.
- [6] Philipp Aichinger, Martin Hagmüller, Berit Schneider-Stickler, Jean Schoentgen, and Franz Pernkopf. “Tracking of Multiple Fundamental Frequencies in Diplophonic Voices”. In: *IEEE/ACM Transactions on Audio, Speech, and Language Processing* 26.2 (2018), pp. 330–341. DOI: 10.1109/taslp.2017.2761233.
- [7] P. Aichinger, M. Hagmüller, I. Roesner, B. Schneider-Stickler, J. Schoentgen, and F. Pernkopf. “Fundamental frequency tracking in diplophonic voices”. In: *Biomedical Signal Processing and Control* 37 (Aug. 2017), pp. 69–81. DOI: 10.1016/j.bspc.2016.10.002.
- [8] Philipp Aichinger, Imme Roesner, Matthias Leonhard, Berit Schneider-Stickler, Doris-Maria Denk-Linnert, Wolfgang Bigenzahn, Anna Katharina Fuchs, Martin Hagmüller, and Gernot Kubin. “Comparison of an audio-based and a video-based approach for detecting diplophonia”. In: *Biomedical Signal Processing and Control* 31 (Jan. 2017), pp. 576–585. DOI: 10.1016/j.bspc.2014.10.001.
- [9] Philipp Aichinger, Imme Roesner, Berit Schneider-Stickler, Matthias Leonhard, Doris-Maria Denk-Linnert, Wolfgang Bigenzahn, Anna Katharina Fuchs, Martin Hagmüller, and Gernot Kubin. “Towards Objective Voice Assessment: The Diplophonia Diagram”. In: *Journal of Voice* 31.2 (Mar. 2017), 253.e17–253.e26. DOI: 10.1016/j.jvoice.2016.06.021.
- [10] Barbara Schuppler, Martin Hagmüller, and Alexander Zahrer. “A corpus of read and conversational Austrian German”. In: *Speech Communication* 94 (Sept. 2017), pp. 62–74. DOI: 10.1016/j.specom.2017.09.003.
- [11] P. Aichinger, M. Hagmüller, I. Roesner, W. Bigenzahn, B. Schneider-Stickler, and J. Schoentgen. “Diplophonia Disturbs Jitter and Shimmer Measurement”. In: *Folia Phoniatr Logop* 68.1 (2016), pp. 22–28. ISSN: 1021-7762. DOI: 10.1159/000447589.
- [12] A. Fuchs, M. Hagmüller, and G. Kubin. “The New Bionic Electro-Larynx Speech System”. In: *IEEE Journal of Selected Topics in Signal Processing* 10.5 (2016), pp. 952–961. ISSN: 1932-4553. DOI: 10.1109/JSTSP.2016.2535970.
- [13] Hannes Pessentheiner, M. Hagmüller, and Gernot Kubin. “Localization and Characterization of Multiple Harmonic Sources”. In: *IEEE/ACM Transactions on Audio, Speech and Language Processing* 24.8 (Aug. 2016), pp. 1348–1363. DOI: 10.1109/TASLP.2016.2556282.
- [14] Marcos Faundez-Zanuy, Jose Juan Lucena-Molina, and Martin Hagmüller. “Speech watermarking: An approach for the forensic analysis of digital telephonic recordings”. In: *Forensic Science International* 55.4 (2010), pp. 1080–1087. DOI: 10.1111/j.1556-4029.2010.01395.x.

- [15] Marcos Faundez-Zanuy, Martin Hagmüller, and Gernot Kubin. “Speaker identification security improvement by means of speech watermarking”. In: *Pattern Recognition* 40.11 (Nov. 2007), pp. 3027–3034. DOI: 10.1016/j.patcog.2007.02.016.
- [16] Marcos Faundez-Zanuy, Martin Hagmüller, and Gernot Kubin. “Speaker verification security improvement by means of speech watermarking”. In: *Speech Communication* 48.12 (Dec. 2006), pp. 1608–1619. DOI: doi:10.1016/j.specom.2006.06.010.
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PEER-REVIEWED CONFERENCE PAPERS

