Prof. Dr. Benedikt Wiestler

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AI-IDT
AI for Image-Guided
Diagnosis and Therapy

Summary

While medical imaging generates vast amounts of information, only a fraction is currently used to inform clinical decisions. My lab *AI for Image-Guided Diagnosis and Therapy* bridges this gap by developing advanced algorithms and strategies that make this wealth of data accessible and actionable for clinicians.

Career

Since 05/2024	Associate W3 Professor, TUM School of Medicine & Health
09/2020 - 04/2024	Consultant, Department of Neuroradiology, TUM
01/2018 - 04/2024	Group Leader *Computational Imaging*, TUM
05/2015 - 06/2020	Resident, Department of Neuroradiology, TUM
07/2012 - 12/2014	Postdoc, German Cancer Research Center, Heidelberg
01/2010 - 06/2012	Resident, Department of Neuro-Oncology, Heidelberg University Hospital

Education

2019 - 2020	Certificate of Advanced Studies *"Artificial Intelligence in Medical Imaging"*, University of Bern
06/2018	Habilitation in Radiology, TUM
2015 - 2019	DKTK School of Oncology Fellow, TUM
06/2011	Doctoral Thesis (*Summa cum Laude*), Heidelberg University
2002 - 2009	Medical School, Bonn & Heidelberg Universities

Honors & Awards

2020	Best project, *"Image Quality Transfer in MRI with Deep Neural Networks"*, Medical Image Computing Summer School, University College London
2019	Kurt Decker Award, German Society of Neuroradiology
2018	2nd Place "Lecturer of the Year", Faculty of Medicine, TUM
2005 – 2009	Fellowship of the German National Merit Foundation (Studienstiftung)

Third-Party Funding

My research is supported by significant funding through competitive national grants (e.g., DFG individual grants and Priority Programme Radiomics), national cancer charities (Deutsche Krebshilfe), and federal ministries (BMBF, BMWi), as well as international grants (NIH, EU-COST).

Academic Service

I contribute to both national and international efforts in my field. This includes participating in groups like the RANO-AI Working Group and the "Multiple Sclerosis" guideline committee of the German Neurological Society. Additionally, I serve on the reviewer boards for multiple academic journals such as Medical Image Analysis, Neuro-Oncology, and Radiology, as well as for international conferences like the Medical Image Computing and Computer Assisted Intervention (MICCAI) conference.

Research Statement

My research focuses on **developing innovative image analysis methods to extract actionable biomarkers for clinical decision-making** from medical imaging data. This interdisciplinary approach bridges medicine and computer science, ultimately contributing to personalized medicine for diagnosis and therapy. Publications like [1] and [2] highlight this interdisciplinary focus, showcasing my collaboration with computer science groups to advance medical image analysis techniques and biophysical models. Translating these advancements into clinical applications is a core motivation for my work. For example, in [3], we use computational image analysis to improve the assessment of inflammatory disease activity in Multiple Sclerosis patients. Similarly, [4] demonstrates how we leverage Deep Learning models to inform personalized radiotherapy planning. Beyond research, I actively contribute to the medical image analysis community by co-organizing key challenges and workshops, such as the Brain Tumor Segmentation (BraTS) or Ischemic Stroke Lesion Segmentation (ISLES) challenges [5].

1. McGinnis J, Shit S, Li H, Sideri-Lampretsa V, Graf R, Dannecker M, Pan J, Stolt-Ansó N, Mühlau M, Kirschke J, Rueckert D, **Wiestler B**.
   Single-subject Multi-contrast MRI Super-resolution via Implicit Neural Representations.
   MICCAI, 2023

2. Ezhov I, Scibilia K, Franitza K, Steinbauer F, Shit S, Zimmer L, Lipkova J, Kofler F, Paetzold JC, Canalini L, Waldmannstetter D, Menten MJ, Metz M, **Wiestler B***, Menze B* (equal contribution).
   Learn-Morph-Infer: A new way of solving the inverse problem for brain tumor modeling.
   Medical Image Analysis 2023 Jan;83:102672

3. Eichinger P, Schön S, Pongratz V, Wiestler H, Zhang H, Bussas M, Hoshi MM, Kirschke J, Berthele A, Zimmer C, Hemmer B, Mühlau M, **Wiestler B**.
   Accuracy of Unenhanced MRI in the Detection of New Brain Lesions in Multiple Sclerosis.
   Radiology 2019 May;291(2):429-435

4. Peeken JC, Molina-Romero M, Diehl C, Menze BH, Straube C, Meyer B, Zimmer C, **Wiestler B***, Combs SE* (equal contribution).
   Deep learning derived tumor infiltration maps for personalized target definition in Glioblastoma radiotherapy.
   Radiotherapy and Oncology 2019 Sep;138:166-172

5. de la Rosa E, Reyes M, Liew SL, ..., Menze BH, Kirschke J, **Wiestler B**.
   A Robust Ensemble Algorithm for Ischemic Stroke Lesion Segmentation: Generalizability and Clinical Utility Beyond the ISLES Challenge.
   arXiv 2024