Aneesh Rangnekar

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EDUCATION

Rochester Institute of Technology, *Ph.D. Imaging Science* — *August 2015 - August 2022*
Thesis: Learning Representations in the hyperspectral domain in aerial imagery
Advisors: Dr. Matthew Hoffman, Dr. Christopher Kanan, Dr. Emmett Ientilucci

Rochester Institute of Technology, *M.S. Electrical Engineering* — *August 2013 - August 2015*
Advisor: Dr. Eli Saber

EXPERIENCE

Memorial Sloan Kettering Cancer Center, *Research Fellow* — *August 2022 – Present*
- Curated large-scale clinical imaging datasets and developed self-supervised pretraining pipelines for 2D and 3D transformer-based architectures on the team led by Dr. Harini Veeraraghavan
- Development of classification and segmentation models across multiple cancer types using standalone and multimodal vision-language architectures; collaborated closely with radiation oncologists, medical physicists, and neuro-oncologists to align models with clinical workflows
- Led development of out-of-distribution detection and sparsity formulation techniques for safe and efficient clinical deployment of our methods to medical data collected by other hospitals
- Students mentored: Jorge T Gomez, Nishant Nadkarni, Shiqin Tan

SRI International, *Research Intern* — *Summer 2018*
- Modified and fine-tuned Faster RCNN object detection pipeline for infrared imagery under limited data constraints
- Designed continual self-supervised approaches for object counting in aerial imagery with efficient data labeling

Conduent Labs, *Software Research Intern* — *Summer 2017*
- Built GAN-based models with categorical conditioning to enhance synthetic vehicle occupancy imagery to improve automated passenger counting at toll booths

Rochester Institute of Technology, *Graduate Research Assistant* — *May 2016 - August 2022*
- Curated large-scale hyperspectral remote sensing datasets and designed self-supervised learning algorithms to extract meaningful representations for labeled data fine-tuning
- Developed semi-supervised learning frameworks for enhancing segmentation accuracy in natural and remote sensing imagery
- Students mentored: Henry Ye, Varun Mondaiyka, Parikshit Shembekar

Hewlett Packard, *Software Engineering Intern* — *Summer 2015*
- Developed demosaicing algorithms for improved color scanning speeds with trade-off efficiency [US Patent App]

PUBLICATIONS

Pre-prints in Submission / Under Preparation

1. **A Rangnekar**, H Veeraraghavan. Bootstrapping masked image modeling with patch clustering improves self-supervised medical imaging.

2. **A Rangnekar**, H Veeraraghavan. Self-supervision boosts medical image segmentation — but what about OOD detection?

3. J Jiang, **A Rangnekar**, C Choi, H Veeraraghavan. Self-distilled masked attention guided masked image modeling with noise regularized teacher (SMART) for medical image analysis. [Link]

4. **A Rangnekar**, N Mankuzhy, J Willmann, C Choi, A Wu, M Thor, A Rimner, H Veeraraghavan. Pretrained hybrid transformer for generalizable cardiac substructures segmentation from contrast and non-contrast CTs in lung and breast cancers. [Link]

5. M Kayser, M Gridnev, W Wang, M Bain, **A Rangnekar**, A Chatterjee, A Petrov, H Veeraraghavan, N Swinburne. brat: Aligned multi-view embeddings for brain MRI analysis. [Link]

6. **A Rangnekar**, K Boehm, E Aherne, I Nikolovski, N Gangai, Y Liu, D Zamarin, K Roche, S Shah, Y Lakhman, H Veeraraghavan. Continual pretraining of medical foundation models helps combat noisy labels: a study on ovarian cancer tumor auto-segmentation. [Link]

Accepted Peer Reviewed Journal, Conference and Workshop Papers

7. **A Rangnekar**, N Nadkarni, J Jiang, H Veeraraghavan. Quantifying uncertainty in lung cancer segmentation with foundation models applied to mixed-domain datasets. *SPIE Medical Imaging*, 2025. [Link]