- [18] Vlad Dumitru, Matthias Boehm, Martin Hagmüller, and Barbara Schuppler. “Speechcake: Version Control for Speech Corpora”. In: *Proceedings of the 20th Conference on Natural Language Processing (KONVENS 2024)*. Ed. by Pedro Henrique Luz de Araujo, Andreas Baumann, Dagmar Gromann, Brigitte Krenn, Benjamin Roth, and Michael Wiegand. Vienna, Austria: Association for Computational Linguistics, Sept. 2024, pp. 303–308. URL: <https://aclanthology.org/2024.konvens-main.30>.
- [19] Werner Lienhart, Vlad-Andrei Dumitru, Lisa Strasser, and Martin Hagmüller. “Lückenlose Überwachung von unterirdischen Versorgungsleitungen mittels verteilter faseroptischer Messungen und Watermarking und KI”. In: *OVE Energietechnik Tagung*. 2024.
- [20] Emil Berger, Barbara Schuppler, Martin Hagmüller, and Franz Pernkopf. “Single Channel Source Separation in the Wild - Conversational Speech in Realistic Environments”. In: 2023, accepted for publication.
- [21] Martin Hagmüller, Julian Linke, Simon Lohrmann, Florian Pokorny, and Barbara Schuppler. “An Acoustic Analysis of Vowels to Predict Voice Changes in Along Reading Task”. In: *Proceedings MAVEBA*. 2023, pp. 23–26. DOI: 10.36253/979-12-215-0146-9.
- [22] Konrad Zieliński, Marek Grzelec, and Martin Hagmüller. “Humanizing bionic voice: interactive demonstration of aesthetic design and control factors influencing the devices assembly and wave-shape engineering”. In: *Proc. Interspeech*. 2022, pp. 1953–1954. URL: https://www.isca-speech.org/archive/interspeech_2022/zielinski22_interspeech.html.
- [23] Krušić, Lucija, Schuppler, Barbara, Hagmüller, Martin, and Kopeinik, Simone. “Exploring Gender Bias in Austrian Education: Seeing What Students are Exposed to”. In: *Proceedings of the STS Conference Graz 2021*. Verlag der Technischen Universität Graz, 2021. DOI: 10.3217/978-3-85125-855-4-13.
- [24] Anastasia Klimashevskaja, Bernhard C. Geiger, Martin Hagmüller, Denis Helic, and Frank Fischer. “”To be or not to be central” - On the Stability of Network Centrality Measures in Shakespeare’s ”Hamlet””. In: *15th Annual International Conference of the Alliance of Digital Humanities Organizations, DH 2020, Ottawa, Canada, July 20-25, 2020, Conference Abstracts*. Ed. by Laura Estill and Jennifer Guiliano. 2020. URL: https://dh2020.adho.org/wp-content/uploads/2020/07/224_TobeornottobecentralOntheStabilityofNetworkCentralityMeasuresinShakespearesHamlet.html.
- [25] Martin Hagmüller, Anna Katharina Fuchs, and Corinna Bath. “Participatory enquiry for a bionic voice”. In: *Proceedings of the 10th International Workshop Models and analysis of vocal emissions for biomedical applications*. Ed. by Claudia Manfredi. Firenze University Press, Dec. 2017, pp. 35–38. ISBN: 978-88-6453-606-4.
- [26] Elmar Messner, Martin Hagmüller, Paul Swatek, Freyja-Maria Smolle-Jüttner, and Franz Pernkopf. “Impact of Airflow Rate on Amplitude and Regional Distribution of Normal Lung Sounds”. In: *Proceedings of the 10th International Joint Conference on Biomedical Engineering Systems and Technologies*. SCITEPRESS - Science and Technology Publications, 2017. DOI: 10.5220/0006134400490053.
- [27] Elmar Messner, Martin Hagmüller, Paul Swatek, Freyja-Maria Smolle-Jüttner, and Franz Pernkopf. “Respiratory Airflow Estimation from Lung Sounds Based on Regression”. In: *International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, Mar. 2017, pp. 1123–1127. DOI: 10.1109/icassp.2017.7952331.

