

Raghav Mehta

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RESEARCH INTEREST

Image Analysis (Medical Imaging, Computer Vision) & Machine Learning (Deep Learning, Bayesian Deep Learning, Causal Learning, Fair and Trustworthy AI)

EDUCATION

Ph.D., Electrical and Computer Engineering

Sep. 2017 – July 2023

McGill University

Montreal, Canada

- **Thesis:** Integrating Bayesian Deep Learning Uncertainties in Medical Image Analysis
- **Advisor:** Prof. Tal Arbel

M.S. by Research, Electronics and Communication Engineering

Aug. 2014 – July 2017

International Institute of Information Technology - Hyderabad (IIIT-H)

Hyderabad, India

- **Thesis:** Population specific template construction and brain structure segmentation using deep learning methods
- **Advisor:** Prof. Jayanthi Sivaswamy

B.E., Electronics Engineering

July 2010 – May 2014

Gujarat Technological University (GTU)

Ahmedabad, India

- **Thesis:** Smart Washing Machine using Fuzzy Logic Control System
- **Advisors:** Prof. Vithal N. Kamat and Prof. D. M. Patel

RESEARCH EXPERIENCE

Imperial College London

Feb. 2024 – Present

Research Associate (PostDoc)

London, UK

- **PI:** Prof. Ben Glocker
- Working on Responsible AI (Uncertainty, Fairness, and Causality) for Medical Image Analysis.
- Part of AI-POD project (Building Trustworthy tools to predict cardiovascular disease).
- Mentoring 1 master's and 1 PhD student.

Meta Inc.

July 2022 – Dec. 2022

Research Scientist Intern

Menlo Park, USA

- **Supervisors:** Dr. Ivan Evtimov and Dr. Tal Hassner
- Worked on robustness and fairness of foundational models. Developed new learning strategies for improving robustness to spurious correlations and improving fairness.
- Led to two publications in ECCV 2022 and ICCV 2023 workshops.

McGill University & MILA AI Institute

Sep. 2017 – Aug. 2023

Graduate Research Assistant

Montreal, Canada

- Worked on Bayesian Deep Learning techniques for medical image analysis on real-world clinical neuroimaging datasets.
- Led to 15 publications including 8 first-author papers.
- Mentored 2 master's thesis.

International Institute of Information Technology - Hyderabad (IIIT-H)

Jan. 2015 – July. 2017

Graduate Research Assistant

Hyderabad, India

- Worked on machine learning techniques for neuroimage analysis.
- Led to 5 publications including 3 first-author papers.
- Worked on a prestigious project on constructing an Indian human brain MR atlas for the young population, which was covered by various news outlets in India [Ex. Zee News, The Hindu, India Today].

TEACHING EXPERIENCE

McGill University

Sep. 2019 – Apr. 2022

Graduate Teaching Assistant

Montreal, Canada

- Worked as a Teaching Assistant for six semesters (Fall 2019, Winter 2020, Fall 2020, Winter 2021, Fall 2021, Winter 2022) for the course on Introduction to Computer Vision.
- Delivered tutorials, designed assignments, and projects.
- **Lecturers:** Prof. Tal Arbel and Prof. James J. Clark

International Institute of Information Technology - Hyderabad (IIIT-H)

Aug. 2016 – Nov. 2016

Graduate Teaching Assistant

Hyderabad, India

- Worked as a Teaching Assistant for the course on Medical Image Processing.
- Delivered tutorials, designed assignments, and projects.
- **Lecturer:** Prof. Jayanthi Sivaswamy

AWARDS

Best Paper Award

- FAIMI workshop MICCAI-2023: Best Oral Presentation Paper
- MICCAI 2023: Top-10 paper (STAR award)
- DART workshop MICCAI-2021: Best paper award
- UNSURE workshop MICCAI-2019: Best paper award

Outstanding Reviewer

- MIDL 2024 – One of 26 review awardees out of a total of 300 reviewers.
- MIDL 2022 – One of 23 review awardees out of a total of 200 reviewers.
- MIDL 2021 – One of 9 review awardees out of a total of 200 reviewers.

