

Prof. Dr. rer. nat. Carsten H. Wolters: Research

Research interests

The main research areas of the SIM-NEURO (Stimulation, Imaging and Modeling of NEURONal networks in the human brain) research group at the IBB are the development of new methods and applications for multimodal brain imaging and brain stimulation to reconstruct and manipulate neuronal networks in the brain. Brain imaging methods include modalities such as Electroencephalography (EEG), Magnetoencephalography (MEG), Magnetic Resonance Imaging (MRI), diffusion MRI (dMRI), functional MRI (fMRI) and Positron Emission Tomography (PET). A special focus is on the development of multimodal imaging and combined EEG/MEG/MRI source reconstruction methods using new forward and inverse approaches. In the brain stimulation research field we contribute new optimization methods for multi-sensor setups to transcranial electric (TES) and magnetic stimulation (TMS) and combined TES/TMS. We develop artifact-correction, linear and non-linear registration as well as segmentation approaches for structural MRI such as T1-MRI, T2-MRI and dMRI and for PET. The new methodology is applied in the field of neuroscientific brain research and in clinical applications such as presurgical epilepsy diagnosis and schizophrenia.

A detailed list of my research interests ordered by keywords can be found as a last subsection in this file.

Running projects

06/2018-02/2022 NIH (Grant Number: 1 R01 EB 026299-01), "BrainStorm: Highly Extensible Software for Advanced Electrophysiology and MEG/EEG Imaging", Software grant for integrating SimBio-NeuroFEM and DUNEuro into Brainstorm.

Own status: Collaborator.

PIs: Prof. Richard Leahy, School of Engineering, USC, Los Angeles, USA and Prof. John Mosher, Department of Neurology, McGovern Medical School, University of Texas, USA.

2017-2021 DFG priority program (SPP 1665/2): "Resolving and Manipulating Neuronal Networks in the Mammalian Brain - from Correlative to Causal Analysis", Project "Individualized closed-loop transcranial alternating current stimulation".

Own status: PI (WO1425/5-2)

Further PI's: C.Hermann (HE 3353/8-2), Allgemeine Psychologie (Fakultät VI), Carl von Ossietzky Universität Oldenburg; T.Schneider (SCHN 1511/1-2), Institut für Neurophysiologie und Pathophysiologie, Universitätsklinikum Hamburg-Eppendorf.

GepriS

- 2016-2020 DFG-project "Rekonstruktion epilepsietypischer Quellen durch simultane Auswertung von EEG-und MEG-Daten unter Nutzung kalibrierter realistischer Kopfmodelle.
Own status: PI (WO1425/7-1)
Further PI: S. Rampp (RA20662/1-1), Neurochirurgische Klinik, Universitätsklinikum Erlangen.
Gepris
- 2018-2020 DAAD PPP Finnland 2018, project 57405052: "Advancing FEM for Reconstructing and Manipulating the Human Somatosensory Cortex".
Own status: PI
Further PI: Prof. Sampsa Pursiainen, University of Tampere, Finland.
Web
- 2016-04/2020 DFG-project "Neurostimulation for the treatment of disturbed pharyngeal sensitivity as a major cause of neurogenic dysphagia".
Own status: Collaborator (WO 1425/6-1)
PI's: R. Dziewas (DZ 78/1-1) and S. Suntrup (SU 922/1-1), Department of Neurology, University Hospital Münster.
Gepris
- 2014-2019 MSCA-ITN-2014-ETN: Marie Sklodowska-Curie Innovative Training Networks, Grant agreement no.: 641652, Action acronym: ChildBrain), Action full title: "Advancing brain research in children's developmental neurocognitive disorders".
Own status: PI.
Further PI's: See Web
- 2014-2017 IZKF-project (JU 2/024/15): "Transcranial direct current stimulation of the medial prefrontal cortex for therapy of unipolar major depression".
Own status: Collaborator.
PI: M.Junghöfer, IBB.
Further collaborator: V.Arolt, Clinic and Polyclinic for Psychiatry and Psychotherapy, University of Münster.

Completed projects

- 2014-2016 DFG priority program (SPP 1665/1): "Resolving and Manipulating Neuronal Networks in the Mammalian Brain - from Correlative to Causal Analysis", Gepris Project "Causal role of brain oscillations in perception: modulation of network dynamics by transcranial alternating current stimulation (tACS). C.H.Wolters (WO1425/5-1); C.Hermann (HE 3353/8-1), Allgemeine Psychologie (Fakultät VI), Carl von Ossietzky Universität Oldenburg; A.Engel (EN 533/13-1), Institut für Neurophysiologie und Pathophysiologie, Universitätsklinikum Hamburg-Eppendorf. Gepris

- 2011-2014 DFG-project KonnekFEM: Entwicklung, Validierung und Anwendung von Verfahren zur Bestimmung der Konnektivität zwischen Hirnstrukturen . C.H.Wolters (WO1425/3-1); L.Grasedyck (GR 3179/3-1), IGPM, RWTH Aachen; T.Knösche (KN 588/4-1), MPI for Human Cognitive and Brain Sciences Leipzig; B.Maess (MA 4940/1-1), MPI for Human Cognitive and Brain Sciences Leipzig; J.Haueisen (HA 2899/14-1), Institut für Biomedizinische Technik und Informatik, TU Ilmenau. Gepris
- 2011-2014 DFG-project COMESA-PED: Rekonstruktion epilepsietypischer Quellen durch simultane Auswertung von EEG-und MEG-Daten unter Nutzung kalibrierter realistischer Kopfmodelle. C.H. Wolters (WO1425/2-1); H. Stefan (STE380/14-1), Epilepsy Center Erlangen. Gepris
- 2007–2012 Industrially funded project AF940097, "Automatic generation of head models and influence of skull segmentation on finite element forward modeling in EEG and MEG".
- 2007-2010 DFG-project EMOBEAMFEM: Entwicklung kombinierter EEG/MEG Beamformer Methoden auf der Basis hoch realistischer Kopfvolumenleitermodelle sowie deren Evaluation anhand der Untersuchung des "prefrontal-thalamic sensory gating" Systems und möglicher Störungen dieses Systems bei schizophrenen Patienten. M.Junghöfer (JU 445/5-1), IBB; C.H.Wolters, IBB; C.Pantev, IBB. Gepris
- 2007-2010 DFG-project FEMINVERS: Entwicklung und Validierung von Verfahren zur Lokalisation von Hirnaktivität mit Hilfe der Methode der Finiten Elemente. C.H.Wolters (WO 1425/1-1); L.Grasedyck (GR 3179/1-1), MPI for Mathematics in the Sciences Leipzig; J. Haueisen (HA 2899/6-1), Biomagnetic Center Jena; T.Knösche (KN 588/2-1), MPI for Human Cognitive and Brain Sciences Leipzig. Gepris
- since 2004 NCCR-NIH Center for Bioelectric Field Modeling, Simulation and Visualization. PI's: C.Johnson, R.S. MacLeod, SCI Institute, University of Utah. Co-Investigators: see webpage. My own status: NCCR collaborator. Web.
- 2000–2003 SimBio-A generic environment for bionumerical simulation. European Commission, Information Society Technologies (IST) Programme, Framework V, Project IST-1999-10378. PI's: G.Lonsdale, U.Hartmann, NEC CCRLE, St.Augustin, Germany; F.Kruggel, C.Wolters, MPI for Cognitive Neuroscience Leipzig, Germany; Rod Hose, University of Sheffield, England. Co-Investigators: see Web.

Software development

- since 2015 duneuro - A software toolbox for forward modeling in neuroscience, Nüssing et al., 2019 and Wiki

since 2013 Fieldtrip-SimBio integration:
Vorwerk et al., 2018, Web

since 2003 SimBio: A free toolbox for EEG and MEG source analysis and brain stimulation using the finite element method.
Wiki, Old-Wiki, overview report.

Large-scale medical equipment

since 2008 3T magnetic resonance scanner for brain research for the Medical Faculty of the Westfälische Wilhelms-Universität Münster:

2008-09 Contribution to the DFG-application

2010-12 Member of the committee for the choice of the manufacturer

2012-17 Member of the steering committee for the use of the new scanner

Awards (own and those of my students)

10/2019 Keynote speaker recognition award to Carsten Wolters, 19th IEEE International Conference on Bioinformatics and Bioengineering, BIBE2019 keynotes, Athens, Greece, October 28-30, 2019.
Award.