- [28] Philipp Aichinger, Berit Schneider-Stickler, and Martin Hagmüller. “Terminology of voice phenomena related to diplophonia”. In: *ICVPB 10th International Conference on Voice Physiology and Biomechanics*. Viña del Mar, Mar. 2016.
- [29] Philipp Aichinger, Berit Schneider-Stickler, Martin Hagmüller, and Jean Schoentgen. “Acoustic detection of diplophonia among other types of dysphonia”. In: *ICVPB 10th International Conference on Voice Physiology and Biomechanics*. Viña del Mar, Mar. 2016, pp. 139–140.
- [30] Elmar Messner, Martin Hagmüller, Paul Swatek, and Franz Pernkopf. “A Robust Multichannel Lung Sound Recording Device”. In: *Proceedings of the 9th International Joint Conference on Biomedical Engineering Systems and Technologies*. Scitepress, 2016, pp. 34–39. DOI: 10.5220/0005660200340039.
- [31] Hannes Pessentheiner, Thomas Pichler, and Martin Hagmüller. “AMISCO: The Austrian-German Multi-Sensor Corpus”. In: *Proceedings of the Tenth International Conference on Language Resources and Evaluation (LREC)*. Portorož, Slovenia, May 2016, pp. 760–766. URL: http://www.lrec-conf.org/proceedings/lrec2016/pdf/375_Paper.pdf.
- [32] Philipp Aichinger, Martin Hagmüller, Imme Roesner, Wolfgang Bigenzahn, Berit Schneider-Stickler, and Jean Schoentgen. “Differentiating Diplophonia from other Types of Severe Dysphonia by Acoustic Analysis”. In: *PEVOC*. abstract only. 2015.
- [33] Philipp Aichinger, Martin Hagmüller, Imme Roesner, Wolfgang Bigenzahn, Berit Schneider-Stickler, Jean Schoentgen, and Franz Pernkopf. “Measurement of Fundamental Frequencies in Diplophonic Voices”. In: *Proc. of 3rd International Workshop on Models and Analysis of Vocal Emissions for Biomedical Applications (MAVEBA)*. Firenze, Italy, 2015.
- [34] Philipp Aichinger, Berit Schneider-Stickler, Wolfgang Bigenzahn, Martin Hagmüller, Alois Sontacchi, and Jean Schoentgen. “Assessment and Psychoacoustic Modelling of Auditory Streams in Diplophonic Voice”. In: *Proc. of 3rd International Workshop on Models and Analysis of Vocal Emissions for Biomedical Applications (MAVEBA)*. 2015.
- [35] Andreas Fuchs, Marco Conter, Reinhard Wehr, Martin Hagmüller, and Hannes Pessentheiner. “Anwendung von Beamforming für Vorbeifahrtsmessungen”. In: *Fortschritte der Akustik - DAGA*. 2015, pp. 173–176.
- [36] Anna Katharina Fuchs, Clemens Amon, and Martin Hagmüller. “Speech/Non-Speech Detection for Electro-Larynx Speech using EMG”. In: *Biosignals*. Lisbon, Portugal, Jan. 2015. DOI: 10.5220/0005181401380144.
- [37] Elmar Messner, Hannes Pessentheiner, Juan A. Morales-Cordovilla, and Martin Hagmüller. “Adaptive Differential Microphone Arrays Used As A Front-End For An Automatic Speech Recognition System”. In: *2015 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, Apr. 2015. DOI: 10.1109/ICASSP.2015.7178459.
- [38] Lukas Pfeifenberger, Tobias Schrank, Matthias Zöhrer, Martin Hagmüller, and Franz Pernkopf. “Multichannel speech processing architectures for noise robust speech recognition: 3rd CHiME Challenge results”. In: *ASRU Workshop*. 2015. DOI: 10.1109/ASRU.2015.7404830.
- [39] Luca Cristoforetti, Mirco Ravanelli, Maurizio Omologo, Alessandro Sosi, Alberto Abad, Martin Hagmüller, and Petros Maragos. “The DIRHA simulated corpus”. In: *Proceedings of the Ninth International Conference on Language Resources and Evaluation (LREC’14)*. Reykjavik, Island, May 2014, pp. 2629–2634. ISBN: 978-2-9517408-8-4. URL: http://www.lrec-conf.org/proceedings/lrec2014/pdf/650_Paper.pdf.
- [40] Anna Katharina Fuchs, Martin Hagmüller, and Gernot Kubin. “Artificial Fundamental Frequency Contour for Electro-Larynx Speech”. In: *Fortschritte der Akustik – DAGA*. Deutsche Gesellschaft für Akustik (DEGA). Oldenburg, Germany, Mar. 2014, pp. 507–508.
- [41] Juan A. Morales-Cordovilla, Hannes Pessentheiner, Martin Hagmüller, José A. González, and Gernot Kubin. “CVX-Optimized Beamforming and Vector Taylor Series Compensation with German ASR Employing Star-Shaped Microphone Array”. English. In: *Advances in Speech and Language Technologies for Iberian Languages*. Vol. 8854. Lecture Notes in Computer Science. Springer International Publishing, 2014, pp. 148–157. ISBN: 978-3-319-13622-6. DOI: 10.1007/978-3-319-13623-3_16.