Academics

- Best Departmental Ph.D. thesis at Electrical and Computer Engineering, McGill University

Scholarships and Travel Grants

- UNIQUE travel grant to attend MIDL 2024 conference in Nashville, USA. (Selective)
- MEITA Scholarship – McGill Engineering International Doctoral Award, 2017-2020. (Selective)
- GREAT Travel Award 2018/19 - McGill University to attend MICCAI-2018. (Selective)
- GMA Travel Award 2018/19 - McGill University to attend Summer School on Deep Learning And Bayesian Methods - DeepBayes 2018. (Selective)
- Financial Aid for Research Assistantship at IIIT-Hyderabad - Funded by the prestigious Department of Science and Technology, Govt. of India, under Grant SR/CSRI/194/2013(G).

PRESS

Construction of 1st Indian Human Brain MR Atlas

- **India Today:** Indians have smallest brains in the world, reveals IIIT-Hyderabad study after creating brain atlas
- **The Hindu:** Indian brain is smaller': IIIT-Hyderabad researchers create Indian Brain Atlas
- **Zee News:** IIIT-H researchers create first-ever Indian Brain Atlas
- **Times Now:** IIIT Hyderabad researchers create first-ever Indian Brain Atlas: What is it?
- **GeoNews:** Indians have smallest brains in the world: research
- **The Economic Times:** Indians have smaller brains compared to Caucasians and Chinese: Study
- **Business Today:** Indian brain size is smaller! Hyderabad researchers make remarkable finding

PUBLICATIONS (👉):

- Published in the top Journals and Conferences.
- Total articles published: **20+** in 10 years of research in Machine Learning and Medical Image Analysis.
- Total Citations: **650+** with H-Index: 13

Under Preparation

1. A. Kumar, **R. Mehta**, N. Fathi, B. Nichyporuk, J.P. Falet, S. Tsaftaris, T. Arbel.
Debias & Explain: Discovering Unbiased and Fair Image Markers Via Counterfactual Image Generation.
IEEE Transactions on Medical Imaging (TMI) journal.
2. M. Roschewitz, **R. Mehta**, C. Jones, B. Glocker.
Automatic dataset shift identification to support root cause analysis of AI performance drift.
Nature Medicine.

Peer Reviewed Journals Publications

1. B. Nichyporuk, J. Cardinell, J. Szeto, **R. Mehta**, J.P. Falet, D. Arnold, S. Tsaftaris, T. Arbel.
Rethinking Generalization: The Impact of Annotation Style on Medical Image Segmentation
Machine Learning for Biomedical Imaging (MELBA) journal.
2. **R. Mehta**, A. Filos, U. Baid, ..., S. Bakas, Y.Gal, T. Arbel.
QU-BraTS: MICCAI BraTS 2020 Challenge on Quantifying Uncertainty in Brain Tumor Segmentation - Analysis of Ranking Metrics and Benchmarking Results.
Machine Learning for Biomedical Imaging (MELBA) journal.
3. **R. Mehta**, T. Christinck, T. Nair, A. Bussy, S. Premasiri, M. Constantino, M. Chakravarty, D. Arnold, Y. Gal, T. Arbel.
Propagating Uncertainty Across Cascaded Medical Imaging Tasks for Improved Deep Learning Inference.
IEEE Transactions on Medical Imaging (TMI), September 2021. (IF: 10.04)
4. J. Sivaswamy, A. Thottupattu*, **R. Mehta***, R. Sheelakumari, C. Keshavdas.
Construction of Indian Human Brain Atlas.
Neurology India Journal, 2019. (IF: 2.17)
5. **R. Mehta**, A. Majumdar, J. Sivaswamy.
BrainSegNet: a convolutional neural network architecture for automated segmentation of human brain structures.
SPIE Journal of Medical Imaging (JMI), 2017. (IF: 3.61)

