Constantin Seibold, Ph.D.

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As a dedicated researcher in artificial intelligence, I specialize in developing machine learning algorithms that bridge the gap between cutting-edge AI and real-world applications. My research is based on computer vision, natural language processing, as well as data analytics and has found application in automatic clinical diagnostics, assistive systems for the visually impaired and the automated analysis of documents. My work has been recognized with prestigious awards, including the KIT Doctoral Award, multiple top rankings in international AI challenges, and successful funding acquisition for innovative healthcare AI projects.

Skills: Deep Learning, Computer Vision, Natural Language Processing, Semantic Segmentation, Learning with Limited Data, Medical Image Analysis, Multimodal Deep Learning, Generative Models, Re-Identification
Programming Languages: Python, JavaScript, Java, MatLab
Tools: Pytorch, OpenCV, scikit-learn, React, plotly, d3js, Docker, ONNX, MinIO, PostgreSQL
Languages: German and English

Professional Experience

May 2023 - November 2024
Junior Research Group Leader, Institute for Artificial Intelligence in Medicine, Clinic for Nuclear Medicine, University Clinic Essen
Lead a team of multiple Ph.D. students on the development of machine learning algorithms in medicine to provide essential information directly in clinical use. Top ranking placements in multiple international challenge tracks, publications in top conferences and journals such as EMNLP and Medical Image Analysis and aquisition of an EU-Horizon grant. [Computer Vision, NLP, Clinical Studies]

July 2019- Dec. 2022
Research Assistant, Computer Vision for Human-Computer Interaction Lab, Karlsruhe Institute of Technology
Computer Vision research on medical report generation in varying image modalities. Developed the first open set pathology recognition model for chest radiographs as well as some of the first models for holistic anatomy segmentation in 2-/3-D.
[Computer Vision, NLP, Clinical Studies, Teaching]

March 2019- July 2019
Student Research Assistant, Computer Vision for Human-Computer Interaction Lab, Karlsruhe Institute of Technology
Development of computer vision algorithms for vehicle re-id. [Computer Vision]

Education

July 2019 - April 2023
PhD Computer Science, Karlsruhe Institute of Technology, Helmholtz Information & Data Science School for Health (HIDSS4Health)
Thesis Title: Towards the automatic generation of medical reports in low supervision scenarios
Grade: **Summa Cum Laudae**, **KIT Doctoral Award**
Advisor: Prof. Dr.-Ing. Rainer Stiefelhagen

Oct. 2016 - March 2019
M. Sc. Computer Science, Karlsruhe Institute of Technology
Thesis Title: Generative Models for Make-Up Style Transfer and Removal
Master Thesis Advisor: Dr.-Ing. Muhammed Saquib Sarfraz, Prof. Dr.-Ing. Rainer Stiefelhagen

Oct. 2013 - Oct. 2016
B.Sc. Computer Science, University of Stuttgart
Thesis Title:
Improving author co-citation analysis in scientific literature by using citation function classification
Bachelor Thesis Advisor: Dr.-Ing. Roman Klinger, Prof. Dr.-Ing. Sebastian Pado

Awards

2024	**2nd Place**, Automated Lesion Segmentation in Whole-Body PET/CT Challenge - autoPET III [paper]
2024	**1st Place (Spanish, Chinese), 3rd Place English**, MEDIQA-M3D Challenge at NAACL-ClinicalNLP [paper]
2023	**Winning Team of the UME - Innovation Contest**, University Medicine Essen
2023	**KIT Doctoral Award**, Karlsruhe Institute of Technology [link]
2022	**Teaching Award - Best Practical Course**, Karlsruhe Institute of Technology, CS Faculty [link]
2019	**Best Industry Paper Award**, British Machine Vision Conference [paper]

Funded Research Projects

2024	**EU HORIZON JU - Innovative Health Initiative - *HORIZON-JU-IHI-2023-05-02***, Thera4Care - THERANOSTICS ECOSYSTEM FOR PERSONALISED CARE, **Role:** PI, **Sub-Project Volume:** 257.000 [Link]
2022	**HIDSS4Health**, Using Anatomical Knowledge to Improve Medical Image Analysis, **Role:** Support in Grant Application Process, **Volume:** 130.000 (50% PhD position, 3 years) [Link]
2022	**HIDSS4Health**, Interactive Annotation of Volumetric Imaging Data Incorporating Report Information, **Role:** Support in Grant Application Process, **Volume:** 130.000 (50% PhD position, 3 years) [Link]
2019	**HIDSS4Health**, Generating Medical Imaging Reports from 3D Radiological CT Scans using Image Captioning Techniques, **Role:** Team-member, project implementation[Link]

