

ABDUL MUNTAKIM RAFI

LinkedIn: 

Google Scholar: 

GitHub: 

ResearchGate: 

CURRENT RESEARCH INTEREST

Deciphering gene regulatory logic using Machine Learning

EDUCATION

DOCTOR OF PHILOSOPHY IN BIOMEDICAL ENGINEERING

2021 - PRESENT

University of British Columbia

Vancouver, Canada

SUPERVISOR: Carl de Boer, Assistant Professor, School of Biomedical Engineering

MASTER OF APPLIED SCIENCE IN ELECTRICAL AND COMPUTER ENGINEERING

2019 - 2021

University of Windsor

Windsor, Canada

SUPERVISOR: Jonathan Wu, Professor, Department of Electrical and Computer Engineering

BACHELOR OF SCIENCE IN ELECTRICAL AND ELECTRONIC ENGINEERING (EEE)

2014 - 2018

Bangladesh University of Engineering and Technology (BUET)

Dhaka, Bangladesh

SUPERVISOR: Md. Kamrul Hasan, Professor, Department of EEE

RESEARCH EXPERIENCE

- Graduate Research Assistant, de Boer Lab** [\[website\]](#) May 2021 - present
School of Biomedical Engineering, The University of British Columbia.
 Pursuing my Ph.D. in biomedical engineering in this lab under the supervision of Professor Dr. Carl de Boer. We are a mixed computational/experimental group. I apply machine learning to understand how the genome is regulated.
- Graduate Research Assistant, Centre for Computer Vision and Deep Learning** [\[website\]](#) Aug 2019 - Mar 2021
Department of Electrical and Computer Engineering, University of Windsor.
 Pursued my Master's in Applied Science degree from this lab under the supervision of Professor Dr. Jonathan Wu. I worked on digital image forensics, biomedical image processing, and social media data analysis. During this time, I published four papers.
- Research Assistant, Digital Signal Processing Research Laboratory** [\[website\]](#) Oct 2018 - Mar 2019
Department of Electrical and Electronic Engineering, BUET.
 Did my undergrad thesis under the supervision of Professor Dr. Md. Kamrul Hasan from this lab. After graduation, I joined the lab as a Research Assistant. I worked on digital image forensics and biomedical image processing. During this time, I published a paper and participated in two international signal processing competitions organized by IEEE.

JOB EXPERIENCE

- Graduate Teaching Assistant, Master of Data Science, UBC** Sep 2021 - present
 Joined UBC's Master of Data Science program as a full-time teaching assistant in Fall 2021 and continued working here. Courses I TAed here are Supervised Learning II, Statistical Inference and Computation II, Web and Cloud Computing, Data Science Workflows, Algorithms and Data Structures, and Computing Platforms for Data Science.
- Graduate Teaching Assistant, Biology Program, UBC** May 2022 - June 2022
 Joined UBC's Biology program as a full-time teaching assistant for the Summer 2022 term in the course Fundamentals of Genetics.
- Mitacs Accelerate Intern, Lanner Electronics Inc.** [\[lanner\]](#) Nov 2020 - Mar 2021
 Joined Lanner through the Mitacs Accelerate, which is Canada's premiere research internship program. I worked on the efficient inference of different AI-driven applications in edge devices.
- Graduate Teaching Assistant, ECE Department, University of Windsor** Jan 2020 - Dec 2020
 Worked as a graduate teaching assistant for the courses Engineering Software Fundamentals and Computational Intelligence.
- Deep Learning Engineer, IFIVEO** [\[i-50\]](#) Oct 2019 - Apr 2020
 Joined IFIVEO through the Mitacs Accelerate. Here, my task was to perform activity recognition to measure and improve manufacturing floor production processes using deep learning based vision systems. I collected data from manufacturing floors, supervised the annotation process, and deployed deep learning models using Amazon SageMaker.
- Machine Learning Engineer, REVE Systems Ltd.** Mar 2019 - July 2019
 Worked on designing a real-time Sign2Text translator for Bangla Sign Language.