Peer Reviewed Conferences Publications

1. C. Shui*, J. Szeto*, **R. Mehta**, D. L. Arnold, T. Arbel.
Mitigating Calibration Bias Without Fixed Attribute Grouping for Improved Fairness in Medical Imaging Analysis
Medical Image Computing and Computer Assisted Intervention (MICCAI) conference 2023.
(Early Acceptance - Top 15%)
2. J. Durso-Finely, J. P. Falet, **R. Mehta**, D. L. Arnold, N. Pawlowski, T. Arbel.
Improving Image-Based Precision Medicine with Uncertainty-Aware Causal Models
Medical Image Computing and Computer Assisted Intervention (MICCAI) conference 2023.
(Shortlisted for MICCAI Best Paper Award – top 1%)

3. **R. Mehta**, C. Shui, T. Arbel.
Evaluating the Fairness of Deep Learning Uncertainty Estimates in Medical Image Analysis
Medical Imaging with Deep Learning (MIDL) conference 2023.
4. S. Vadacchino, **R. Mehta**, N.M. Sepahvand, B. Nichyporuk, J. Clark, T. Arbel.
HAD-Net: A Hierarchical Adversarial Knowledge Distillation Network for Improved Enhanced Tumour Segmentation Without Post-Contrast Images
Medical Imaging with Deep Learning (MIDL) conference 2021.
5. **R. Mehta**, A. Filos, Y. Gal, T. Arbel.
Uncertainty Evaluation Metric for Brain Tumour Segmentation
Medical Imaging with Deep Learning (MIDL) conference 2020.
Short Paper Oral Presentation
6. **R. Mehta**, J. Sivaswamy.
M-net: A Convolutional Neural Network for deep brain structure segmentation.
IEEE International Symposium on Biomedical Imaging (ISBI) 2017
Oral Presentation (Acceptance Rate: **20%**)
7. **R. Mehta**, J. Sivaswamy.
A hybrid approach to tissue-based intensity standardization of brain MRI images.
IEEE International Symposium on Biomedical Imaging (ISBI) 2016

Peer Reviewed Workshops Publications

1. A. Kumar, N. Fathi, **R. Mehta**, B. Nichyporuk, J. P. Falet, S. Tsaftaris, T. Arbel.
Debiasing Counterfactuals In the Presence of Spurious Correlations
Fairness of AI in Medical Imaging (FAIMI) Workshop
Medical Image Computing and Computer Assisted Intervention (MICCAI) conference 2023
(Best oral presentation award) – Oral Presentation
2. V. Albiero, **R. Mehta**, I. Evtimov, S. Bell, L. Sagun, A. Markosyan.
Confusing Large Models by Confusing Small Models
Out Of Distribution Generalization in Computer Vision (OOD-CV) Workshop
International Conference on Computer Vision (ICCV) 2023
Oral Presentation
3. **R. Mehta**, V. Albiero, L. Chen, I. Evtimov, T. Glaser, Z. Li, T. Hassner.
You Only Need a Good Embeddings Extractor to Fix Spurious Correlations
Responsible Computer Vision (RCV) workshop
European Conference on Computer Vision (ECCV) 2022
Oral Presentation.
4. **R. Mehta**, C. Shui, B. Nichyporuk, T. Arbel.
Information Gain Sampling for Active Learning in Medical Image Classification
Uncertainty for Safe Utilization of Machine Learning in Medical Imaging (UNSURE)
Medical Image Computing and Computer Assisted Intervention (MICCAI) conference 2022
5. B. Nichyporuk, J. Cardinell, J. Szeto, **R. Mehta**, D. Arnold, S. Tsaftaris, T. Arbel.
Cohort Bias Adaptation in Aggregated Datasets for Lesion Segmentation
Domain Adaptation and Representation Transfer (DART) 2021 workshop
Medical Image Computing and Computer Assisted Intervention (MICCAI) conference 2021
(Best paper award) – Oral Presentation