Teaching Experience

Theses

Since 2024	**Supervision of Ph.D. Theses**, UCE; Students: H. Kalisch
2023-2024	**Co-Supervision of Ph.D. Theses**, UCE; Students: L. Heine, A. Brehmer, F. Jonske
2020-2024	**Supervision of Master Theses**, KIT, UCE; Students: P. Nguyen, W. Di, P. Albrecht, R. Chlebecec
2020, 2024	**Supervision of Bachelor Theses**, KIT, UCE; Students: C. Goos, J. Nasimzada, S. Mahler

Courses

2022	**Deep Learning for Computer Vision I: Basics**, KIT; Teaching Assistant [SS22]
2021-2022	**Deep Learning for Computer Vision II: Advanced Topics**, KIT; Teaching Assistant, Lecturer [WS 22,WS 23]
2021-2022	**Practical Course - Computer Vision for Human Computer Interaction**, KIT; Lecturer/Course Organizer **[Best Practical Course of SS21]** [WS21, SS21, WS22], consistently LQI 100 (”Lehrqualitätsindex”, 100 is the best possible value at KIT).
2020-2021	**Deep Learning for Computer Vision**, KIT; Teaching Assistant [SS20,SS21]

Outreach & Professional Development

Service and Outreach

2025	**CVPR Tutorial - Identifying Structure in Data**, Organizer [link]
2023-2024	**Initiating and organizing the Computer-Vision Reading Group at the IKIM**, Organizer, Presenter
2021-2022	**Initiating and organizing the Computer-Vision Reading Group at CV:HCI**, Organizer, Presenter
2022	**MICCAI Workshop - Medical Applications with Disentanglements**, Program Committee

Peer Review

2022	**Journals**, IEEE Transactions on Biomedical Engineering
Since 2021	**Conferences**, AAAI Conference on Artificial Intelligence (AAAI-23/24/25), IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR 2022/23/25), International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 22/24),European Conference on Computer Vision (ECCV 2022), Winter Conference on Applications of Computer Vision (WACV 2024)

Further Education

2023	**Workshop KHYS Basics of Leadership in Science 2023**, engaged with essential concepts of leadership in a scientific field.
2023	**Workshop KHYS Time-& Self-Management 2023**, presented approaches and tools for improved organization and self-reflexion.
2022	**IBM Neuro-Symbolic AI Summer School**, displayed possible combinations of knowledge-driven, symbolic AI with more traditional data-driven machine learning approaches. Distinguished speakers shared an overview of neuro-symbolic AI and how these method are applied in current applications.
2021	**Workshop Nawik Visualizing Science**, provided insights on how to properly visualize research results to convey the consequent insights.
2021	**Workshop Nawik Communicating Science**, provided insights on how to properly communicate your research results to both experts and layman.

Invited Talks

2024	**ENBIS Spring Meeting**, Dortmund, Germany Interpretable AI in Medicine: Generating Radiological Reports with Panoptic Scene Graphs
2024	**Intelligent Sensing and Perception Group**, Stuttgart, Germany The Current state of vision-language models in Radiology

Selected Publications

2025	**Every Component Counts: Rethinking the Measure of Success for Medical Semantic Segmentation in Multi-Instance Segmentation Tasks**, Jaus, Alexander, Seibold, Constantin et al., Proceedings of the AAAI conference on artificial intelligence. [A*, top 7% (CORE2023)](Poster/Proceedings)
2023	**Accurate Fine-Grained Segmentation of Human Anatomy in Radiographs via Volumetric Pseudo-Labeling**, Seibold, Constantin, et al. arXiv preprint arXiv:2306.03934, 16k Pypi downloads since release.
2022	**Reference-guided pseudo-label generation for medical semantic segmentation.**, Seibold, Constantin, et al. Proceedings of the AAAI conference on artificial intelligence. [A*, top 7% (CORE2023)](Poster/Proceedings)
2022	**Breaking with fixed set pathology recognition through report-guided contrastive training**, Seibold, Constantin, et al., International Conference on Medical Image Computing and Computer-Assisted Intervention. [A, top 15% (CORE2023)](Poster/Proceedings)
2022	**Detailed Annotations of Chest X-Rays via CT Projection for Report Understanding**, Seibold, Constantin, et al. The 33rd British Machine Vision Conference Proceedings [A, top 15% (CORE2023)] (Poster/Proceedings)