Curriculum Vitae

Personal Details

Prof. Dr.
Arne Ewald

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Professional Experience

Since December 2023

Professor for Data Science, NORDAKADEMIE University of Applied Sciences

October 2015 – September 2023

Senior Research Scientist, Philips Research Laboratory Hamburg, specializing in machine learning for medical image analysis. Selected projects and contributions to products:

- Philips Ultrasound HeartModel: Automated quantification and visualization of 3D ultrasound examinations of the heart
- Philips EchoNavigator: Automatic fusion of echocardiography and X-ray images for interventional cardiology
- AI-based detection and assessment of strokes in CT images
- 3D brain model for automated measurement in MRI scans and navigation support during surgery, licensed to ClearPoint Neuro
- Development, implementation, and management of an inner-source deep learning experimentation toolkit hosted on GitHub, meeting high software quality standards

March 2020 – December 2022

Release Train Engineer in scaled agile project management (SAFe certification) for a team of ~50 people

March 2020 – August 2021

SCRUM Master (SAFe certification) for a team of ~8 people

June 2013 – September 2015

Research Scientist, University Medical Center Hamburg-Eppendorf (UKE), Institute of Neurophysiology and Pathophysiology. Responsible for developing robust mathematical and statistical methods for the analysis of multivariate data. Contributed to the project *NEUCONN – Development of novel methods and imaging techniques for the early detection of neurodegenerative processes in MS patients*.

September 2011 – April 2013	Software Developer and Research Scientist, NIRx Medizintechnik GmbH, Berlin. Further development of commercial instruments and software for near-infrared spectroscopy (NIRS).
June 2009 – June 2011	Research Scientist, Fraunhofer Institute for Computer Architecture and Software Technology (FIRST), Berlin, in the "Intelligent Data Analysis" group.

Academic Education

2009 – 2014	PhD (German doctorate: Dr. rer. nat.), summa cum laude, in *Machine Learning and Intelligent Data Analysis* at Technische Universität (TU) Berlin, supervised by Prof. Dr. Klaus-Robert Müller. Thesis: *Novel multivariate data analysis techniques to determine functionally connected networks within the brain from EEG or MEG data* [Link to pdf]
November 2004 – May 2005	Thesis project during study abroad: *Selection of hidden objects in a graphical 3D environment using transparency*, Universidad Tecnica Federico Santa Maria, Valparaíso, Chile
2000 - 2009	Studies at Technische Universität Hamburg-Harburg (TUHH) Diploma in Computer Engineering. Diploma thesis at Fraunhofer FIRST, Berlin: *Exploiting physiological knowledge to improve Brain Computer Interface performance* Bachelor of Science in General Engineering Science, specializing in Computer Engineering. Bachelor thesis: *The smoothing method for calculating 3D protein structures*

School Education

1997	Participation in multi-week exchange program with partner school "Albuquerque Academy", USA
1990 - 1999	General higher education entrance qualification (Abitur), Gymnasium Petershagen, North Rhine-Westphalia. Specialized courses: Mathematics and Computer Science.

Other

2001 – 2007	Practical experience during studies as a working student, through internships and part-time jobs, including at AOL, Airbus, and various TUHH departments
May 2000 - September 2000	Employment as a host at Expo 2000 in Hanover
July 1999 - April 2000	Mandatory military service, Ahlen, Westphalia

Selected Publications

Total publications: 19, Citations: 682, H-index: 10
See Google Scholar profile: https://scholar.google.de/citations?user=DNMizxQAAAAJ&hl=de

- Ewald, A., Aristei, S., Nolte, G., & Rahman, R. A. (2012). Brain oscillations and functional connectivity during overt language production. *Frontiers in Psychology*, *3*, 166.
- Ewald, A., Marzetti, L., Zappasodi, F., Meinecke, F. C., & Nolte, G. (2012). Estimating true brain connectivity from EEG/MEG data invariant to linear and static transformations in sensor space. *NeuroImage*, *60*(1), 476–488.
- Ewald, A., Ziehe, A., Shahbazi, F., & Nolte, G. (2010). Exploiting prior neurophysiological knowledge to improve Brain Computer Interface performance. *17th International Conference on Biomagnetism Advances in Biomagnetism–Biomag2010: March 28–April 1, 2010 Dubrovnik, Croatia*, 370–373.
- Haufe, S., & Ewald, A. (2019). A simulation framework for benchmarking EEG-based brain connectivity estimation methodologies. *Brain Topography*, *32*, 625–642.
- Haufe, S., Treder, M., Gugler, M., Sagebaum, M., Ewald, A., Curio, G., & Blankertz, B. (2010). Neural Signatures Enhance Emergency Braking Intention Detection during Simulated Driving. *Front. Comput. Neurosci.*
- Sonnleitner, A., Treder, M. S., Simon, M., Willmann, S., Ewald, A., Buchner, A., & Schrauf, M. (2014). EEG alpha spindles and prolonged brake reaction times during auditory distraction in an on-road driving study. *Accident Analysis & Prevention*, *62*, 110–118.
- Zagorchev, L., Hyde, D. E., Li, C., Wenzel, F., Fläschner, N., Ewald, A., O'Donoghue, S., Hancock, K., Lim, R. X., Choi, D. C., & others. (2024). Shape-constrained deformable brain segmentation: Methods and quantitative validation. *NeuroImage*, *289*, 120542.