09/2019 Young Investigator Award (1.000 Eur) to Marios Antonakakis: For his talk entitled "Individual targeting effects and optimization of multi-channel transcranial electric stimulation of the human primary somatosensory cortex", 13th Int Conf on Complex Medical Engineering, Dortmund, Germany, Sept.23-25, 2019.
Award, Abstract booklet, Web1, Web1.

04/2018 Best poster award (3rd place, (500 \$): Antonakakis, M., Oostenveld, R., Wellmer, J., Möddel, G., Hauelsen, J., Rampp, S., Wolters, C.H., Age-related skull conductivity estimated by a calibration procedure using combined somatosensory evoked potentials and fields on realistic head models, 50 years of MEG, ISACM/EMEGS, Poros, Greece, April 20-21, 2018.
Award, Web, pdf of poster

05/2017 Wolters, C.H., Prof.(apl) at the Medical Faculty, Westfälische Wilhelms-Universität Münster, Germany, 2017: Fulfillment of criteria,

11/2016 Featured article in IEEE Trans.Biomed.Eng., see Web:
Fiederer, L.D.J., Lahr, J., Vorwerk, J., Lucka, F., Aertsen, A., Wolters, C.H., Schulze-Bonhage, A., Ball, T., Electrical Stimulation of the Human Cerebral Cortex by Extracranial Muscle Activity: Effect Quantification with Intracranial EEG and FEM Simulations, *IEEE Trans Biomed Eng*, 63(12), pp.2552–2563 (2016).

- 04/2016 Best poster award (1st place): Nüßing, A., Wolters, C.H., Brinck, H. and Engwer, C., The Unfitted Discontinuous Galerkin Method for Solving the EEG Forward Problem: A Second Order Study, Proc. of the workshop BIOSIGNAL PROCESSING 2016, April 7–8, Berlin, Germany, (2016).
Web, pdf.
- 02/2016 A proposed image of the following paper was chosen as cover image of *NeuroImage*, volume 128, 2016:
Fiederer, L.D.J., Vorwerk, J., Lucka, F., Dannhauer, M., Yang, S., Dümpelmann, M., Schulze-Bonhage, A., Aertsen, A. Speck, O., Wolters, C.H. and Ball, T., The role of blood vessels in high-resolution volume conductor head modeling of EEG, *NeuroImage*, 128:193–208, (2016).
- 09/2015 Best poster award (1st place): Nüßing, A., Wolters, C.H., Brinck, H. and Engwer, C. The unfitted discontinuous Galerkin method in brain research, BACI2015, International Conference on Basic and Clinical Multimodal Imaging, Utrecht, The Netherlands, Sept. 1-5, 2015. Web pdf of poster
- 01/2015 Journal of Neural Engineering: Selected as one of the 16 highlights of 2014: Wagner S, Rampersad SM, Aydin Ü, Vorwerk J, Oostendorp TF, Neuling T, Herrmann CS, Stegeman DF, Wolters CH, Investigation of tDCS volume conduction effects in a highly realistic head model, *J. Neural Eng.*, 11:016002(14pp), (2014).
- 04/2014 Best poster award (2nd place): Lucka, F., Tellen, S., Wolters, C.H., Burger, M. Workshop "Innovative Verarbeitung bioelektrischer und biomagnetischer Signale" - bbs2014, Physikalisch-Technische Bundesanstalt, Berlin, Germany, April 10-11 (2014). Web, pdf of poster
- 11/2013 Best poster award (1st place): Wagner S., Aydin Ü., Vorwerk J., Herrmann, C., Burger M., Wolters C.H., *NeuroVisionen* 9, 29.11.2013, Cologne, pdf of poster
- 11/2012 Faculty of 1000, 20.Nov.2012; F1000 Prime Recommendation of:
Neuling, T., Rach, S., Wagner, S., Wolters, C.H. and Herrmann, C.S., *NeuroImage*, 63(2):771-778, (2012). DOI Web
- 10/2012 Best poster award (1st place): Lucka, F., Pursiainen, S., Burger, M. and Wolters, C.H., *NeuroVisionen* 8, 26.10.2012, Aachen, Web, Web2
- 04/2012 Best scientific contribution award (1st place in section "biomagnetism"): Lucka, F., Pursiainen, S., Burger, M. and Wolters, C.H., Workshop "Innovative Verarbeitung bioelektrischer und biomagnetischer Signale" - bbs2012, Physikalisch-Technische Bundesanstalt, 19.-20.04.2012, Berlin, Web,
- 03/2012 Best scientific contribution award (1st place): Ruthotto, L., Gigengack, F., Burger, M., Wolters, C.H., Jiang, X., Schaeffers, K.P. and Modersitzki, J., *Bildverarbeitung für die Medizin*, Berlin, March 18-20, Web1, Web2, (2012).

- 05/2010 First Muenster Science Slam (Lars Ruthotto):
Newspaper article (german) YouTube video
- 11/2007 Paper evaluated for Faculty of 1000 Biology:
Wolters, C.H., Anwander, A., Tricoche, X., Weinstein, D., Koch, M.A., and MacLeod, R.S., *NeuroImage*, Vol.30, No.3, pp.813-826(2006). Web
- 08/2002 Young Investigators Award: Anwander, A., Wolters, C.H., Dümpelmann, M. and Knösche, T.R. 13th Int.Conf. on Biomagnetism, Jena, Germany. Web.
- 06/1998 Friedrich Springorum medal: Wolters, C.H., RWTH Aachen, Germany.
- 1992 DAAD-grant: Wolters, C.H., For studying at INSA de Lyon (<http://www.insa-lyon.fr>), 1992-1993, Lyon, France.

Member of advisory board

- since 11/2016 Wolters, C.H.: Member of the scientific advisory board of EU-project STIPED entitled "Transcranial brain stimulation as innovative therapy for chronic pediatric neuropsychiatric disorders", Coordinator: Michael Siniatchkin, Christian-Albrechts-Universität zu Kiel, Kiel, Germany.
Web.

Organization of workshops/conferences/dissemination/outreach

- 03/2020 Wolters, C.H.: Wissenschaftlicher Beirat for workshop entitled "Biosignale2020: Innovative Verarbeitung bioelektrischer und -magnetischer Signale", Kiel, March 11-13, (2020).
Web
- 09/2019 Wolters, C.H. and Schneider, T.: Session OS5-1: "New methods and experimental results for optimized multi-channel tES (II)", 13th Int. Conf. on Complex Medical Eng., Dortmund,Germany, Sept.23-25, (2019).
Web, Abstract-Book, CME-Booklet.
- 09/2019 Wolters, C.H. and Knösche, T.: Session OS4-1: "New methods and experimental results for optimized multi-channel tES (I)", 13th Int. Conf. on Complex Medical Eng., Dortmund,Germany, Sept.23-25, (2019).
Web, Abstract-Book, CME-Booklet.
- 08/2019 Wolters, C.H. and Rampp, S.: Scientific Symposium coupled with a Poster Session on "EEG and MEG source analysis methods", SuSIE - Summer School on Imaging in Epilepsy, Epilepsy Surgery and Epilepsy Research , Bochum, Aug.25 (2019).
Web

- 08/2019 Wolters, C.H. and Rampp, S.: Seminar on “Source Analysis with Open Source Tools”, SuSIE - Summer School on Imaging in Epilepsy, Epilepsy Surgery and Epilepsy Research , Bochum, Aug.27 (2019).
Web
- 03/2019 Antonakakis, M., Wessing, I., Wollbrink, A., Wolters, C.H., Das Gehirn bei der Arbeit beobachten: Ein Tag in der Hirnforschung, Girls’ Day, March 28, 2019. Evaluation, Web1, Web2.
- 08/2018 Wolters, C.H. & Rampp, S. (Erlangen): Panel Session entitled ”Advanced MEG/EEG source analysis in epilepsy”, 21th Int.Conf.on Biomagnetism (Biomag2018), Aug.26-30, 2018, Philadelphia, USA.
Web.
- 06/2018 Wolters, C.H.: Workshop on “Epilepsy and transcranial electric stimulation”, IBB , Münster, June 28 (2018).
Web
- 09/2018 Rampp, S., (Erlangen) & Wolters, C.H.: Session ”From Desktop to Epilepsy Surgery - New Source Analysis Approaches in Clinical Practice”, 54. Jahrestagung der Deutschen Gesellschaft für Epileptologie (DGfE) e.V., Fürth, June 13-16 (2018).
Web
- 06/2018 Homölle, S., Piastra, M.C., Oostenveld, R., Schrader, S., Wolters, C.H.: Educational Course on “EEG and MEG Source Reconstruction with FieldTrip”, 2018 OHBM Annual Meeting, Singapore, June 17 (2018).
Web
- 04/2018 Wolters, C.H., Wollbrink, A., Piastra, M.C., Antonakakis, M. Das Gehirn bei der Arbeit beobachten: Ein Tag in der Hirnforschung, Girls’ Day, April 26, 2018. Evaluation. Web.
- 03/2018 Wolters, C.H.: Wissenschaftlicher Beirat for workshop entitled “Biosignale2018: Innovationen bei der Erfassung und Analyse bioelektrischer und biomagnetischer Signale” and chair of the session “EEG/MEG Quellenrekonstruktion”, Augustinerkloster Erfurt, March 21-23, (2018).
Program, Web
- 03/2018 Nitsche, M. & Wolters, C.H.: Symposium entitled “Neue Methoden und Anwendungen der transkraniellen Hirnstimulation”, 62. Wissenschaftliche Jahrestagung der Deutschen Gesellschaft für Klinische Neurophysiologie (DGKN2018), Berlin, Germany, March 15-17 (2018).
Program, Web
- 05/2017 Junghöfer, M., Wollbrink, A. & Wolters, C.H. (org.): “Abschiedssymposium Christo Pantev”. Medizinische Fakultät, Westfälische Wilhelms-Universität