8. JT Gomez, **A Rangnekar**, H Williams, HM Thompson, J Garcia-Aguilar, J Smith, H Veeraraghavan. Swin transformers are robust to distribution and concept drift in endoscopy-based longitudinal rectal cancer assessment. *SPIE Medical Imaging*, 2025. [Link]

9. J Jiang, **A Rangnekar**, H Veeraraghavan. Self-supervised learning improves robustness of deep learning lung tumor segmentation models to CT imaging differences. *Medical Physics*, 2025. [Link]

10. J Jiang, **A Rangnekar**, H Veeraraghavan. Co-distilled attention guided masked image modeling with noisy teacher for self-supervised learning on medical images. *International Conference on Medical Imaging with Deep Learning (MIDL)*, 2025. [Link]

11. F Reinders, M Savenije, M de Ridder, M Maspero, P Doornaert, C Terhaard, C Raaijmakers, K Zakeri, N Lee, E Aliotta, **A Rangnekar**, H Veeraraghavan, M Philippens. Automatic segmentation for magnetic resonance imaging guided individual elective lymph node irradiation in head and neck cancer patients. *Physics and Imaging in Radiation Oncology*, 2024. [Link]

12. H Williams, HM Thompson, C Lee, **A Rangnekar**, JT Gomez, M Widmar, I Wei, E Pappou, G Nash, M Weiser, P Paty, J Smith, H Veeraraghavan, J Garcia-Aguilar. Assessing endoscopic response in locally advanced rectal cancer treated with total neoadjuvant therapy: development and validation of a highly accurate convolutional neural network. *Annals of Surgical Oncology*, 2024. [Link]

13. **A Rangnekar**, J Jiang, H Veeraraghavan. 3D Swin transformer for partial medical auto segmentation. *Challenge on Fast and Low-Resource Semi-supervised Abdominal Organ Segmentation, MICCAI*, 2023. [Link]

14. MJ Hoffman, **A Rangnekar**, Z Mulhollan, A Vodacek. DDDAS-based remote sensing. *Book Chapter: Handbook of Dynamic Data Driven Applications Systems*, Volume 2, 2023. [Link]

15. **A Rangnekar**, C Kanan, MJ Hoffman. Semantic segmentation with active semi-supervised learning. *Winter Conference on Applications of Computer Vision (WACV)*, 2023. [Link]

16. **A Rangnekar**, C Kanan, MJ Hoffman. Semantic segmentation with active semi-supervised representation learning. *British Machine Vision Conference (BMVC)*, 2022. [Link]

17. **A Rangnekar**, E Ientilucci, C Kanan, MJ Hoffman. SpecAL: Towards active learning for semantic segmentation of hyperspectral imagery. *International Conference on Dynamic Data Driven Applications Systems*, 2022. [Link]

18. **A Rangnekar**, Z Mulhollan, A Vodacek, MJ Hoffman, A Sappa, E Blasch, J Yu, L Zhang, S Du, H Chang, K Lu, Z Zhang, F Gao, Y Yu, F Shuang, L Wang, Q Ling, P Shyam, KJ Yoon, KS Kim. Semi-supervised hyperspectral object detection challenge results - PBVS 2022. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) workshops*, 2022. [Link]

19. **A Rangnekar**, Y Yao, MJ Hoffman, A Divakaran. Fine-tuning for one-look regression vehicle counting in low-shot aerial datasets. *International Conference on Pattern Recognition (ICPR)*, 2021. [Link]

20. **A Rangnekar**, N Mokashi, E J Ientilucci, C Kanan, MJ Hoffman. AeroRIT: A new scene for hyperspectral image analysis. *IEEE Transactions on Geoscience and Remote Sensing*, 2020. [Link]

21. **A Rangnekar**, E J Ientilucci, C Kanan, MJ Hoffman. Uncertainty estimation for semantic segmentation of hyperspectral imagery. *International Conference on Dynamic Data Driven Applications Systems*, 2020. [Link]