Selected Patents

52+ patents worldwide, 100 patents submitted worldwide, 49 patent families
Justia Patents profile: https://patents.justia.com/inventor/arne-ewald
Google Patents profile: https://patents.google.com/?q=(arne+ewald)&oq=arne+ewald

- US-12190562 B2 (2025) – *fMRI task settings with machine learning*. Inventors: Arne Ewald, Rudolf M. J. N. Lamerichs, etc.
- US-2020253548 A1 (2020) – *Classifying a disease or disability of a subject*. Inventors: Heiner Daerr, Arne Ewald.
- US-2022165004 A1 (2022) – *Removal of false positives from white matter fiber tracts*. Inventors: Evan Schwab, Arne Ewald.
- US-2020293690 A1 (2020) – *Medical data collection for machine learning*. Inventors: Arne Ewald, Tim Nielsen, et al.
- US-2022142612 A1 (2022) – *Methods and systems for adjusting the field of view of an ultrasound probe*. Inventors: Frank M. Weber, Tobias Wissel, Arne Ewald, et al.
- US-2023270500 A1 (2023) – *Generating and displaying a rendering of a left atrial appendage*. Inventors: Frank M. Weber, Alasdair I. Dow, Eduardo Ortiz Vazquez, Andrea Laghi, Arne Ewald.
- US-2023126342 A1 (2023) – *Failure detection for segmentation of an image*. Inventors: Jochen Peters, Matthias Lenga, Tobias Wissel, Arne Ewald, et al.
- US-2023061953 A1 (2023) – *Methods and systems for cardiac chamber imaging*. Inventors: Frank M. Weber, Jochen Peters, Irina Waechter-Stehle, Arne Ewald, et al.
- US-2024127432 A1 (2024) – *Image sequence analysis*. Inventors: Alexandra Groth, Tanja Lossau, Irina Waechter-Stehle, Frank M. Weber, Jochen Peters, Sebastian Wild, Arne Ewald, André Goossen.
- US-2024153037 A1 (2024) – *Method and system for correcting contrast-enhanced images*. Inventors: Wild Sebastian, Arne Ewald, et al.

Reviewing Activities

2025	Program Committee: 1st International Conference on Agentic and Generative Techniques in Intelligent Computer Systems
2022 - 2023	Program Committee: 17th & 18th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications
2011 - present	NeuroImage IEEE Transaction of Medical Imaging IEEE Transactions on Industrial Informatics Frontiers in Neuroscience | Brain Imaging Methods PLOS ONE PLOS Computational Biology Transactions on Neural Systems & Rehabilitation Engineering Journal Signal Processing Systems Biological Psychology

Awards and Scholarships

July 2020	Best Paper Award, Brain Topography, awarded by the Organization of Human Brain Mapping (OHBM)
September 2014	PhD Poster Prize, 19th International Conference on Biomagnetism, Halifax, Canada
April 2012	Poster Prize, Biomedical Signal Analysis conference, organized by the Physikalisch-Technische Bundesanstalt
2004	Scholarship from the Dietze Foundation for a semester abroad in Chile

Selected Scientific Talks & Public Engagements

February 2025	Talk at the NORDAKADEMIE Alumni Association: "Artificial Intelligence – Current Trends and Developments"
November 2024	Panelist at the AI Forum: Trade and Logistics organized by the AGA Business Association
March 2024	Keynote at "KI-Safari", organized by the Mittelstand-Digital Center
2015 – 2024	Various technical talks within Philips, addressing audiences from ~100 people at the Hamburg research lab to ~1,500 attendees at Philips Research global events
June 2019	Invited talk at the International Max Planck Research School for Genome Science: "Research in industry – a paradox?"
February 2016	Invited talk at the Institute for Systems Neuroscience, UKE: "Introduction to inverse modelling"

September 2015	Talk at the Basic Clinical and Multimodal Imaging (BaCI) conference, Utrecht: "On the relationship between phase coupling and power envelope coupling"
May 2015	Invited talk at the Brain and Cognition Center, University of Amsterdam: "Improving the estimation of EEG/MEG functional connectivity by using multivariate data analysis techniques"
January 2015	Invited talk at the Brain and Cognition Center, University of Amsterdam: "Improving the estimation of EEG/MEG functional connectivity by using multivariate data analysis techniques"
April 2011	Conference presentation at the Society of Applied Neuroscience (SAN), Thessaloniki

