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. Random forest-based out-of-distribution detection for robust lung cancer segmentation. [Link]
2. 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]
3. **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. [**Under review**] [Link]
4. **A Rangnekar**, K Boehm, E Aherne, I Nikolovski, N Gangai, Y Liu, D Zamarin, K Roche, S Shah, Y Lakhman, H Veeraraghavan. Medical foundation models helps combat noisy labels: a study on ovarian cancer tumor autosegmentation. [**Under review**] [Link]

Accepted Peer Reviewed Journal, Conference and Workshop Papers

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]
Winter Conference on Applications of Computer Vision (WACV), 2026.

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

7. 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. [Link]
SPIE Conference on Medical Imaging, 2025.

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

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

10. 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. [Link]
Journal of Physics and Imaging in Radiation Oncology, 2024.

11. 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. [Link]
Annals of Surgical Oncology, 2024.

12. **A Rangnekar**, J Jiang, H Veeraraghavan. 3D Swin transformer for partial medical auto segmentation. [Link]
International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) Workshops, 2023.

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

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

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

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

17. **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. [Link]
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, 2022.

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

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

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

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

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

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

Abstracts and Posters at Medical Conferences

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

25. 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. [Link]
AAPM Annual Meeting, 2025.

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

27. 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. [Link]
Radiotherapy and Oncology, 2025.

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

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

30. **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. [Link]
International Journal of Radiation Oncology, Biology, Physics, 2024.

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

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