Münster, Alexander-von-Humboldt Haus, Hüfferstr., May 12, 2017.
Program

- 04/2017 Moliadze, V. & Wolters, C.H.: Symposium entitled "Besonderheiten transkranieller Hirnstimulation bei Kindern und Jugendlichen", Deutsche Gesellschaft für Klinische Neurophysiologie (DGKN2017), Leipzig, Germany, April 27-29 (2017).
Program Web
- 04/2017 Wolters, C.H., Wollbrink, A., Piastra, M.C., Antonakakis, M., Schrader, S. Das Gehirn bei der Arbeit beobachten: Ein Tag in der Hirnforschung, Girls' Day, April 27, 2017. Evaluation. Web.
- 04/2017 Wolters, C.H.: Workshop with about 30 participants from all over Germany entitled "Theory and praxis for simulation of transcranial electric stimulation (tES) using SimBio with outlook to DUNEuro", IBB, April 7, 2017, Münster, Germany.
Program.
- 04/2017 Wolters, C.H.: SPP1665 kick-off meeting of Troika Münster/Oldenburg/Hamburg IBB, April 6, 2017, Münster, Germany.
Program.
- 10/2016 Wolters, C.H. and Oostenveld, R.: Symposium entitled "Improving source reconstruction for MEG and EEG in children", Biomag2016, 20th Int.Conf.on Biomagnetism, Oct.1-6, 2016, Seoul, Korea.
Web, pdf.
- 10/2016 Wolters, C.H. and Haueisen, J.: Symposium entitled "Validating and Evaluating New Methods for Source Analysis", Biomag2016, 20th Int.Conf.on Biomagnetism, Oct.1-6, 2016, Seoul, Korea.
Web, pdf.
- 04/2016 Wolters, C.H., Piastra, M.C., Cunedioğlu, U., Das Gehirn bei der Arbeit beobachten: Ein Tag in der Hirnforschung, Girls' Day, April 26, 2016. Web. Evaluation.
- 04/2016 Wolters, C.H.: Wissenschaftlicher Beirat, Workshop Biosignalverarbeitung 2016: Innovationen bei der Erfassung und Analyse bioelektrischer und biomagnetischer Signale, April 7-8, 2016, Tieranatomisches Theater der HU, Berlin. Web.
- 03/2016 Stefan, H. & Wolters, C.H. (symposium chairs), Quellenlokalisierung und Netzwerkanalyse: Ansatz zur Therapiesteuerung in der Epileptologie, 60. Jahrestagung der Deutschen Gesellschaft für Klinische Neurophysiologie und Funktionelle Bildgebung (DGKN2016), Düsseldorf, Germany, March 16-19 (2016).
Web

- 09/2015 Wolters, C.H.: ChildBrain kick-off workshop, 44 participants from 18 nations, Institute for Biomagnetism and Biosignalanalysis, University of Münster, Sept. 22-24, 2015.
 Press release Westfälische Nachrichten (in german),
 Press release Die Glocke (in german),
 Press release (in german),
 Workshop program,
 ChildBrain webpage
- 09/2015 Organization of the ChildBrain kick-of workshop at IBB in Münster. Web
- 09/2015 Wolters, C.H.: Scientific committee, BACI2015, International Conference on Basic and Clinical Multimodal Imaging, Utrecht, The Netherlands, Sept. 1-5, 2015. Web
- 09/2015 Wolters, C.H., & Rampp, S., (Erlangen): Session "EEG/MEG inverse modeling 1: combined EEG-MEG", BACI2015, International Conference on Basic and Clinical Multimodal Imaging, Utrecht, The Netherlands, Sept. 1-5, 2015. Web
- 04/2015 Wolters, C.H., & Stefan, H. & Trinka, E.: Seminar "EEG und MEG Komplementarität in der präoperativen Diagnostik", 9. Dreiländertagung der Deutschen und Österreichischen Gesellschaften für Epileptologie und der Schweizerischen Liga gegen Epilepsie, Dresden, 22.-25. April 2015. Web
- 10/2014 Wolters, C.H., & Rampp, S., (Erlangen): Workshop "New methodology and results in EEG, MEG and combined EEG/MEG source analysis in presurgical epilepsy diagnosis, 23. Deutsches EEG/EP Mapping Meeting, Giessen, Germany, October 24-26, (2014). Program
- 08/2014 Wolters, C.H.: Awards committee, Biomag2014, 19th Int.Conf.on Biomagnetism, August 24-28, 2014, Halifax, Canada. Web.
- 03/2010 Steinhoff, U. & Wolters, C.H.: Session on BBS2014 (Innovative Verarbeitung bioelektrischer und biomagnetischer Signale), PTB Berlin, April 10.-11, 2014, Program
- 04/2014 Wolters, C.H.: Wissenschaftlicher Beirat, Innovative Verarbeitung bioelektrischer und biomagnetischer Signale, April 10.-11, 2014, PTB Berlin. Web.
- 09/2013 Wolters, C.H.: 6th International Summer School in Biomedical Engineering - Multimodal integration of brain measurements in research and clinical practice, September 23rd - October 6th, 2013 in Havana, Cuba. Web.
- 02/2013 Scherg, M. and Wolters, C.H. (org.): Workshop entitled "Efficient evaluation of interictal epileptiform activity in EEG and MEG". With participation of epilepsy experts from Munich, Erlangen, Bochum, Bonn, Bethel, Osnabrück

and Münster, Feb.20.-22, 2013, Institute for Biomagnetism and Biosignal-analysis, Münster, Germany.

- 03/2012 Wolters, C.H. (org.): Chair for track O "Modeling and Simulation of Brain and Heart". 46.DGBMT Jahrestagung, Sept.16-19, 2012, Jena, Germany. Web
- 03/2010 Wolters, C.H. & Haueisen, J. (org.): Workshop on "Forward modeling in EEG and MEG source analysis". Biomag2010, 17th Int.Conf.on Biomagnetism, March 28-April 1, 2010, Dubrovnik, Croatia. Program
- 09/2008 Dobel, C., Junghöfer, M. & Wolters, C.H. (org.): "Fusing brain states and mental domains". Otto Creutzfeldt Center for Cognitive and Behavioral Neuroscience, Medizinische Fakultät, Westfälische Wilhelms-Universität Münster. Invited guests from Europe and the USA. Program
- 07/2003 Co-organization of the SimBio project-meeting at the MPI-CBS in Leipzig.
- 11/2000 Wolters, C.H. & Anwander, A. (org.): "Models to Generate Individual Anisotropic Conductivity Maps of Head Tissues from Multimodal MR and Influence on EEG/MEG Source Localization", MPI-CBS, Leipzig. Invited guests from Europe and the USA.
- 07/2000 Co-organization of the SimBio project-meeting at the MPI-CBS in Leipzig.

