

Kumar Abhishek

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Education

Simon Fraser University

PH.D. IN COMPUTING SCIENCE, GPA: 4.33

- **Advisor:** Prof. Ghassan Hamarneh, Medical Image Analysis Lab
- **Supervisory Committee:** Prof. Manolis Savva, GrUVi Lab

Burnaby, Canada

Summer 2020 - Present

M.Sc. (THESIS) IN COMPUTING SCIENCE, GPA: 4.07

- **Advisor:** Prof. Ghassan Hamarneh, Medical Image Analysis Lab
- **Examination Committee:** Prof. Mark Drew (SFU), Prof. Sandra Avila (University of Campinas, Brazil), Prof. Angel X. Chang (SFU)
- **Thesis:** Input Space Augmentation for Skin Lesion Segmentation in Dermoscopic Images [\[Link\]](#)

Fall 2018 - Spring 2020

Indian Institute of Technology (IIT)

B.TECH. IN ELECTRONICS AND COMMUNICATION ENGINEERING

- **Advisor:** Prof. Prithwijit Guha, Multimedia Analytics Lab
- **Thesis:** Summarization and Visualization of Large Volumes of Broadcast Video Data [\[Link\]](#)

Guwahati, India

Fall 2011 - Spring 2015

Selected Publications

All publications on [Google Scholar](#) | **IF:** Impact factor | *****: Equal contribution | Paper titles are hyperlinks to DOIs.

Journals:

- (j7) [Kumar Abhishek](#), Colin J. Brown, Ghassan Hamarneh, “**Multi-Sample ζ -mixup: Richer, More Realistic Synthetic Samples from a p -Series Interpolant**”, *Journal of Big Data*, 2024. **[IF: 8.1]**
- (j6) Ashish Sinha*, Jeremy Kawahara*, Arezou Pakzad*, [Kumar Abhishek](#), Enjie Ghorbel, Anis Kacem, Djamilia Aouada, Ghassan Hamarneh, “**Derm-Synth3D: Synthesis of in-the-wild Annotated Dermatology Images**”, *Medical Image Analysis*, 2024. **[IF: 13.828]**
- (j5) [Kumar Abhishek](#)*, Zahra Mirikharaji*, Alceu Bissoto, Catarina Barata, Sandra Avila, Eduardo Valle, M. Emre Celebi, Ghassan Hamarneh, “**A Survey on Deep Learning for Skin Lesion Segmentation**”, *Medical Image Analysis*, 2023. **[IF: 13.828]**
- (j4) Mengliu Zhao*, Jeremy Kawahara*, [Kumar Abhishek](#), Sajjad Shamanian, Ghassan Hamarneh, “**Skin3D: Detection and Longitudinal Tracking of Pigmented Skin Lesions in 3D Total-Body Textured Meshes**”, *Medical Image Analysis*, 2022. **[IF: 13.828]**
- (j3) [Kumar Abhishek](#), Jeremy Kawahara, Ghassan Hamarneh, “**Predicting the Clinical Management of Skin Lesions Using Deep Learning**”, *Nature Scientific Reports*, 2021. **[IF: 4.996]** **[Media Coverage: [Massive Science](#), [The Wire Science](#)]**.
- (j2) [Kumar Abhishek](#)*, Saeid Asgari Taghanaki*, Joseph Paul Cohen, Julien Cohen-Adad, Ghassan Hamarneh, “**Deep Semantic Segmentation of Natural and Medical Images: A Review**”, *Springer Artificial Intelligence Review*, 2020. **[IF: 9.588]**
- (j1) Weina Jin, Mostafa Fatehi, [Kumar Abhishek](#), Mayur Mallya, Brian Toyota, Ghassan Hamarneh, “**Artificial Intelligence In Glioma Imaging: Challenges and Advances**”, *Journal of Neural Engineering*, 2020. **[IF: 5.043]**

Conferences and Workshops:

- (c9) [Kumar Abhishek](#), Colin J. Brown, Ghassan Hamarneh, “ **ζ -mixup: Richer, More Realistic Mixing of Multiple Images**”, *Medical Imaging with Deep Learning (MIDL)*, 2023.
- (c8) Arezou Pakzad, [Kumar Abhishek](#), Ghassan Hamarneh, “**CIRCLE: Color Invariant Representation Learning for Unbiased Classification of Skin Lesions**”, *European Conference on Computer Vision (ECCV) ISIC Skin Image Analysis Workshop*, 2022. **[Oral]**
- (c7) Zahra Mirikharaji, [Kumar Abhishek](#), Saeed Izadi, Ghassan Hamarneh, “**D-LEMA: Deep Learning Ensembles from Multiple Annotations – Application to Skin Lesion Segmentation**”, *IEEE International Conference on Computer Vision and Pattern Recognition (CVPR) ISIC Skin Image Analysis Workshop*, 2021. **[Oral]** **[Best Paper Award]**
- (c6) [Kumar Abhishek](#), Ghassan Hamarneh, “**Matthews Correlation Coefficient Loss for Deep Convolutional Networks: Application to Skin Lesion Segmentation**”, *IEEE International Symposium on Biomedical Imaging (ISBI)*, 2021.
- (c5) [Kumar Abhishek](#), Ghassan Hamarneh, Mark S. Drew, “**Illumination-based Transformations Improve Skin Lesion Segmentation in Dermoscopic Images**”, *IEEE International Conference on Computer Vision and Pattern Recognition (CVPR) ISIC Skin Image Analysis Workshop*, 2020. **[Oral]**
- (c4) [Kumar Abhishek](#), Ghassan Hamarneh, “**Mask2Lesion: Mask-Constrained Adversarial Skin Lesion Image Synthesis**”, *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) Workshop on Simulation and Synthesis in Medical Imaging (SASHIMI)*, 2019.
- (c3) Saeid Asgari Taghanaki, [Kumar Abhishek](#), Ghassan Hamarneh, “**Improved Inference via Deep Input Transfer**”, *International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2019. **[Early Accept]**
- (c2) Sorour Mohajerani, Reza Asad, [Kumar Abhishek](#), Neha Sharma, Alysha van Duynhoven, Parvaneh Saeedi, “**CloudMaskGAN: A Content-Aware Unpaired Image-to-Image Translation Algorithm for Remote Sensing Imagery**”, *IEEE International Conference on Image Processing (ICIP)*, 2019.
- (c1) Saeid Asgari Taghanaki, [Kumar Abhishek](#), Shekoofeh Azizi, Ghassan Hamarneh, “**A Kernelized Manifold Mapping to Diminish the Effect of Adversarial Perturbations**”, *IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019.

