Neerav Karani

Curriculum Vitae

1 Personal Information

- Nationality: Indian
- Data of birth: 31.10.1989
- Marital status: Married
- Google scholar ID: neLQ1MQAAAAJ [link]

2 Education

- **PhD in Medical Image Analysis, Biomedical Image Computing Group, ETH Zurich**
  - July 2017 - March 2022 (PhD Defense: 04.03.2022)
  - Thesis: Tackling distribution shifts in machine learning-based medical image analysis
  - Advisor: Prof. Ender Konukoglu
  - Jury: Prof. Ender Konukoglu, Prof. Ben Glocker, Prof. Rama Chellappa

- **M.Sc. in Biomedical Imaging, ETH Zurich**
  - Sept 2015 - April 2017
  - GPA: 5.54 / 6.0
  - Master Thesis: Temporal interpolation of abdominal MRIs.
  - Advisor: Prof. Ender Konukoglu, Prof. Sebastian Kozerke
  - Semester Thesis: Interactive MRI segmentation with random forests and multi-resolution random walker.
  - Advisor: Prof. Orcun Goksel

- **B.Tech in Engineering Design, Indian Institute of Technology Madras**
  M.Tech in Biomedical Design, Indian Institute of Technology Madras
  - Aug 2008 - May 2013
  - GPA: 8.77 / 10.0
  - Master Thesis: Multimodal image registration.
  - Advisor: Prof. R Krishna Kumar

3 Employment History

- **Postdoctoral researcher, Computer Science and Artificial Intelligence Laboratory, MIT**
  - July 2022 - June 2024
  - Advisor: Prof. Polina Golland

- **Postdoctoral researcher, Biomedical Image Computing Group, ETH Zurich**
  - April 2022 - June 2022
  - Advisor: Prof. Ender Konukoglu

- **PhD in Medical Image Analysis, Biomedical Image Computing Group, ETH Zurich**
  - July 2017 - March 2022
  - Advisor: Prof. Ender Konukoglu

- **Senior Electrical Engineer at Philips Healthcare R&D Centre (Pune, India)**
  - July 2013 - May 2015
  - Advisor: Ajit Abhyankar

4 Grants

- Swiss National Science Foundation (SNSF) Postdoc Mobility 2 year grant (CHF 106,000)

5 Supervision of Junior Researchers

- Master's Theses (duration: 6 months)
  - Konstantinos Skovolas (co-supervised with Dr. Xiaoran Chen, Dr. Shadi Albarqouni, Prof. Ender Konukoglu)
    Domain Adaptation in Unsupervised anomaly detection in structural MRIs.
  - Aris Mukherjee (co-supervised with Georg Brunner, Prof. Ender Konukoglu)
    Out-of-Distribution Robustness in Transformer Architectures for Medical Image Analysis.
  - Pol Peiffer (co-supervised with Dr. Xiaoran Chen, Prof. Ender Konukoglu)
    Unsupervised anomaly detection in 4D flow MRIs of the aorta using variational autoencoders
  - Nicolas Blondel (co-supervised with Prof. Ender Konukoglu)
    CNN-based aorta segmentation from 4D flow MRIs without ground truth labels
  - Yigit Baran Can (co-supervised with Dr. Christian Baumgartner, Prof. Ender Konukoglu)
    Robust segmentation of multimodal MRIs with missing modalities
- Semester Theses (duration: 7 weeks)
  - Zhexin Wu (co-supervised with Dr. Krishna Chaitanya, Prof. Ender Konukoglu)
    Effects of Semi-Supervised Learning and Meta-Learning in Domain Generalization
  - Simin Fei (co-supervised with Dr. Ertunc Erdil, Prof. Ender Konukoglu)
    Test-time adaptation with empirical Gaussian prior under domain shift
  - Carina Fuss (co-supervised with Dr. Ertunc Erdil, Prof. Ender Konukoglu)
    Test-time training for cross-scanner robustness in deep learning based medical image segmentation
  - Silvan Borghi (co-supervised with Dr. Christian Baumgartner, Prof. Ender Konukoglu)
    Coping with missing input features in deep learning
  - Lin Zhang (co-supervised with Dr. Christine Tanner, Prof. Ender Konukoglu)
    Explicit motion prediction during deep interpolation
- Research Assistants
  - Hande Harputluoglu (co-supervised Prof. Ender Konukoglu)
    Software containerization and compatibility across code developed in a multi-group project

6 Teaching Activities

- Lecturer
  - Medical Image Analysis, ETH Zurich (Spring semesters 2020, 2021, 2022)
    * Co-taught with Prof. Ender Konukoglu, Prof. Mauricio Reyes
    * Gave lectures on deep learning and its applications in medical image analysis. [Recordings]
- Teaching Assistant
  - Summer School on Biomedical Imaging, ETH Zurich (Sept 2019 - Sept 2020) [Link]
  - Image Analysis and Computer Vision, ETH Zurich (Sept 2017 - Jan 2019) [Link]
  - Advanced Machine Learning, ETH Zurich (Sept 2016 - Jan 2017) [Link]

7 Scientific Reviewing Activity

Scientific reviewing activity

- Journals
  - IEEE Transactions on Medical Imaging (TMI) (2020, 2021, 2022)

- Elsevier Medical Image Analysis (2021, 2022)
  - Elsevier NeuroImage (2022)
- Conferences
  - Medical Image Computing and Computer Assisted Surgery (MICCAI) (2019, 2020, 2021)
  - Medical Imaging and Deep Learning (MIDL) (2019, 2020)
- Workshops
  - ICML Workshop Interpretable Machine Learning in Healthcare (2022)
  - Medical Imaging meets Neural Information Processing Systems (MED-NeurIPS) (2019, 2020)
  - ICLR Workshop Rethinking ML Papers Exhibit and Workflow (2021)

8 Prizes, Awards

- MICCAI 2020 Outstanding Reviewer Acknowledgement
- MICCAI 2018 Student Travel Award (500 Euros)
- Awarded a Medal for Best Academic Performance in the Department at IIT Madras (2009-10)

9 Personal Skills

- Languages: English, German (intermediate), Indian languages - Hindi, Marathi, Gujarati, Kutchi (native).
- Digital competences
  - Programming languages: Python, Matlab, C++
  - Frameworks: Tensorflow, PyTorch, ITK, VTK
  - Other tools: Git, Latex