

Saikat Roy

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Summary

A researcher specializing in designing deep learning techniques for representation learning in predictive and generative problems. Currently, I work as a doctoral researcher exploring “*Transformer and Self-Attention-based networks*” for effective medical image analysis.

Skills

Research Competencies:

- Machine Learning, Semantic Segmentation, Transformers, Diffusion Models, Representation Learning, Transfer Learning, Predictive and Generative Problems in Medical Image Analysis.

Technical Proficiency

- Proficient:** Python, NumPy, PyTorch, Scikit-Learn, Git, LaTeX, Matplotlib
- Familiar:** Shell Scripting, Pandas, SciPy, Docker, PyTest, C, SQL, Matlab, Keras, CoPilot, HPC (LSF, SLURM)

Education

Heidelberg University Heidelberg, DE
Ph.D, Computer Science 2023–2026
– Thesis: *Transformers and Self-Attention for Medical Image Segmentation*

University of Bonn Bonn, DE
M.Sc, Computer Science 2017–2021
– Thesis: *Fully-3D Deep CNNs for Segmentation of Neuroanatomy*

Jadavpur University Kolkata, India
M.E., Software Engineering 2013–2015
– Thesis: *Supervised-Layerwise Training of Deep CNNs for Classification*

Work Experience

mediaire GmbH Berlin, Germany
Senior Machine Learning Engineer May 2026 – Present
– Leading AI development for MRI-based medical image analysis products.

Radboud University Medical Center (UMC) Nijmegen, Netherlands
Visiting Researcher Oct. 2025 – Present
– Diagnostic Image Analysis Group (DIAG) on AI for prostate cancer diagnosis.

German Cancer Research Center (DKFZ) Heidelberg, Germany
Doctoral Researcher (Full-Time) Mar. 2021 – Feb. 2026
– Developed one of the highest-cited CNN architectures of the last 2 years, using Transformer-based insights, for 3D medical image segmentation.
– *Research Topics:* Semantic segmentation, Transformers, Representation Learning, Transfer Learning, Self-supervised training, Foundation Models

Siemens Healthineers Princeton, USA
Research Intern (Full-Time) July. 2024 – Nov. 2024
– Developed *patch-based* Diffusion models for medical image denoising and super-resolution at 25% less memory with no performance loss.
– *Research Topics:* Diffusion Models, Denoising, Super-resolution

German Center for Neurodegenerative Diseases Bonn, Germany
Research Assistant (Half-Time) Nov. 2018 – Feb. 2021
– Developed *Spatially ensembled* 3D Deep Convolutional Neural Networks for state-of-the-art segmentation of 95 structures in brain MRIs in 30 seconds.
– *Research Topics:* Semantic segmentation, Deep CNNs, neuroimaging

Publications (Selected)

- S. Roy** et al. “Primus: Enforcing Attention Usage for 3D Medical Image Segmentation,” *TMLR*, 2026.
- S. Roy** et al. “Investigating the Feasibility of Patch-Based Inference for Generalized Diffusion Priors in Inverse Problems for Medical Images,” *IEEE ISBI*, 2025. **Oral Presentation**
- S. Roy** et al. “Skeleton Recall Loss for Connectivity Conserving and Resource Efficient Segmentation of Thin Tubular Structures,” *ECCV*, 2024. **(CORE Ranking: A*) 100+ citations**
- P. Bassi et al. “Touchstone Benchmark: Are We on the Right Way for Evaluating AI Algorithms for Medical Segmentation?,” *NeurIPS*, 2024. **(CORE Ranking: A*) 5k+ benchmark Win: MedNeXt**
- F. Isensee et al. “nnU-Net Revisited: a Call for Rigorous Validation in 3D Medical Image Segmentation,” *MICCAI*, 2024. **(CORE Ranking: A) Benchmark Win: MedNeXt, 700+ citations**
- S. Roy** et al. “**MedNeXt**: Transformer-driven Scaling of ConvNets for Medical Image Segmentation,” *MICCAI*, 2023. **(CORE Ranking: A) Early Accept: Top 14%, 700+ citations**

Publications in Preparation / Under Review

- S. Roy**, et al. “Dataset Collections: Trials and Tribulations of Large-Scale Data Aggregation in 3D Medical Image Analysis,” 2026.
- S. Roy** et al. “MedNeXt-v2: Scaling 3D ConvNeXts for Large-Scale Representation Learning in Medical Image Segmentation,” 2026.

Public Projects / Open-Source

• Author and maintainer

- MIC-DKFZ/MedNeXt ******

• Contributor

- Deep-MI/3d-neuro-seg
- MIC-DKFZ/nnUNet/tree/nnunetv1 *******
- MIC-DKFZ/batchgenerators ******

***** ≥ 250 stars

****** ≥ 500 stars

******* ≥ 1000 stars

Other Publications (Selected)

- Disch et al. “CRONOS: Continuous Time Reconstruction for 4D Medical Longitudinal Series, *ICLR* 2026. **(CORE Ranking: A*)**
- Rokuss et al, “LesionLocator: Zero-Shot Universal Tumor Segmentation and Tracking in 3D Whole-Body Imaging,” *CVPR*, 2025. **(CORE Ranking: A*)**
- **S. Roy**, et al, “SAM.MD: Zero-Shot Medical Image Segmentation Capabilities of the Segment Anything Model,” *MIDL, short paper*, 2023. **(200+ citations)**
- **S. Roy**, et al, “Are 2.5D approaches superior to 3D deep networks in whole brain segmentation?,” *Medical Imaging with Deep Learning (MIDL)*, 2022. **(Oral presentation)**

Miscellaneous (Summer Schools, Talks, Visits and Awards)

– Research Visits and Talks

- * Speaker on *MedNeXt-v2* at Raysearch Laboratories, Sweden. (2026)
- * Speaker at Sprint AI Training for African Medical Imaging Knowledge Translation (SPARK) Academy. (2026)
- * Research visit to Diagnostic Image Analysis Group (DIAG) at Radboud UMC, Netherlands. (2025)
- * Speaker at Machine Learning Galore Talks at Heidelberg University, Germany. (2025)
- * Keynote Speaker at MICCAI 2024 Challenge – “*Body Maps: Towards 3D Atlas of Human Body*” (2024)
- * Research talk and visit to Luxembourg Centre for Systems Biomedicine, University of Luxembourg, Luxembourg. (2023)
- * Invited talk at Medical and Environmental Computing Lab, TU Darmstadt, Darmstadt, Germany. (2023)
- * Tutorial on “*Transformers in Medical Image Analysis*”, BVM, Germany. (2022-23)

– Reviewer Assignments (Selected)

- * Conference on Neural Information Processing Systems (NeurIPS) (2026)
- * International Conference on Learning Representations (ICLR) (2025-Present)
- * IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) (2025-Present)
- * International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) (2024-Present)
- * IEEE Transactions in Image Processing (2024-Present)
- * IEEE Transactions on Neural Networks and Learning Systems (2023-Present)
- * IEEE Transactions in Medical Imaging (2023-Present)

- Oxford Machine Learning (OxML) Summer School, 2021.
- GATE Scholarship (2013–2015) for Masters Degree, Ministry of Human Resources & Development, Gov. of India.
- Erasmus Mundus FUSION Scholarship 2015 for PhD mobility to University of Evora, Portugal. (*Did not accept offer*)

References

- Prof. Dr. Klaus Maier-Hein

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Heidelberg, Germany

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- Prof. Dr. Martin Reuter

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German Center for Neurodegenerative Diseases (DZNE),
Bonn, Germany

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