Reviewer for funding agencies

- Deutsche Forschungsgemeinschaft (DFG)
- Alexander von Humboldt-Stiftung

Member of expert committees

since 03/2018 Deutsche Gesellschaft für Biomedizinische Technik (DGBMT), Fachausschuss "Magnetische Methoden in der Medizin".
Web

Editorial positions

- Associate editor for the International Journal of Bioelectromagnetism, IJBEM. Web
- Biomag Central: Section editor for Mathematical modelling. Web
- Review editor for Frontiers in Neuroscience, Section Brain Imaging Methods. Web

Reviewer for

- Brain Stimulation
- Brain Topography
- Computational Intelligence and Neuroscience
- Computer Methods and Programs in Biomedicine
- Enzy.Biomed.Eng.
- Frontiers in Neuroscience
- Human Brain Mapping
- IEEE Transactions on Biomedical Engineering
- IEEE Transactions on Circuits and Systems
- IEEE Transactions on Medical Imaging.
- IEEE Transactions on Neur Sys Rehab Eng
- Inverse Problems
- Journal of Applied Electromagnetics and Mechanics
- Journal of Applied Numerical Mathematics
- Journal of Neurology and Clinical Neurophysiology
- Journal of Neuroscience Methods
- Med. Biol. Eng. Comp. (MBEC)
- NeuroImage
- Physics in Medicine and Biology
- Scholarpedia, Encyclopedia of Computational Neuroscience
- SIAM Computational Science and Engineering Book Series
- SIAM Journal for Scientific Computing

Teaching

- 19/12/2018 Beitrag zur curriculären Lehre von Medizinstudenten, 90 min. Vorlesung zur allgemeinen Neurologie, Rainer Dziewas & Heinz Wiendl (organizers), Universitätsklinikum Münster.
- 10/2018–02/2019 "Mathematical methods for EEG/MEG reconstruction and TES/TMS manipulation of neuronal networks in the human brain, Part I", Veranstaltungs-Nr.: 104384, Type of presentation: Lecture, Assignment: Master Mathematik (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0), Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9), together with Christoph Kellinghaus (7%), Klinikum Osnabrück, Harald Kugel (7%), Institute of Clinical Radiology, UKM and Gabriel Möddel (7%), Clinic for Sleep Medicine and Neuromuscular Diseases, UKM.
Web, Student rating, Part I.
- 10/2018–02/2019 "Mathematical methods for EEG/MEG reconstruction and TES/TMS manipulation of neuronal networks in the human brain, Part I", Veranstaltungs-Nr.: 104385, Type of presentation: Practice, Assignment: Master Mathematik (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0), Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9).
Web.
- 20/04/2018 Beitrag zur curriculären Lehre von Medizinstudenten, 90 min. Vorlesung zur allgemeinen Neurologie, Rainer Dziewas & Heinz Wiendl (organizers), Universitätsklinikum Münster.
- 04/2018–07/2018 "Transcranial electric and magnetic stimulation of the brain: From simulation to clinical applications in neurology and psychiatry, Part II", Veranstaltungs-Nr.: 102562, Type of presentation: Lecture, Assignment: Master Mathematik (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0), Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9), together with Rebekka Lencer (7%), Clinic for Psychiatry, UKM, and Harald Kugel (7%), Institute of Clinical Radiology, UKM.
Web. Student rating,
- 04/2018–07/2019 "Transcranial electric and magnetic stimulation of the brain: From simulation to clinical applications in neurology and psychiatry, Part II", Veranstaltungs-Nr.: 102563, Type of presentation: Practice, Assignment: Master Mathematik (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0), Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9).
Web.

- 22/02/2018 Juror für Münsteraner Studierfähigkeitstest von Medizinstudenten im Auftrag des Institutes für Ausbildung und Studienangelegenheiten (IfAS), Universitätsklinikum Münster.
- 22/11/2017 Beitrag zur curriculären Lehre von Medizinstudenten, 90 min. Vorlesung zur allgemeinen Neurologie, Rainer Dziewas & Heinz Wiendl (organizers), Universitätsklinikum Münster.
- 10/2017–02/2018 "Transcranial electric and magnetic stimulation of the brain: From simulation to clinical applications in neurology and psychiatry, Part I", Veranstaltungs-Nr.: 100607, Type of presentation: Lecture, Assignment: Master Mathematik (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0), Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9), together with Rebekka Lencer (7%), Clinic for Psychiatry, UKM, and Harald Kugel (7%), Institute of Clinical Radiology, UKM.
Web.
- 10/2017–02/2018 "Transcranial electric and magnetic stimulation of the brain: From simulation to clinical applications in neurology and psychiatry, Part I", Veranstaltungs-Nr.: 100608, Type of presentation: Practice, Assignment: Master Mathematik (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0), Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9).
Web.
- 14/06/2017 Beitrag zur curriculären Lehre von Medizinstudenten, 90 min. Vorlesung zur allgemeinen Neurologie: "Quellenanalyse und Hirnstimulation in der neurologischen Grundlagenforschung und Klinik", Rainer Dziewas & Heinz Wiendl (organizers), Universitätsklinikum Münster.
- 04/2017–07/2017 "Bioelectromagnetism and multimodal imaging and stimulation of neuronal systems, Part II", Veranstaltungs-Nr.: 108003, Type of presentation: Lecture, Assignment: Master Mathematik (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0), Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9), together with Christoph Kellinghaus (7%), Klinikum Osnabrück, Harald Kugel (7%), Institute of Clinical Radiology, UKM and Gabriel Möddel (7%), Clinic for Sleep Medicine and Neuromuscular Diseases, UKM.
Web.
- 04/2017–07/2017 "Bioelectromagnetism and multimodal imaging and stimulation of neuronal systems, Part II", Veranstaltungs-Nr.: 108004, Type of presentation: Tutorial, Assignment: Master Mathematik (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0),

Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9).
Web.

- 02/2017 Juror für Münsteraner Studierfähigkeitstest von Medizinstudenten im Auftrag des Institutes für Ausbildung und Studienangelegenheiten (IfAS), Universitätsklinikum Münster.
- 28/10/2016 Beitrag zur curriculären Lehre von Medizinstudenten, 90 min. Vorlesung zur allgemeinen Neurologie: "Nicht-invasive Rekonstruktion und Manipulation neuronaler Netzwerke in der neurologischen Grundlagenforschung und Klinik", Rainer Dziewas & Heinz Wiendl (organizers), Universitätsklinikum Münster.
- 10/2016–02/2017 "Bioelectromagnetism and multimodal imaging and stimulation of neuronal systems, Part I", Veranstaltungs-Nr.: 106318, Type of presentation: Lecture, Assignment: Master Mathematik (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0), Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9), together with Christoph Kellinghaus (7%), Klinikum Osnabrück, Harald Kugel (7%), Institute of Clinical Radiology, UKM and Gabriel Möddel (7%), Clinic for Sleep Medicine and Neuromuscular Diseases, UKM.
Web.
- 10/2016–02/2017 "Bioelectromagnetism and multimodal imaging and stimulation of neuronal systems, Part I", Veranstaltungs-Nr.: 106319, Type of presentation: Tutorial, Assignment: Master Mathematik (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0), Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9).
Web.
- 15/04/2016 Beitrag zur curriculären Lehre von Medizinstudenten, 90 min. Vorlesung zur allgemeinen Neurologie: "Wie hilft die Grundlagenforschung dem Kliniker: Fallbeispiele aus der prächirurgischen Epilepsiediagnostik", Rainer Dziewas & Heinz Wiendl (organizers), Universitätsklinikum Münster.
- 04/2016–07/2016 "New methods for reconstructing and manipulating neuronal networks in the human brain, Part II", Veranstaltungs-Nr.: 102932, Type of presentation: Lecture, Assignment: Master Mathematik (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0), Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9), together with Christoph Kellinghaus (7%), Klinikum Osnabrück, Harald Kugel (7%), Institute of Clinical Radiology, UKM and Gabriel Möddel (7%), Clinic for Sleep Medicine and Neuromuscular Diseases, UKM.
Web.