LIST OF PUBLICATIONS

- Ishika Luthra, Xinyi E Chen, Cassandra Jensen, **Abdul Muntakim Rafi**, Asfar Lathif Salaudeen, Carl G de Boer, “Biochemical activity is the default DNA state in eukaryotes”. [\[preprint\]](#)
- Dmitry Penzar, Daria Nogina, Georgy Meshcheryakov, Andrey Lando, **Abdul Muntakim Rafi**, Carl de Boer, Arsenii Zinkevich, Ivan V Kulakovskiy, “LegNet: resetting the bar in deep learning for accurate prediction of promoter activity and variant effects from massive parallel reporter assays”. [\[preprint\]](#)
- Nicholas Mateyko, Omar Tariq, Xinyi E Chen, Will Cheney, Asfar Lathif Salaudeen, Ishika Luthra, Najmeh Nikpour, **Abdul Muntakim Rafi**, Hadis Kamali Deghan, Cassandra Jensen, Carl de Boer, “GIL: A Python package for designing custom indexing primers”. [\[preprint\]](#)
- **Abdul Muntakim Rafi**, Thamidul Islam Tonmoy, Uday Kamal, Q.M. Jonathan Wu, Md. Kamrul Hasan, “RemNet: Remnant Convolutional Neural Network for Camera Model Identification”, published in **Neural Computing And Applications** 2021. [\[SpringerLink\]](#)
- Uday Kamal, **Abdul Muntakim Rafi**, Rakibul Hoque, Jonathan Wu, Md. Kamrul Hasan, “Lung Cancer Tumor Region Segmentation Using Recurrent 3D-DenseUNet”, accepted at The Second International Workshop on Thoracic Image Analysis in conjunction with **MICCAI 2020**, October 2020. [\[SpringerLink\]](#)
- **Abdul Muntakim Rafi**, Shivang Rana, Rajwinder Kaur, Jonathan Wu, Pooya Moradian Zadeh, “Understanding Global Reaction to the Recent Outbreaks of COVID-19: Insights from Instagram Data Analysis”, accepted at **IEEE International Conference on Systems, Man, and Cybernetics, 2020**, October 2020. [\[IEEEXplore\]](#)
- **Abdul Muntakim Rafi**, Jonathan Wu, Md. Kamrul Hasan, “L2-Constrained RemNet for Camera Model Identification and Image Manipulation Detection”, presented in Advances in Image Manipulation workshop and challenges on image and video manipulation in conjunction with **ECCV 2020**, August 2020. [\[SpringerLink\]](#)
- **Abdul Muntakim Rafi**, Uday Kamal, Rakibul Hoque, Abid Abrar, Sowmitra Das, Robert Laganieri, Md. Kamrul Hasan, “Application of DenseNet in Camera Model Identification and Post-processing Detection”, presented in **The IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, 2019**, pp. 19-28, Long Beach, CA, USA, June 2019. [\[CVPR 2019 open access\]](#)
- **Abdul Muntakim Rafi**, Nowshin Nawal, Nur Sultan Nazar Bayev, Lusain Nima, Celia Shahnaz, Shaikh Anowarul Fattah, “Image-based Bengali Sign Language Alphabet Recognition for Deaf and Dumb Community”, presented in **2019 IEEE Global Humanitarian Technology Conference (GHTC)**, Seattle, WA, USA, October 2019. [\[IEEEXplore\]](#)