Manuscripts under review:

Work Experience

Medical Image Analysis Lab, Simon Fraser University

Burnaby, Canada

GRADUATE RESEARCH ASSISTANT

September 2018 - Present

- I have worked on various medical image analysis tasks using deep learning, such as adding robustness to deep learning-based models (c1), input transformation methods to improve prediction performance (c3), leveraging illumination and color imaging-based information (c5), a new loss function (c6) and an ensemble model (c7) for improving segmentation, learning to augment medical image datasets by synthesizing realistic 2D images (c4) and 2D views of 3D scans (u1), augmenting classification datasets (c9, j6), predicting the clinical management decisions for diseases (j3), detecting and tracking skin lesion in 3D whole-body scans (j4), and learning skin-tone independent representations for unbiased skin disease diagnosis (c9). I have also reviewed the literature for semantic segmentation of natural and medical images in general (j2) and of skin lesion images in particular (j5), and artificial intelligence-based applications in medical imaging (j1).

School of Computing Science, Simon Fraser University

Burnaby, Canada

TEACHING ASSISTANT, CMPT 340: BIOMEDICAL COMPUTING

Spring 2021, Summer 2021, Fall 2023, Spring 2024

- Designed questions for weekly assignments and quizzes, marked assignments and final projects, and held office hour sessions for questions and project guidance for four offerings of CMPT 340, an advanced undergraduate course on Biomedical Computing.

Altisource Labs

Bengaluru, India

DATA SCIENTIST

April 2017 - July 2018

- Developed algorithms for document image enhancement, OCR, and information extraction from document images for loan underwriting.
- Developed an automated real estate image tagging platform using deep learning for classification of uploaded images into scene categories.

Wipro Ltd.

Bengaluru, India

MACHINE LEARNING ENGINEER

July 2015 - March 2017

- Worked on fraud detection on internal employee data using big data and machine learning algorithms.
- Worked on several machine learning projects - from building an automated employee ticket handling system to predicting failures in a multi-node Hadoop cluster.

Multimedia Analytics Lab, IIT Guwahati

Guwahati, India

UNDERGRADUATE RESEARCH ASSISTANT (BACHELOR THESIS) | SUPERVISOR: DR. P. GUHA, ASSOC. PROFESSOR, DEPT. OF EEE

August 2014 - March 2015

- Developed a robust news presentation format detector for broadcast video analytics to identify various band elements and their layouts in broadcast news video frames. Evaluated the layout overlap with ground truth using data from recorded news videos of 4 English news channels.

Skills

Programming

Python, MATLAB, Bash

Software

PyTorch, Keras, Lightning, NumPy, SciPy, Scikit-Learn, Pandas, Matplotlib, Seaborn, OpenCV, MySQL, LaTeX, Anaconda, Git

Honors & Awards

PhD Research Fellowship, Simon Fraser University	2023, 2024
Outstanding Reviewer Honorable Mention, MICCAI 2023	2023
Computing Science Diversity Committee Awards Finalist, Simon Fraser University	2023
Graduate Fellowship, School of Computing Science, Simon Fraser University	2018, 2021, 2022, 2023, 2024
Graduate Fellowship, Faculty of Applied Sciences, Simon Fraser University	2022, 2023, 2024
Helmut & Hugo Eppich Family Graduate Scholarship, Faculty of Applied Sciences, Simon Fraser University	2021, 2022, 2023, 2024
Brian J. Blaha Memorial Graduate Scholarship, Faculty of Applied Sciences, Simon Fraser University	2021, 2022, 2023
Best Paper Award, CVPR 2021 ISIC Skin Image Analysis Workshop	2021
Special Graduate Entrance Scholarship, Dean of Graduate Studies, Simon Fraser University	2020
Borden Ladner Gervais Graduate Scholarship, Faculty of Applied Sciences, Simon Fraser University	2019
Winner, Wipro Datathon, a machine learning competition with over 200 teams across all 11 offices of Wipro	2017

Service

Peer Reviewer

- **Journals:** Medical Image Analysis (MedIA), Computer Methods and Programs in Biomedicine (CMPB), Computers in Biology and Medicine (CIBM), Nature Scientific Reports (Nat Sci Rep), Nature Scientific Data (Nat Sci Data), Journal of Nuclear Medicine (JNM), npj Imaging.
- **Conferences and Workshops:** MICCAI, International Skin Imaging Collaboration (ISIC) Skin Image Analysis Workshop, IPMI, MedNeurIPS.

Volunteer Work

- Instructor for UBC Geering Up program for high school students on a hands-on introduction to Teachable Machine (2022).
- Executive Committee member of SFU Computing Science Graduate Student Association (2018–2020).
- Mentor and judge for Technovation Girls BC, an entrepreneurship event for getting 10-18 year old girls interested in STEM fields (2019–2020).