- 04/2016–07/2016 Tutorial for the lecture "New methods for reconstructing and manipulating neuronal networks in the human brain, Part I and II", Veranstaltungs-Nr.: 510390, Type of presentation: Tutorial, Assignment: Master in Mathematics (88 105 10, 88 105 13), Staatsexamen Medizin (08 107 0), Gaststudium Medizinische Wissenschaften (A2 E84 0), Zus Dr. rer. medic Medizinische Wissenschaften (67 E84 9), together with Ugur Cunedioğlu, Institute for Biomagnetism and Biosignalanalysis, University of Münster. Web.
- 04/2016 Wolters, C.H., Piastra, M.C., Cunedioğlu, U., Das Gehirn bei der Arbeit beobachten: Ein Tag in der Hirnforschung, Girls' Day, April 26, 2016. Web, Evaluation.
- 10/2015–02/2016 "New methods for reconstructing and manipulating neuronal networks in the human brain, Part I", Veranstaltungs-Nr.: 102932, Assignment: Master in Mathematics or Staatsexamen Medizin, Type of presentation: Lecture, together with Christoph Kellinghaus (13%), Klinikum Osnabrück, Harald Kugel (13%), Institute of Clinical Radiology, UKM and Gabriel Möddel (7%), Clinic for Sleep Medicine and Neuromuscular Diseases, UKM. Web, Student rating.
- 10/2014–02/2015 OCC Ringvorlesung, pdf.
- 04/2014–07/2014 "Moderne nicht-invasive Methoden zur Erforschung des menschlichen Gehirns, Teil 2", Veranstaltungs-Nr.: 103619, Assignment: Master in Mathematics or Staatsexamen Medizin, Type of presentation: Lecture, together with Christoph Kellinghaus (13%), Klinikum Osnabrück, Harald Kugel (13%), Institute of Clinical Radiology, UKM and Gabriel Möddel (7%), Clinic for Sleep Medicine and Neuromuscular Diseases, UKM. Web Student rating, pdf.
- 04/2014–07/2014 Übung zu den Vorlesungen "Moderne nicht-invasive Methoden zur Erforschung des menschlichen Gehirns, Teil 1 und 2", Veranstaltungs-Nr.: 103623, Assignment: Master in Mathematics or Staatsexamen Medizin, Type of presentation: Tutorial Web Student rating, pdf
- 10/2013–03/2014 "Moderne nicht-invasive Methoden zur Erforschung des menschlichen Gehirns", Veranstaltungs-Nr.: 109695, Assignment: Master in Mathematics, Type of presentation: Lecture, together with Christoph Kellinghaus (13%), Klinikum Osnabrück, Harald Kugel (13%), Institute of Clinical Radiology, UKM and Gabriel Möddel (7%), Clinic for Sleep Medicine and Neuromuscular Diseases, UKM. Student rating, Web.
- 10/2012–03/2013 "Innovative Methoden zur Diagnose und Therapie von Epilepsien, Teil 2", Veranstaltungs-Nr.: 102320, Assignment: Master in Mathematics, Type of presentation: Lecture, together with Christoph Kellinghaus (13%), Klinikum

Osnabrück and Harald Kugel (13%), Institute of Clinical Radiology, UKM.
Student rating, Web

- 10/2012–03/2013 "Innovative Methoden zur Diagnose und Therapie von Epilepsien, Teil 2",
Veranstaltungs-Nr.: 102517, Assignment: Master in Mathematics, Type of
presentation: Tutorial, Student rating, Web
- 10/2012–03/2013 "Innovative Methoden zur Diagnose und Therapie von Epilepsien, Teil 2",
Assignment: Staatsexamen Medizin, Type of presentation: Lecture and Tu-
torial, together with Christoph Kellinghaus (13%), Klinikum Osnabrück and
Harald Kugel (13%), Institute of Clinical Radiology, UKM. Student rating,
Web
- 04/2012–07/2012 "Innovative Methoden zur Diagnose und Therapie von Epilepsien", Assign-
ment: Staatsexamen Medizin, Type of presentation: Lecture, together with
Christoph Kellinghaus (13%), Klinikum Osnabrück. Student rating, Web
- 04/2012–07/2012 "Innovative Methoden zur Diagnose und Therapie von Epilepsien",
Veranstaltungs-Nr.: 101335, Assignment: Master in Mathematics, Type of
presentation: Lecture, together with Christoph Kellinghaus (13%), Klinikum
Osnabrück. Student rating, Web
- 02/2012–03/2012 "Neurophysiology: from cell to system", Veranstaltungs-Nr.: 132659,
Assignment: Master in Biowissenschaften or Biomedizin, Type of pre-
sentation: Practical course, together with H.C.Pape, C.Pantev, Budde,
Coulon, Juengling, Junghoefer, Lesting, Seidenbecher, Otto-Creutzfeld-
Center (OCC), Fachbereich Medizin, Westfälische Wilhelms-Universität
Münster. Web,
- 10/2011–02/2012 "Praktikum: Mathematische Elektrophysiologie", Veranstaltungs-Nr.:
109869, Assignment: Master in Mathematics, Type of presentation: Prac-
tical course, together with M.Burger, Fachbereich Mathematik und Infor-
matik, Westfälische Wilhelms-Universität Münster. Web,
- 04/2011–07/2011 "Seminar: Mathematical methods for the registration and segmentation
of magnetic resonance images", Veranstaltungs-Nr.: 101367, Assignment:
Diploma in Computer Science, Mathematics or Medicine, Type of presen-
tation: Seminar, Fachbereich Mathematik und Informatik sowie Medizin,
Westfälische Wilhelms-Universität Münster. Web,
- 10/2010–01/2011 "Mathematical methods for bioelectromagnetism and for the analysis of
biosignals", Veranstaltungs-Nr.: 101278, Assignment: Diploma in Com-
puter Science, Mathematics or Medicine, Type of presentation: Lec-
ture, Fachbereich Mathematik und Informatik sowie Medizin, Westfälische
Wilhelms-Universität Münster. Web.

- 04/2010–07/2010 "Part III: Mathematical methods for biomagnetism and for the analysis of biosignals", Veranstaltungs-Nr.: 102759, Assignment: Diploma in Computer Science, Mathematics or Medicine, Type of presentation: Lecture, Fachbereich Mathematik und Informatik sowie Medizin, Westfälische Wilhelms-Universität Münster. Web.
- 10/2009–02/2010 "Part II: Mathematical methods for biomagnetism and for the analysis of biosignals", Veranstaltungs-Nr.: 102430, Assignment: Diploma in Computer Science, Mathematics or Medicine, Type of presentation: Lecture, Fachbereich Mathematik und Informatik sowie Medizin, Westfälische Wilhelms-Universität Münster. Web.
- 04/2009–07/2009 "Part I: Mathematical methods for biomagnetism and for the analysis of biosignals", Belegnr.: 102346, Assignment: Diploma in Computer Science or Mathematics, Type of presentation: Lecture, Fachbereich Mathematik und Informatik, Westfälische Wilhelms-Universität Münster. Web.
- 10/2008–02/2009 "Numerische Verfahren in der EEG und MEG Quellenanalyse", Belegnr.: 102352, Assignment: Diploma in Computer Science or Mathematics, Type of presentation: Seminar, Fachbereich Mathematik und Informatik, Westfälische Wilhelms-Universität Münster.
- since 04/2005 IBB Instituts-Colloquium
- since 04/2005 Seminar "Modern Investigation Methods in Human Neuroscience", Institut für Biomagnetismus und Biosignalanalyse, Otto Creutzfeldt Center for Cognitive and Behavioral Neuroscience, Medizinische Fakultät, Westfälische Wilhelms-Universität Münster.
- 11/1997–12/2004 Interdisciplinary lectures about Electro- and Magnetoencephalography for the staff of the MPI-institutes and students of the University of Leipzig.
- 10/1995–07/1996 Lecturer for Numerische Mathematik III and IV for Mathematics-students, Institut für Geometrie und Praktische Mathematik (IGPM, W.Dahmen), RWTH Aachen, <http://www.igpm.rwth-aachen.de>.
- 07/1994–07/1996 Lecturer for "Mathematisches Praktikum" for Mathematics-students in 3rd and 4th semester, IGPM, RWTH Aachen.

Dissertation geneology

3. My own dissertation geneology
2. My own geneology tree: Only 5 generations from Helmholtz and 9 from Gauss
1. My own geneology tree only through the branch of Prof.Zeidler

PhD promoter (completed)

8. Maria Carla Piastra, 03/2019, "New Finite Element Methods for MEG and combined EEG/MEG Forward Problem", PhD thesis, Westfälische Wilhelms-Universität Münster, together with Prof.C.Engwer. Dissertation was funded by MSCA-ITN-2014-ETN: Marie Skłodowska-Curie Innovative Training Networks, Grant agreement no.: 641652, Action acronym: ChildBrain.
pdf.
7. Andreas Nüssing, 07/2018, "Fitted and Unfitted Finite Element Methods for Solving the EEG Forward Problem", PhD thesis, Westfälische Wilhelms-Universität Münster, together with Prof.C.Engwer and Prof.H.Brinck.
Eversion, pdf.
6. Johannes Vorwerk, 02/2016, "New Finite Element Methods to Solve the EEG/MEG Forward Problem", PhD thesis, Westfälische Wilhelms-Universität Münster, together with Prof.C.Engwer.
pdf
5. Sven Wagner, 08/2015 "Optimizing tCS and TMS multi-sensor setups using realistic head models", PhD thesis, Westfälische Wilhelms-Universität Münster, together with Prof. Martin Burger.
pdf
4. Ümit Aydın, 03/2015, "Combined EEG and MEG source analysis of epileptiform activity using calibrated realistic finite element head models", PhD thesis, Westfälische Wilhelms-Universität Münster, together with Prof. J. Haueisen.
pdf, Web.
3. Felix Lucka, 01/2015, "Bayesian Inversion in Biomedical Imaging", PhD thesis, Westfälische Wilhelms-Universität Münster, together with Prof. Martin Burger, Universität Münster.
pdf, Web.
2. Benjamin Lanfer, 07/2014, "Automatic Generation of Volume Conductor Models of the Human Head for EEG Source Analysis", PhD thesis, Westfälische Wilhelms-Universität Münster, together with Dr. M. Scherg and Prof. Martin Burger.
pdf.
1. S.Lew, 07/2008, "Conductivity estimation with EEG/MEG Brain Source Localization in a Finite Element Head Model", PhD thesis, SCI Institute, University of Utah, USA, together with Prof.R.S.MacLeod.
pdf,