TALKS AND POSTER PRESENTATIONS

- **Predicting gene expression using random promoter sequences - Challenge Overview** 2022
14th annual RECOMB/ISCB Conference on Regulatory & Systems Genomics with DREAM Challenges, United States
- **Tumor Segmentation from CT Scans Using Deep Learning** 2021
Guest lecture at graduate level course 'ELEC 8280: Image Processing', University of Windsor
- **L2-Constrained RemNet for Camera Model Identification and Image Manipulation Detection** 2020
Advances in Image Manipulation workshop and challenges on image and video manipulation in conjunction with ECCV 2020, United Kingdom
- **Lung Cancer Tumor Region Segmentation Using Recurrent 3d-denseunet** 2020
The Second International Workshop on Thoracic Image Analysis in conjunction with MICCAI 2020, Peru
- **IEEE SPS Video and Image Processing Cup 2018 Final Round** 2018
2018 IEEE International Conference on Image Processing, Greece
- **Shongket: Bengali Sign Language Alphabet Interpreter for the Deaf Community in Bangladesh** 2018
4TH IEEE WIECON-ECE 2018 CONFERENCE, Thailand

AWARDS AND SCHOLARSHIPS

- **Four Year Doctoral Fellowship (4YF)** [\[UBC 4YF\]](#) 2021-2025
AWARD: 96,000 CAD in 4 years
The Four Year Doctoral Fellowship (4YF) program ensures UBC’s best Ph.D. students are provided with financial support plus tuition for up to four years of their doctoral studies.
- **SBME Graduate Support Initiative-Entrance Award** [\[UBC GSI\]](#) 2021
AWARD: 4,000 CAD
This one-time award is granted to top-ranked incoming Ph.D. students, or top-ranked Ph.D. students in the first year of their program in SBME (School of Biomedical Engineering).
- **International Tuition Award** [\[UBC ITA\]](#) 2021-graduation
AWARD: 3,200 CAD per year
International Tuition Awards assist international graduate students with their tuition fees if they are registered full-time in research-oriented masters and doctoral programs at UBC - Vancouver campus.

- **President’s Academic Excellence Initiative Ph.D. Award** [UBC President’s] 2021-graduation
 AWARD: 1,500 CAD per year
 Awards totalling approximately 4.3 million CAD per year are provided to recognize the significant contributions of Ph.D. students to the research activities of the university.
- **PharmaHacks 2022** [PharmaHacks] [GitHub] 2022
 Member of the team that won the hackathon’s Phyla Challenge ‘Classification of Diseases Based on the Gut Microbiome’.
- **IEEE SPS Video and Image Processing Cup 2018** [IEEE SP Magazine] 2018
 AWARD: 2,500 USD
 Member of the team that won **2nd** place among 28 teams from the whole world.
- **4th IEEE-WIECON-ECE 2018 Humanitarian Project Competition** [IEEE SIGHT BLOG] [YouTube] 2018
 AWARD: 500 USD
 Member of the team that placed **2nd** among top 8 teams.
- **Bangladesh Math Olympiad** 2011-2013
 Divisional Champion
- **Bangladesh Astro Olympiad** 2012
 National 4th
- **Bangladesh Physics Olympiad** 2012
 Divisional Champion
- **Bangladesh Science Olympiad** 2011
 National 3rd

FUNDED PROJECTS

- **TPU resources for DREAM Challenge 2022** [website] May 2022 - July 2022
Funding Source: **TPU Research Cloud, Google**
Principal investigator: **Carl de Boer (UBC), Pablo Meyer (IBM research), Jake Albrecht (Sage Bionetworks)**
Total Funding: 50 TPU quotas (each TPU quota consists of 5 v3-8s, 5 v2-8s, and 100 preemptible v2-8s)
My Role: I co-organized the competition with Professor de Boer, Dr. Meyer, and Dr. Albrecht as the only graduate student in the committee.
- **Identifying selection on human gene expression with gene regulatory models** Jan 2022 - Dec 2022
Funding Source: **The Digital Research Alliance of Canada**
Principal investigator: **Carl de Boer**
Total Funding: 6 GPU years of cloud computing resources
My Role: I assisted Professor de Boer with writing the proposal for this grant.
- **Efficient edge inference benchmarking for AI-driven applications** [lanner] Nov 2020 - Mar 2021
Funding Source: **Mitacs Accelerate**
Principal investigator: **Jonathan Wu**
Total Funding: 15,000 CAD
My Role: I was the only co-applicant in this project. I wrote the proposal with Professor Wu’s supervision.
- **Spatio-Temporal Human Activity Recognition on Manufacturing Floors** [i-50] Oct 2019 - Apr 2020
Funding Source: **Mitacs Accelerate**
Principal investigator: **Jonathan Wu**
Total Funding: 22,500 CAD
My Role: I was one of the co-applicants in this project. I assisted Professor Wu with writing this proposal.