6. **R. Mehta***, T. Christinck*, T. Nair, P. Lemaitre, D. Arnold, T. Arbel.
Propagating Uncertainty Across Cascaded Medical Imaging Tasks for Improved Deep Learning Inference
Uncertainty for Safe Utilization of Machine Learning in Medical Imaging (UNSURE)
Medical Image Computing and Computer Assisted Intervention (MICCAI) conference 2019
(Best paper award) – Oral Presentation
7. B. Kaur, P. Lemaitre, **R. Mehta**, N.M. Sepahvand, D. Precup, D. Arnold, T. Arbel.
Improving Pathological Structure Segmentation Via Transfer Learning Across Diseases
Domain Adaptation and Representation Transfer learning (DART) workshop
Medical Image Computing and Computer Assisted Intervention (MICCAI) 2019
Oral Presentation
8. **R. Mehta**, T. Arbel.
RS-Net: Regression-Segmentation 3D CNN for Synthesis of Full Resolution Missing Brain MRI in the Presence of Tumours
Simulation and Synthesis in Medical Imaging (SASHIMI) workshop
Medical Image Computing and Computer Assisted Intervention (MICCAI) 2018
Oral Presentation
9. A. Majumdar*, **R. Mehta***, J. Sivaswamy.
To Learn or Not to Learn Features for Deformable Registration?
Deep Learning Fails (DLF) workshop
Medical Image Computing and Computer Assisted Intervention (MICCAI) 2018
Oral Presentation

International Conference Challenge (Benchmarks) Proceedings

1. **R. Mehta**, T. Arbel.
3D U-net for Brain Tumour Segmentation
Multimodal Brain Tumour Segmentation (BraTS) challenge 2018
Medical Image Computing and Computer Assisted Intervention (MICCAI) conference 2018
2. A. Kriz, **R. Mehta**, B. Nichyporuk, T. Arbel.
Exploring Compound Loss Functions for Brain Tumor Segmentation
Multimodal Brain Tumour Segmentation (BraTS) challenge 2023
Medical Image Computing and Computer Assisted Intervention (MICCAI) conference 2023

Refereed Short Paper Contributions

1. **R. Mehta**, T. Arbel.
RS-Net: Regression-Segmentation 3D CNN for Synthesis of Full Resolution Missing Brain MRI in the Presence of Tumours
Workshop on Medical Imaging meets NeurIPS (Med-NeurIPS) – NeurIPS 2018.

ArXiv Preprint

1. J. Sivaswamy, A. Thottupattu*, Mythri V.*, **R. Mehta**, R. Sheelakumari, C. Keshavdas.
Sub-cortical structure segmentation database for young population.
arXiv preprint arXiv:2111.01561, 2021
2. S. Bakas, M. Reyes, ..., T. Arbel, ..., **R. Mehta**, ..., B. Menze.
"Identifying the Best Machine Learning Algorithms for Brain Tumor Segmentation, Progression Assessment, and Overall Survival Prediction in the BRATS Challenge"
arXiv preprint arXiv:1811.02629, 2018

Organizing Committee

- UNSURE workshop (Uncertainty for Safe Utilization in Medical Imaging)
 - MICCAI 2022
 - MICCAI 2023
 - MICCAI 2024
- QU-BraTS challenge (Quantification of Uncertainty in Brain Tumour Segmentation)
 - MICCAI 2019
 - MICCAI 2020

Session Chair

- Medical Imaging and Deep Learning (MIDL) 2021

Area Chair

- Medical Imaging and Deep Learning (MIDL) 2025

Technical Reviewer

- CVPR: Computer Vision and Pattern Recognition conference 2024-2025
- MIDL: Medical Imaging and Deep Learning conference 2020-2025
- MICCAI: Medical Imaging Computing and Computer Assisted Intervention conference 2020-2024
- NeurIPS: Neural Information Processing Systems conference 2022
- ICLR: International Conference on Learning Representations 2022
- MedIA: Medial Image Analysis Journal 2022
- MELBA: The Journal of Machine Learning for Biomedical Imaging 2021-2024
- TMI: Transactions on Medical Imaging 2019-2020
- TUFFC: Transactions on Ultrasonics, Ferroelectrics, and Frequency Control 2020
- FN: Frontiers of NeuroImaging journal. 2020
- NI: Elsevier NeuroImage journal 2021

Miscellaneous

- Lab Head during the Fair Federated AI (FIFAI) Summer School. 2024
- Lab coordinator during the 1st Machine Learning Summer School at IIIT-Hyderabad. 2017

Industry Collaboration and Software License:

- Automatic Segmentation of Healthy Tissues and Tumours in Patient Brain Images using 3D Fully Convolutional Neural Networks. McGill University & Synaptive Medical Inc.