PhD promoter (running)

4. Asad Khan, DFG project WO1425/5-2, Gepris, since 02/2017.
3. Sophie Schrader, DFG project WO1425/7-1, Gepris, since 09/2016.
2. Marios Antonakakis, MSCA-ITN-2014-ETN: Marie Skłodowska-Curie Innovative Training Networks, Grant agreement no.: 641652, Action acronym: ChildBrain), since 08/2016.
1. Frank Neugebauer, DFG project WO1425/7-1, Gepris, since 06/2016.

PhD thesis contributions

1. Reviewer and member of the graduation committee for the PhD thesis of: Hermann Sonntag, 08/2019, "The effect of uncertainty in MEG-to-MRI coregistrations on MEG inverse problems", PhD thesis, Fakultät für Informatik und Automatisierung, Technische Universität Ilmenau, together with Prof. J. Haueisen.
2. Contribution to the PhD thesis of: Laith Hamid, "M/EEG Source Imaging via the Spatiotemporal Kalman Filter and its Applications in Epileptology", Technische Fakultät der Christian-Albrechts-Universität zu Kiel, Germany, Dec.5, 2018.
pdf
3. Reviewer, opponent and member of the graduation committee for the PhD thesis of Anne Hanrath, "Finite Element Representation of the EEG Forward Problem with Multipole Expansion", PhD in Mathematics, Fakultät für Mathematik, Informatik und Naturwissenschaften, RWTH Aachen, Germany, March 22, 2019.
4. Reviewer, opponent and member of the graduation committee for the PhD thesis of Ralf Engbers, "Non-Negative Matrix Factorization for Dynamic Positron Emission Tomography", PhD in Mathematics, Fachbereich Mathematik und Informatik, University of Münster, Germany, Dec.13, 2018. pdf,
5. Reviewer, opponent and member of the graduation committee for the PhD thesis of Alexander Kuck, University of Twente, The Netherlands, "Trans-Spinal Direct Current Stimulation for the Modulation of the Lumbar Spinal Motor Networks", Jan. 24, 2018. Eversion, UT, pdf,
6. Reviewer for PhD thesis of Christos Papageorgakis, École doctorale Sciences et Technologies de l'Information et de la Communication, Centre de Recherche Inria Sophia Antipolis - Méditerranée, France, "Patient specific conductivity models: characterization of the skull bones", Dec., 2017.
Eversion

7. Reviewer for PhD thesis of Ms Hyeong Seo, School of Electrical Engineering and Computer Science, Gwangju Institute of Science and Technology, Gwangju, South-Korea, "A Multiscale Computational Study of Brain Stimulation: Investigation of Activation of Cortical Neurons", 2017.
pdf, Eversion.
8. Contribution to the PhD thesis of Arno Janssen, Department of Neurology, Radboud University Nijmegen Medical Centre, The Netherlands, June 2, 2016.
Eversion, pdf.
9. Examiner for PhD thesis of Takfarinas Medani, "Contribution à l'amélioration du modèle de source dans la méthode des éléments finis pour la résolution du problème direct en électroencéphalographie" Université Pierre et Marie Curie, Paris, France, May 24, 2016. pdf, Server.
10. Opponent for PhD thesis of Sumientra Rampersad, Department of Neurology, Radboud University Nijmegen Medical Centre, The Netherlands, Jan.21, 2015.
pdf1, pdf2,
11. Examiner for PhD thesis of Markus Pierre Knappitsch, "Patient Specific Multiscale Modelling of Glioma Growth", PhD in Mathematics, Fachbereich Mathematik und Informatik, University of Münster, Germany, May 21, 2014.
12. Examiner for PhD thesis of Lars Ruthotto, "Hyperelastic image registration. Theory, numerical methods, and applications", PhD in Mathematics, Fachbereich Mathematik und Informatik, University of Münster, Germany, Nov.26, 2012.
pdf
13. Opponent for PhD thesis of Sylvain Vallaghé, Doctor of Science, Specialized in Control, Signal and Image Processing, INRIA Sophia Antipolis, University of Nice-Sophia Antipolis, Graduate School of Information and Communication Sciences, Frankreich, "EEG and MEG forward modelling: computation and calibration", 2008.
14. Reviewer for PhD thesis of Sampsa Pursiainen, Institute of Mathematics, Helsinki University of Technology, Helsinki, Finland, "Computational methods in electromagnetic biomedical inverse problems", 2008.
pdf
15. Opponent for PhD thesis of Hans Hallez, Vakgroep Elektronica en Informatiesystemen, Faculteit Ingenieurswetenschappen, Universiteit Gent, Belgium, "Incorporation of Anisotropic Conductivities in EEG Source Analysis", ISBN 978-90-8578-229-2, 08/2008.

16. Reviewer for PhD thesis of S.Lew, PhD in Biomedicine, SCI Institute, University of Utah, USA. "Conductivity estimation with EEG/MEG Brain Source Localization in a Finite Element Head Model.", 07/2008.

Supervisor for master and diploma theses

25. J. Kramps, 2019, "Numerische Untersuchungen zu den Auswirkungen der Quellmodelle auf das FEM-basierte MEG-Vorwärtsproblem", Master Thesis, Westfälische Wilhelms-Universität Münster. together with Prof.C.Engwer
pdf
24. A. Dachwitz, 2019, "Accurate Methods to Compute the MEG Forward Problem", Master Thesis, Westfälische Wilhelms-Universität Münster. together with Dr. Oliver Kamps and PD. Dr. Svetlana Gurevich.
pdf
23. N. Vogenauer, 08/2019, "Sensitivity of tES Optimization to Different FEM Approaches", Master Thesis, Westfälische Wilhelms-Universität Münster. together with Prof.C.Engwer
pdf
22. Konstantinos Politof, 06/2019, Functional Connectivity In The Somatosensory Network: An EEG/MEG Study, Diploma Thesis, together with M. Sc. Marios Antonakakis, and Prof. Michalis Zervakis, Technical University of Crete, Greece.
pdf
21. Vasileios Dimakopoulos, 03/2019, Characterization of Epileptic Activity Based on Integrated Functional Network from Combined EEG & MEG Data on a Realistic Head Model, Diploma Thesis, together with M. Sc. Marios Antonakakis, and Prof. Michalis Zervakis, Technical University of Crete, Greece.
Eversion, pdf
20. T. Miinalainen, 2017, "Numerical EEG forward modeling with dipolar sources: H(div) approach", Master Thesis, together with Prof. S. Pursiainen, Tampere University of Technology, Finland.
Eversion, pdf
19. Marie Theiß, 2016, "Impact of Different Registration Methods on MEG Source Analysis", Master Thesis, together with Prof.Dr.Heiner Brinck, Fachbereich Elektrotechnik und angewandte Naturwissenschaften, Abteilung Molekulare Biologie, University of Applied Sciences (Westfälische Hochschule), and Dipl.Ing. Andreas Wollbrinck, and Prof.Dr.Christophe Grova, Department of Physics, Concordia University, Montreal, Canada.
pdf