PEER-REVIEW ACTIVITIES

Primary reviewer:

- *Neurocomputing*
 Number of papers reviewed: **2**
- *Journal of Real-Time Image Processing*
 Number of papers reviewed: **2**
- *Cyber-systems and Robotics*
 Number of papers reviewed: **1**

Secondary reviewer (assisted PI with permission from the editor):

- *Proceedings of the National Academy of Sciences of the United States of America*
 Number of papers reviewed: **1**
- *Molecular Systems Biology*
 Number of papers reviewed: **1**

EXTRACURRICULAR ACTIVITIES

- **Project co-ordinator and organizer**, *DREAM Challenge 2022* [[website](#)]
 Over 100 teams of ~ 300 scientists from over 75 universities and companies worldwide participated in DREAM Challenge 2022 to create machine learning models that predict gene expression from DNA sequences. I co-organized the competition with [Carl de Boer](#) (UBC), [Pablo Meyer](#) (IBM research), and [Jake Albrecht](#) (Sage Bionetworks) as the only graduate student in the committee. I was responsible for the daily operation of the competition.

2022
- **Mentor**, *SUS-GSS Mentorship Program*, University of British Columbia [[website](#)]
 Mentored second-year undergrads regarding professional development skills.

2022
- **Secretary**, *Biomedical Engineering Graduate Association*, University of British Columbia
 Organized social events for SBME graduate students to increase interaction between different research groups.

2021-2022
- **Graduate Student Rep**, *SBME Sustainability Committee*, University of British Columbia
 Worked towards adopting sustainable thinking into the daily operations and culture of the SBME.

2021-2022
- **Assistant Treasurer**, *IEEE Joint Chapter SP/COM, IEEE Windsor Section*, University of Windsor
 Researched and analyzed financing alternatives and provided recommendations.

2020-2021
- **Vice President**, *Satyen Bose Science Club*, BUET
 Arranged scientific talks, seminars, and debates for university students to create an environment where students engage in active discussions on different topics of science.

2017 - 2018
- **Assistant General Secretary**, *Satyen Bose Science Club*, BUET
 Worked as the foot soldier in the events organized by the club.

2017
- **Volunteer tutor** for *illiterate workers of BUET dormitory canteen*
 Taught illiterate kids and adults to read and write who were working at the dorm canteen.

2014-2015
- **Volunteer tutor** for *Bholananda Night High School*, Sylhet
 Taught kids who were required to work during day to support their families. I tried my best to inspire them to continue their education despite their circumstances.

2011-2012

SKILLS

- **Programming Languages:** Python (Advanced), R (Advanced), MATLAB (Advanced), C++ (Intermediate), C (Intermediate), Assembly(Intermediate), Verilog (Basic)
- **Machine Learning Libraries:** Pytorch, Tensorflow, MXNet, Scikit-learn, OpenCV
- **Machine Learning Inference:** Amazon SageMaker (cloud), Intel OpenVINO (edge), Nvidia TensorRT (edge)
- **Cloud Computing:** Amazon S3, AWS SageMaker, Amazon ECS, Amazon Kinesis
- **Simulation & Design Tools:** OrCAD PSpice, Cadence EDA Tools (Virtuoso), Proteus7, Auto-CAD, emu8086, AVRstudio, CYME PSAF
- **Typesetting Software:** L^AT_EX(Advanced)
- **Graphic Design:** Adobe Illustrator (Advanced), Adobe Photoshop (Intermediate), Adobe Premiere Pro(Intermediate)