INVITED TALKS

- *Explainable AI and its application in Healthcare* Sep. 2023
Nirma University, Ahmedabad, Gujarat, India. Invited By: Prof. Rupal Kapdi
- *Towards Trustworthy AI for Medical Image Analysis* Sep. 2023
GE Healthcare, Bangalore, Karnataka, India. Invited By: Dr. Sudhanya Chatterjee
- *Towards trustworthy machine learning models for medical image analysis* Aug. 2023
Cornell Tech, New York, NY, USA. Invited By: Prof. Mert Sabuncu
- *Towards trustworthy machine learning models for medical image analysis* Aug. 2023
A.A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA. Invited By: Prof. Adrian Dalca

- *Towards trustworthy models for Medical Image analysis* July 2023
Imperial College London, London, UK. Invited By: Prof. Ben Glocker
- *Towards Trustworthy and Fair Medical Image Analysis Models* May 2023
Centre for Visual Information Technology (CVIT) seminar series, International Institute of Information Technology (IIIT) - Hyderabad, India. Invited By: Prof. Jayanthi Sivaswamy
- *Towards Trustworthy and Fair Machine Learning Models: A medical image analysis study* Mar. 2023
Meta Inc., Menlo Park, CA, USA. Invited By: Dr. Tal Hassner
- *Towards Trustworthy and Fair Medical Image Analysis Models* Mar. 2023
John Hopkins University (JHU), Baltimore, MD, USA. Invited By: Arunkumar Kannan
- *Modeling, Propagating, & Evaluating Uncertainties in DL models for Medical Image Analysis* Jan. 2023
Brigham & Women's Hospital, Harvard Medical School, Boston, USA. Invited By: Prof. Yogesh Rathi
- *Modeling & Propagating Uncertainties in ML models for MRI of patients with brain tumour* Apr. 2021
Brain Tumour Research Seminar Series at MNI, Montreal, Canada. Invited By: Theresa Degenhard

STUDENT MENTORSHIP

- Imperial College London** Feb. 2024 – Present
co-supervised with Prof. Ben Glocker
- *Ajay Mittal, M.Eng. Thesis* Nov. 2024 – May 2025
 - Thesis: Semi-Supervised Atlas-ISTN: Joint Segmentation, Registration, and Atlas-Construction of Cardiac CT
 - *Brian Cregan, M.Sc. Thesis* May 2024 – Aug. 2024
 - Thesis: Object Centric Learning for Uncertainty Aware Image Segmentation
 - *Omar Todd, Ph.D. Thesis* Feb. 2024 – Present
 - Thesis: Uncertainty Modeling in Medical Image Analysis
- McGill University** May 2017 – Sep. 2021
co-supervised with Prof. Tal Arbel
- *Saverio Vadacchino, M.Sc. Thesis* May 2020 – Sep. 2021
 - Thesis: Hierarchical Adversarial Knowledge Distillation for Improved Inference with Missing Medical Images
 - Published at MIDL 2021 conference.
 - *Barleen Kaur, M.Sc. Thesis* May. 2017 – Dec. 2019
 - Thesis: Transfer Learning for Focal Pathology Segmentation across Neuro-degenerative Diseases
 - Published at the MICCAI DART 2019 workshop.
- International Institute of Information Technology - Hyderabad (IIIT-H)** Jan. 2016 – July 2017
co-supervised with Prof. Jayanthi Sivaswamy
- *Aabhas Majumdar, M.S. Thesis* Jan. 2016 – July 2017
 - Thesis: A study of Automatic Segmentation of 3-D Brain MRI and its application to Deformable Registration
 - Published at MICCAI DLF 2018 workshop.

TECHNICAL SKILLS

Programming Languages: Python, MATLAB
Libraries: PyTorch, Keras/Tensorflow, OpenCV, Pandas, Scikit-learn
Medical Imaging: FSL, Freesurfer, ANTs