18. F. Neugebauer, 2016, "Beamformer inverse analysis in presurgical epilepsy diagnosis", Master Thesis, Westfälische Wilhelms-Universität Münster, together with Prof.M.Burger
pdf
17. S. Homölle, 2016, "Comparison of optimization approaches in high-definition transcranial current stimulation in the mammalian brain", Master Thesis, Westfälische Wilhelms-Universität Münster, together with Prof.M.Burger
pdf
16. B. Agsten, 2015, "Comparing the complete and the point electrode model for combining tCS and EEG", Master Thesis, Westfälische Wilhelms-Universität Münster, together with Prof.S.Pursiainen and Prof.M.Burger
pdf
15. F. Grüne, 2014, "Validierung von FEM-Ansätzen höherer Ordnung für das EEG-Vorwärtsproblem", Master Thesis, Westfälische Wilhelms-Universität Münster. together with Prof.C.Engwer
pdf,
14. J. Ludewig, 2013, "Discontinuous Galerkin Methods for the EEG forward problem", Master Thesis, Westfälische Wilhelms-Universität Münster, together with Prof.C.Engwer
pdf
13. F. Meyer, 2013, "Convergent adaptive Finite Element Methods for the solution of the EEG forward problem with the help of the subtraction method", Master Thesis, Westfälische Wilhelms-Universität Münster, together with Prof.M.Ohlberger
pdf
12. Dr.med. Philipp Küpper, 2013, "Combined EEG and MEG for improving source analysis in patients with focal epilepsy", Master of Science, Westfälische Wilhelms-Universität Münster in cooperation with the Beuth-Hochschule für Technik Berlin, Studiengang Medizinische Informatik, together with Prof.L.Leutelt.
pdf
11. D.Ritterskamp, 2012, "A Neural Network with Synaptic Plasticity: Applications to Epileptic Seizures", Diploma Thesis, Westfälische Wilhelms-Universität Münster, together with Prof.R.Friedrich.
pdf
10. M. Bauer, 2012, "Special Finite Elements for Dipole Modeling", Master Thesis, Universität Erlangen in cooperation with the Westfälische Wilhelms-Universität Münster, together with Dr.Köstler, Prof.Pursiainen and Prof.Rüde.
pdf

9. S.Wagner, 2011, "An adjoint FEM approach for the EEG Forward Problem", Diploma Thesis, Westfälische Wilhelms-Universität Münster. together with Prof.M.Burger.
pdf
8. J. Vorwerk, 2011, "Comparison of Numerical Approaches for the EEG Forward Problem", Diploma Thesis, Westfälische Wilhelms-Universität Münster, together with Prof.M.Burger.
pdf
7. F. Lucka, 2011, "Hierarchical Bayesian Approaches to the Inverse Problem of EEG/MEG Current Density Reconstruction", Diploma Thesis, Westfälische Wilhelms-Universität Münster, together with Prof.M.Burger.
pdf
6. L. Ruthotto, 2010, "Mass-preserving Registration of Medical Images", Diploma Thesis, Westfälische Wilhelms-Universität Münster, together with Prof.M.Burger.
pdf
5. S. Sillekens, 2008, "Influence of Volume Conduction on Beamformer Source Analysis in the Human Brain", Diploma Thesis, Westfälische Wilhelms-Universität Münster, together with Olaf Steinsträter, IBB, and Prof.M.Burger.
pdf
4. C. Röer, 2008, "Source Analysis of Simultaneous sEEG and iEEG Measurements in Presurgical Epilepsy Diagnosis", Diploma Thesis, Westfälische Wilhelms-Universität Münster, together with Prof.R.Friedrich.
pdf
3. B. Lanfer, 2007, "Validation and comparison of realistic head modeling techniques and application to combined somatosensory EMEG data", Diploma Thesis, Westfälische Wilhelms-Universität Münster, together with Prof.S.Demokritov.
pdf
2. C. Möller, 2005, "Dipole models for Finite Element Method based Source Reconstruction", Diploma Thesis, Universität Erlangen in cooperation with the Westfälische Wilhelms-Universität Münster, together with Prof.U.Rüde.
pdf
1. S.Burkhardt, 2001, "Registration and segmentation of the human skull from multimodal MRI." Diploma Thesis, Max-Planck Institut für neuropsychologische Forschung Leipzig in cooperation with the Universität Leipzig, together with Dr. F. Kruggel and Prof.D.Saupe.

Master thesis reviews

1. S. Tellen, Master Thesis in Mathematics, Fachbereich Mathematik und Informatik, Supervisor: Prof.M.Burger Universität Münster. "Sparse Reconstruction and Realistic Head Modelling in EEG/MEG", 2013.
2. Joanna Tendera, Diploma in Mathematics, Fachbereich Mathematik und Informatik, Supervisor: Prof.M.Burger Universität Münster. "Linear Functionals in ECG and VCG", 2013.

Supervisor for bachelor theses

8. Alexander Schell, Bachelor of Science, "Ein lokalisierter Subtraktionsansatz für das EEG Vorwärtsproblem together with Prof. Dr. Christian Engwer Fachbereich Mathematik und Informatik, University of Münster, 2019.
7. Florentin Sannwaldt, Bachelor of Science, "Einfluss der Segmentiergenauigkeit eines Finite-Elemente-Kopfmodells auf die optimierte transkranielle Gleichstromstimulation", together with Prof. Dr. Ulrich Stöber Fachbereich Physikalische Technik, University of Applied Sciences Münster, 2017.
pdf
6. Marcel Kettelmann, Bachelor of Science, Fachbereich Physik, "Verwendung von EEG und MEG zur Quellenrekonstruktion akustisch evozierter Potentiale und Felder", together with Dr. Oliver Kamps Universität Münster, 2016.
pdf
5. Thomas Grottko, Bachelor of Science, Fachbereich Physik, "Quellenrekonstruktion auf Basis somatosensorisch evozierter Potentiale und Felder", together with Dr. Oliver Kamps Universität Münster, 2015.
pdf
4. Yvonne Krumbek, "Analyse nicht stationärer stochastischer Prozesse am Beispiel von EEG Daten", Bachelor of Science, Fachbereich Physik, together with Dr. Oliver Kamps Universität Münster, 08/2015.
pdf
3. Philo Reipke, Bachelor of Sciences, "Development of an Application for MEG/MRI Co-Registration", together with Prof.Dr.Heiner Brinck, Fachbereich Elektrotechnik und angewandte Naturwissenschaften, Abteilung Molekulare Biologie, University of Applied Sciences (Westfälische Hochschule), and Dipl.Ing. Andreas Wollbrinck, 2014.
pdf
2. Marie Theiß, Bachelor of Sciences, "Registration of MRI and MEG data", together with Prof.Dr.Heiner Brinck, Fachbereich Elektrotechnik und angewandte Naturwissenschaften, Abteilung Molekulare Biologie, University of

Applied Sciences (Westfälische Hochschule), and Dipl.Ing. Andreas Wollbrinck, 2014.

pdf

1. T.M.Hägele, "Regularisierung der EEG/MEG Quellrekonstruktion und ihre Auswirkung auf Gruppenstudien", Bachelor of Science, Fachbereich Mathematik und Informatik, together with Dipl.-Math. Felix Lucka and Prof.M.Burger, Universität Münster.
pdf 2012.

Supervisor for internships

1. Anna-Gesina Hülemeier, internship of 160 hours from Nov.8, 2017 to June 28, 2018. Fachbereich Psychologie, Universität Münster.

Examinations for master and diploma students

15. Carlotta Bo Catharine Barkhau, oral examination (Spezialisierungsmodul Ang.Math. / 17010), Master in Mathematics, Fachbereich Mathematik und Informatik, Oct.2, 2019.
14. Tim Erdbrügger, oral examination (Spezialisierungsmodul Ang.Math. / 17010), Master in Mathematics, Fachbereich Mathematik und Informatik, Sept.28, 2018.
13. Judith Kramps, oral examination (Spezialisierungsmodul Ang.Math. / 17010), Master in Mathematics, Fachbereich Mathematik und Informatik, Sept.29, 2017.
12. Nikolas Vogenauer, oral examination (Spezialisierungsmodul Ang.Math. / 17010), Master in Mathematics, Fachbereich Mathematik und Informatik, Aug.17, 2016.
11. Joana Klages, oral examination (Spezialisierungsmodul Ang.Math. / 17010), Master in Mathematics, Fachbereich Mathematik und Informatik, Aug.17, 2016.
10. Michael Krühler, oral examination (Spezialisierungsmodul Ang.Math. / 17010), Master in Mathematics, Fachbereich Mathematik und Informatik, June 27, 2016.
9. Bastian Pietras, oral examination (Spezialisierungsmodul Ang.Math. / 17010), Master in Mathematics, Fachbereich Mathematik und Informatik, Nov.5, 2014.
8. Sophie Schrader, oral examination (Spezialisierungsmodul Ang.Math. / 17010), Master in Mathematics, Fachbereich Mathematik und Informatik, Nov.5, 2014.