- [42] Juan A. Morales-Cordovilla, Hannes Pessentheiner, Martin Hagmüller, and Gernot Kubin. “Distant Speech Recognition in Reverberant Noisy Conditions Employing a Microphone Array”. In: *Proceedings of the European Signal Processing Conference (EUSIPCO)*. Lisbon, Portugal, Sept. 2014, pp. 2380–2384. URL: <https://www.eurasip.org/Proceedings/Eusipco/Eusipco2014/HTML/papers/1569925567.pdf>.
- [43] Juan A. Morales-Cordovilla, Hannes Pessentheiner, Martin Hagmüller, and Gernot Kubin. “Room Localization for Distant Speech Recognition”. In: *Proceedings of Interspeech*. Singapore, Sept. 2014, pp. 2450–2453. URL: https://www.isca-speech.org/archive/archive_papers/interspeech_2014/i14_2450.pdf.
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- [45] Andreas Zehetner, Martin Hagmüller, and Franz Pernkopf. “Wake-Up-Word Spotting for Mobile Systems”. In: *EUSIPCO*. Lisbon, Portugal, Sept. 2014, pp. 1472–1476.
- [46] P. Aichinger, I. Roesner, B. Schneider-Stickler, W. Bigenzahn, F. Feichter, A.K. Fuchs, M. Hagmüller, and G. Kubin. “Spectral Analysis of Laryngeal High-Speed Videos: Case Studies on Diplophonic and Euphonic Phonation”. In: *8th International Workshop on Models and Analysis of Vocal Emissions for Biomedical Applications (MAVEBA)*. Firenze, Italy, Dec. 2013.
- [47] P. Aichinger, B. Schneider-Stickler, W. Bigenzahn, A.K. Fuchs, B. Geiger, M. Hagmüller, and G. Kubin. “Double pitch marks in diplophonic voice”. In: *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. 2013, pp. 7437–7441. DOI: 10.1109/ICASSP.2013.6639108.
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- [51] P. Mowlaee, Juan A. Morales-Cordovilla, Franz Pernkopf, Hannes Pessentheiner, Martin Hagmüller, and Gernot Kubin. “The 2nd CHiME Speech Separation and Recognition Challenge: Approaches on Single-channel Speech Separation and Model-driven Speech Enhancement”. In: *Proceeding of the 2nd CHiME Speech Separation and Recognition Challenge, IEEE Int. Conf. Acoustics, Speech, Signal Processing*. Vancouver, Canada, May 2013, pp. 59–64. URL: http://spandh.dcs.shef.ac.uk/chime_workshop/papers/pP7_mowlaee.pdf.
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PATENT

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- [66] Martin Hagmüller and Gernot Kubin. “Methode zur Trennung von Signalpfaden und Anwendung auf die Verbesserung von Sprache mit Elektro-Larynx”. Pat. AT507844 (A1). 2009.

TECH REPORTS

- [67] Martin Hagmüller, Erhard Rank, and Gernot Kubin. *Evaluation of the Human Voice for Indications of Workload-induced Stress in the Aviation Environment*. Tech. rep. EEC Note 2006-18. Eurocontrol Experimental Center, 2006. URL: http://www.eurocontrol.int/eec/public/standard_page/DOC_Report_2006_023.html.
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