22. Z Mulhollan, **A Rangnekar**, T Bauch, MJ Hoffman, A Vodacek. Calibrated vehicle paint signatures for simulating hyperspectral imagery. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, 2020. [Link]

23. B Uzkent, **A Rangnekar**, MJ Hoffman. Tracking in aerial hyperspectral videos using deep kernelized correlation filters. *IEEE Transactions on Geoscience and Remote Sensing*, 2018. [Link]

24. B Uzkent, **A Rangnekar**, MJ Hoffman. Aerial vehicle tracking by adaptive fusion of hyperspectral likelihood maps. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops*, 2017. [Link]

Abstracts and Posters at Medical Conferences

25. **A Rangnekar**, N Mankuzhy, M Thor, A Wu, A Rimner, H Veeraraghavan. Foundation models with balanced data sampling enhance auto-segmentation for cardiac substructures. *AAPM Annual Meeting*, 2025. [Link]

26. C Choi, J Jiang, **A Rangnekar**, N Mankuzhy, Y Cho, J Kim, A Rimner, M Thor, J Deasy, A Wu, H Veeraraghavan. Multimodal framework for predicting radiation-induced severe acute esophagitis in esophageal cancer. *AAPM Annual Meeting*, 2025. [Link]

27. S Tan, J Jiang, **A Rangnekar**, H Veeraraghavan. Integrating multiple modalities with pretrained Swin foundation model for head and neck tumor segmentation. *AAPM Annual Meeting*, 2025. [Link]

28. NF Silverio, A Couwenberg, **A Rangnekar**, H Veeraraghavan, T Janssen. Zero-shot auto-segmentation of rectal cancer CTV for MRI-guided online adaptive radiotherapy prompted with pre-treatment delineations. *Radiotherapy and Oncology*, 2025. [Link]

29. **A Rangnekar**, N Nadkarni, J Jiang, H Veeraraghavan. Robustness of pretrained transformers on lung cancer segmentation with computed tomography scans. *AAPM Annual Meeting*, 2024. [Link]

30. **A Rangnekar**, J Jiang, H Veeraraghavan. Enhancing Swin transformer with semantic attention for explainable prediction: a case study with lung cancer CT images. *AAPM Annual Meeting*, 2024. [Link]

31. **A Rangnekar**, NP Mankuzhy, M Thor, A Rimner, H Veeraraghavan. Balancing prevalence of contrast and non-contrast computed tomography examples in a limited set and training transformer-based great vessel segmentation. *International Journal of Radiation Oncology, Biology, Physics*, 2024. [Link]

32. J Jiang, **A Rangnekar**, S Elguindi, L Cervino, J Moran, J Deasy, H Veeraraghavan. Organs at risk segmentations using foundational models. *AAPM Annual Meeting*, 2023. [Link]

TEACHING EXPERIENCE

- Guest lecture: "Semantic Segmentation" for graduate course of Dr. Christopher Kanan   Dec 2021
- Guest lecture: "Transformers for vision" for graduate course of Dr. Emmett Ientilucci   Dec 2021
- Guest lecture: "Transformers for vision" for graduate course of Dr. Emmett Ientilucci   Dec 2020
- Guest lecture: "Reinforcement learning" for graduate course of Dr. Emmett Ientilucci   Dec 2020
- Guest lecture: "Reinforcement learning" for graduate course of Dr. Christopher Kanan   Dec 2016
- Teaching assistant: Linear and Fourier methods for imaging   Spring 2016
- Guest lecture: "Reinforcement learning" at PARC, Xerox   Dec 2016
- Teaching assistant: Introduction to computing and control   Fall 2015
- Teaching assistant: Advanced engineering mathematics   Fall 2014

REVIEWER

- Journals: Medical Physics and IEEE Transactions on Geoscience and Remote Sensing
- Conferences: IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), IEEE/CVF International Conference on Computer Vision (ICCV), European Conference on Computer Vision (ECCV), IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), and International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)

TECHNICAL SKILLS

- Languages: Python, C++, MATLAB
- Frameworks and packages: PyTorch, JAX, OpenCV