Grant Applications

2025	Freiraum proposal (under review): Innovative Teaching in Artificial Intelligence (IN:KI) – Understanding and Experiencing Machine Learning through the Analysis of Brain Signals
2025	Proposal to the NORDAKADEMIE Foundation (under review): Artificial Intelligence to Support Scientific Practice in Teaching and Academic Administration (KIWI)
2024	Lead author and submitter of a concept proposal for DFG funding line "Forschungsimpulse," aimed at research-oriented universities of applied sciences (HAW/FH). Topic: Sustainable Applications of Artificial Intelligence in SMEs
2019	BMBF Future Cluster Neurotechnology and Digital Mental Health: Contributed to proposal and served on project advisory board
2018	Contributor to Horizon 2020 – Research and Innovation Framework Programme, Call H2020-MSCA-ITN-2019: Psychiatric Disease Diagnosis and Therapy Supported by MRI (PsyMRI)

Teaching Experience

since December 2023 Lectures at NORDAKADEMIE University of Applied Sciences:

- Artificial Intelligence (M.Sc., 4 × 3 SWS)
- Introduction to AI (B.Sc., 6 SWS)
- Scientific Work 2 (B.Sc., 4 SWS)
- Machine Learning (M.Sc., 3 SWS)
- Data Mining (M.Sc., 3 SWS)
- Analytical Information Systems (B.Sc., 2 × 6 SWS)
- Software Development 1 (B.Sc., 2 × 3 SWS)
- Software Development 2 (B.Sc., 2 × 3 SWS)
- Statistics 1 (B.Sc., 2 × 3 SWS)
- Statistics 2 (B.Sc., 2 × 5 SWS)
- Introduction and Application of AI (M.Sc., 3 × 3 SWS)
- Mathematics 1 (B.Sc., 4 × 4 SWS)

SWS: contact hours / week (Semesterwochenstunden)

2021 - 2023	Lecture Computer Vision (M.Sc., 2 contact hours/week), focusing on machine learning methods using artificial neural networks, University of Applied Sciences Wedel
2019	Session on Electroencephalography in the lecture Medical Image Processing, Technische Universität Hamburg-Harburg (TUHH)
2013 – 2015	Seminar Introduction to Data Analysis with MATLAB, elective module in the 2nd Track for medical students, University Medical Center Hamburg-Eppendorf (UKE)

Supervision of Students

Ongoing Supervisions

Master

- Efficient neural embedding compression of Earth-foundation models for downstream tasks
- Use of latent diffusion models to generate synthetic defect images of pharmaceutical products – Empirical study on automated visual inspection of injectable preparations
- Design and evaluation of an AI-based assistance system for troubleshooting in technical systems using RAG and agentic workflows
- Detection of Ghanaian mango farms using foundational models and satellite imagery
- Object detection of blood cells for downstream processing

2025 (completed)

Master

- Classification of ischemic strokes based on 4D angiography data using vision transformers
- Development and analysis of machine learning models for sales forecasting
- Image-based detection of *Columba livia forma domestica* using machine learning methods
- Automated detection of knee fractures in X-ray images using deep learning methods
- Deep learning–based object detection of constellations
- Evaluation of large language models for querying structured medical data via natural language
- Automated visual summarization of online meetings using artificial intelligence

Bachelor

- Fine-tuning strategies for LLMs: A systematic evaluation focusing on domain-specific knowledge in the biotechnology sector
- Specializing a generic LLM with RAG for agricultural queries – A case study with data experts
- AI-based detection of unlawful content in self-publishing
- Potential applications and requirements of large language models in the rehabilitation sector

2024

Master

- Evaluating the use of LLMs for ERP system interaction

Bachelor

- Which organisational structure is particularly suitable for effectively advancing the implementation and use of AI within Bauer Media Group? How should such a structure be designed and strategically integrated into the company?
- Potential use cases for generative AI in CRM systems
- Design of a management dashboard for the logistics sector

2020	Supervision of internship and bachelor's thesis by a student from Karlsruhe Institute of Technology: *CNN-based left ventricle segmentation in transesophageal ultrasound images*\
2013 – 2015	Co-supervision of a medical doctoral thesis on data analysis in the context of neurodegenerative diseases (multiple sclerosis)
	Guidance for various student assistants supporting neuroscientific measurements
2011	Supervision of internship and bachelor's thesis by a student from the Berlin University of Applied Sciences on software development for functional near-infrared spectroscopy

IT and Programming Skills

Programming Languages	Python (including various Data Science and visualization modules such as PyTorch, NumPy, SciPy, pandas, scikit-learn, matplotlib, seaborn), C/C++, MATLAB, LabView, LaTeX
Software Development	SVN & Git, GitLab/GitHub, CI/CD tools, Docker, REST APIs, PyCharm, VS Code, Sublime, Visual Studio
Tools and Operating Systems	Unix, Windows, various AWS Cloud Services (EC2, SageMaker, S3), Windows High Performance Computing, SLURM, MS Office
Additional Experience as a student	Java, JavaScript, SQL, HTML

Further Skills and Interests

Languages	German (native), English (fluent, business level), Spanish (good)

Volunteering

Since 2012	Member of *Weltfriedensdienst e.V.* (World Peace Service)
2001 – 2008; 2013 – present	Active member in amateur men's football at FC St. Pauli
2001 – 2002	University committee work in the student council

Sports	Kitesurfing, football, hiking
Personal Interests	Music, sustainable travel