7. Simon Homölle, oral examination (Ergänzungsmodul), Master in Mathematics, Fachbereich Mathematik und Informatik, Sept.29, 2014.
6. Assja Laas, oral examination (Spezialisierungsmodul Wissenschaftliches Rechnen / 18001), Master in Mathematics, Fachbereich Mathematik und Informatik, Sept.29, 2014.
5. Janna Heins, oral examination (Spezialisierungsmodul Ang.Math. / 17010), Master in Mathematics, Fachbereich Mathematik und Informatik, Sept.29, 2014.
4. Frank Neugebauer, oral examination (Ergänzungen und Wissenschaftliches Arbeiten / 22001), Master in Mathematics, Fachbereich Mathematik und Informatik, Sept.29, 2014.
3. Florian Grüne, oral examination (Schwerpunktprüfung), Master in Mathematics, Fachbereich Mathematik und Informatik, April 19, 2013.
2. Sven Wagner, oral examination (Schwerpunktprüfung zur Diplomarbeit), Diploma in Mathematics, Fachbereich Mathematik und Informatik, May 20, 2011.
1. Johannes Vorwerk, oral examination (Schwerpunktprüfung zur Diplomarbeit), Diploma in Mathematics, Fachbereich Mathematik und Informatik, March 31, 2011.

Research interests ordered by keywords

My research interests, ordered by keywords, include:

- Epilepsy research, see, e.g., Rampp et al., 2019; Aydin et al., 2017; Neugebauer et al., 2017; WN, 2016; Wellmer et al., 2016; Aydin PhD, 2015; Aydin et al., 2015; Aydin et al., 2014; Lanfer et al., 2013; Rullmann et al., 2009
- Evoked potentials and fields research, see, e.g., Antonakakis et al., 2019; Baltus et al., 2018; Vorwerk et al., 2018, Winker et al., 2018; Vorwerk et al., 2018; Aydin PhD, 2015; Lucka PhD, 2015; Aydin et al., 2014; Lew et al., 2009; Sander et al., 2010; Okamoto et al., 2007
- Artefact-correction, registration and segmentation of medical image datasets, see, e.g., Lanfer PhD thesis, 2014; Ruthotto et al., 2012; Gigengack et al., 2012; Ruthotto diploma, 2010; Wolters et al., 2006
- Diffusion tensor magnetic resonance imaging (DT-MRI), see, e.g., Ruthotto et al., 2012; Ruthotto diploma, 2010; Rullmann et al., 2009; Wolters et al., 2006
- Helmholtz reciprocity that directly relates source analysis and transcranial brain stimulation forward problems, see, e.g., Wagner et al., 2016; Wagner PhD, 2015; Wagner diploma, 2011

- Guideline for head volume conductor modeling (in EEG/MEG and tES/TMS)
Vorwerk et al., 2014; Antonakakis et al., 2019; Vorwerk et al., 2018; Vorwerk PhD, 2016;
Wagner et al., 2014; Wagner PhD, 2015; Wolters et al., 2006; Wolters PhD, 2003
- Validation and evaluation in animal models, see, e.g., Lau et al., 2016; Güllmar et al., 2006
- Finite element methods (FEM) for bioelectromagnetic forward problems,
see, e.g., Vorwerk et al., 2019, Miinalainen et al., 2018, Piastra et al., 2018,
Vorwerk et al., 2018; Engwer et al., 2017; Vorwerk et al., 2017; Pursiainen et al., 2017;
Nüßing et al., 2016; Pursiainen et al., 2016; Vorwerk PhD, 2016; Bauer et al., 2015;
Drechsler et al., 2009; Wolters et al., 2007b; Wolters et al., 2007a; Wolters et al., 2004;
Wolters et al., 2002
- Multipole modeling for bioelectromagnetic forward problems, see, e.g., Vorwerk et al., 2019
- Bayesian Approximation Error (BAE) approach for bioelectromagnetic forward problems, see, e.g., Rimpiläinen et al., 2018,
- FEM has linear complexity and can be computationally efficient and fast,
see, e.g., Wolters et al., 2004; Wolters et al., 2002
- Inverse approaches in EEG/MEG/MRI/DTI/fMRI source reconstruction, such
as minimum current estimation (see, e.g., Pursiainen et al., 2017), Bayesian
modeling (see, e.g., Rimpiläinen et al., 2018, Lucka PhD, 2015; Lucka et al., 2012;
Lucka diploma, 2011), spatio-temporal current density approaches (see, e.g.,
Dannhauer et al., 2013; Schmitt et al., 2002), Kalman filtering (see, e.g., Hamid et al., 2013),
other current density approaches (see, e.g., Jordanov et al., 2018, Lucka PhD, 2015;
Lucka et al., 2012; Lucka diploma, 2011; Rullmann et al., 2009), beamform-
ing (see, e.g., Neugebauer et al., 2017; Steinsträter et al., 2010), goal func-
tion scan (see, e.g., Aydin et al., 2015; Aydin et al., 2014; Dannhauer et al., 2011;
Lanfer et al., 2013) and dipole fit approaches (see, e.g., Lanfer et al., 2013;
Sander et al., 2010; Rullmann et al., 2009; Wolters et al., 1999).
- EEG/MEG connectivity analysis, see, e.g., Cho et al., 2015
- Brain stimulation (tDCS, tACS, TMS), see, e.g., Winker et al., 2019; Baltus et al., 2018;
Winker et al., 2018; Pursiainen et al., 2018; Wagner et al., 2016a; Wagner et al., 2016b;
Wagner PhD, 2015; Schmidt et al., 2015; Wagner et al., 2014; Rampersad et al., 2014;
Janssen et al., 2013; Neuling et al., 2012a; Neuling et al., 2012b; Wagner diploma, 2011;
Oostendorp et al., 2008
- PDE constrained optimization for multi-sensor brain stimulation (tDCS, tACS,
TMS), see, e.g., Wagner et al., 2016; Wagner PhD, 2015; Schmidt et al., 2015;
- Combined EEG/MEG/MRI data analysis and source reconstruction, see, e.g.,
Piastra et al., 2018; Aydin et al., 2017; Aydin et al., 2015; Aydin et al., 2014;
Hamid et al., 2013; Wolters et al., 2010

- Methods for estimating head tissue conductivities, see, e.g., Antonakakis et al., 2019; Aydin et al., 2014; Wolters et al., 2010; Lew et al., HBM, 2009; Lew PhD, 2008,
- Complete electrode model versus point electrode model in source analysis and brain stimulation, see, e.g., Pursiainen et al., 2017; Pursiainen et al., 2016; Agsten master, 2015; Pursiainen et al., 2013; Pursiainen et al., 2012
- Evaluation and comparison of FEM and boundary element method (BEM) approaches for bioelectromagnetic forward modeling, see, e.g., Antonakakis et al., 2019; Vorwerk et al., 2012; de Munck et al., 2012; Vorwerk diploma, 2011 Lew et al., 2009; Wolters and de Munck, 2007
- Generalized polynomial chaos (gPC) sensitivity investigations, see, e.g., Vorwerk et al., 2019; Schmidt et al., 2015
- Specific sensitivity investigations for volume conductor modeling with regard to skull (see, e.g., Antonakakis et al., 2019; Aydin et al., 2014; Vorwerk et al., 2014; Vorwerk et al., 2018; Wagner et al., 2014; Lanfer et al., 2012; Dannhauer et al., 2011; Vorwerk et al., 2014; Steinsträter et al., 2010), cerebrospinal fluid (see, e.g., Vorwerk et al., 2014; Wagner et al., 2014; Aydin et al., 2014; Lanfer et al., Biomed Tech, 2012; Wolters et al., 2006), brain anisotropy (see, e.g., Vorwerk et al., 2014; Wagner et al., 2014; Aydin et al., 2014; Steinsträter et al., 2010; Wolters et al., 2006; Güllmar et al., 2006), blood vessels (see, e.g., Fiederer et al., 2016), insulating ECoG grid in combined ECoG/EEG epilepsy investigations (see, e.g., Lanfer et al., 2013), and fontanels and sutures in baby and infant volume conductors (see, e.g., Pursiainen et al., 2016; Lew et al., 2013).
- Neuroscientific research on babies and infants, see, e.g., Pursiainen et al., 2017; Lew et al., 2013
- Scientific programming, see, e.g., Härdtlein et al., 2010; Wolters et al., 2002
- Schizophrenia research, see, e.g., Gonzalez-Hernandez et al., 2015
- Cognitive neuropsychology, see, e.g., Winker et al., 2019; Huster et al., 2009; Winker et al., 2018
- Signal pre-processing, see, e.g., Sander et al., 2010
- Cardiac positron emission tomography (PET), see, e.g., Gigengack et al., 2012; Ruthotto, 2010