MD ASHIKUZZAMAN, PH.D.

+1 667-381-8519
rasel.ashik@gmail.com
linkedin.com/in/md-ashikuzzaman-/

RESEARCH FOCUS AND SUMMARY

My research focuses on developing deep learning- and analytic optimization-based biomedical imaging algorithms that render quantitative biomarkers. My research interests include 1) ultrasound and photoacoustic imaging, 2) computational medical imaging 3) artificial intelligence, 4) analytic optimization, 5) image-guided surgery and therapy, and 6) clinical translation and disease diagnosis. To date, my research has led to **38 top-tier publications (14 journal articles and 24 conference publications/abstracts/presentations).** I have published **11 articles in IEEE Transactions: 4 in IEEE Transactions on Medical Imaging, 6 in IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, and 1 in IEEE Transactions on Biomedical Engineering.** I was a **winner of the ULTRA-SR Challenge**, IEEE IUS 2022, the flagship conference of the IEEE UFFC society. In addition, my submission was selected as a **finalist for the best student paper award** in ITEC 2018, the flagship conference for tissue elasticity imaging research. The rigor and prospects of my research have thus far been recognized with **$181,534 worth of prestigious awards and fellowships.**

EDUCATION/TRAINING

Postdoctoral Fellow | ***Computational Medical Imaging*** May 2023 – May 2025
Johns Hopkins University Baltimore, MD, USA

- Research focus: Development of Novel Techniques for Biomedical Image Analysis
- Supervisor: **Muyinatu Bell, PhD**

Visiting Graduate Scholar | ***Computational Medical Imaging*** April 2023 – May 2023
Johns Hopkins University Baltimore, MD, USA

- Research focus: Myofascial Stiffness Quantification with Ultrasound Shear Strain Measurements
- Supervisor: **Muyinatu Bell, PhD**

Ph.D. | ***Electrical and Computer Engineering*** September 2019 – May 2023
Concordia University Montreal, QC, Canada

- Thesis: Development of Novel Energy-Based Displacement Estimation Methods: From Ultrasound Elastography to Super-Resolution Ultrasound **(Ranked: Excellent)**
- Supervisor: **Hassan Rivaz, PhD**

Master of Applied Science | ***Electrical and Computer Engineering*** September 2017 – August 2019
Concordia University Montreal, QC, Canada

- Thesis: Estimation and Enhancement of Tissue Motion using Ultrasound Imaging **(Ranked: Outstanding)**
- Supervisor: **Hassan Rivaz, PhD**

Bachelor of Science | ***Electrical and Electronic Engineering*** May 2010 – September 2015
Bangladesh University of Engineering and Technology (BUET) Dhaka, Bangladesh

PROFESSIONAL APPOINTMENTS

Assistant Professor | ***Electrical and Computer Engineering*** Aug 2025 – Present
University of Missouri-Kansas City Kansas City, MO, USA

- Tenure-track Assistant Professor in the Division of Energy, Matter and Systems in the School of Science and Engineering at the University of Missouri-Kansas City (UMKC).
- Founding Director, Medical Imaging for Global Health TechnologY **(MIGHTY)** Lab.

Lecturer | ***Electrical and Electronic Engineering*** Sept 2015 – June 2017
Daffodil International University Dhaka, Bangladesh

- Conducted undergraduate-level theory and lab courses in the Department of Electrical and Electronic Engineering at Daffodil International University, Bangladesh.

PUBLICATIONS

Intellectual Property (IP)

IP2 Muyinatu A. Lediju Bell, MD Jahin Alam, and **Md Ashikuzzaman** (2025). Motion Cleaning Techniques for Ultrasound Shear Wave Elastography. **Johns Hopkins University, IP share: 33%.**

IP1 Muyinatu A. Lediju Bell, MD Jahin Alam, **Md Ashikuzzaman**, and Lingyi Zhao (2025). Ultrasound Displacement Tracking for Myofascial Shear Strain Quantification Software. **Johns Hopkins University, IP share: 25%.**

Journal Papers

JP17 MD Jahin Alam, **Md Ashikuzzaman**, and Muyinatu A. Lediju Bell (2025). DeepShearMoFit: A Weakly Supervised Approach for Spatial Soft-Mask Representation of Ultrasound Shear Wave Motion. **IEEE Transactions on Medical Imaging (IEEE TMI, Impact factor 10.60)**, submission in progress.

JP16 Yanlin Wu, **Md Ashikuzzaman**, Nidhi Batra, Neil Mahto, Preeti Raghavan, and Muyinatu A. Lediju Bell (2025). CNN and Transformer-Based Segmentation of Pectoral Fascia in Post-Stroke Ultrasound Images. **Radiology: Artificial Intelligence (Impact factor 9.8)**, submission in progress, **first authorship shared with Y. Wu**.

JP15 **Md Ashikuzzaman**, Ahmed El-Desoky, and Muyinatu A. Lediju Bell (2025). Convolutional Neural Network in Automatic Selection of Ultrasonic Speckle-Tracking Parameters. **IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (IEEE TUFFC, Impact factor 3.63)**, revision requested.

JP14 **Md Ashikuzzaman**, Jonny Huang, Steve Bonwit, Azin Etemadimanesh, Ali Ghasemi, Patrick Debs, Robert Nickl, Jamie Enslein, Laura M. Fayad, Preeti Raghavan, and Muyinatu A. Lediju Bell (2024). Ultrasound Displacement Tracking Techniques for Post-Stroke Myofascial Shear Strain Quantification. **IEEE Transactions on Biomedical Engineering (IEEE TBME, Impact factor 4.76)**, in press.

JP13 **Md Ashikuzzaman**, Arunima Sharma, Nethra Venkatayogi, Eniola Oluyemi, Kelly Myers, Emily Ambinder, Hassan Rivaz, and Muyinatu A. Lediju Bell (2024). MixTURE: $L1$-Norm-Based Mixed Second-Order Continuity in Strain Tensor Ultrasound Elastography. **IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (IEEE TUFFC, Impact factor 3.63)**, vol. 71, no. 11, pp. 1389-1405.

JP12 **Md Ashikuzzaman**, Arnaud Heroux, An Tang, Guy Cloutier, and Hassan Rivaz (2024). Displacement Tracking Techniques in Ultrasound Elastography: From Cross-Correlation to Deep Learning. **IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (IEEE TUFFC, Impact factor 3.63)**, vol. 71, no. 7, pp. 842-871.

JP11 Marcelo Lerendegui *et al.* (2024). ULTRA-SR: Assessment of Ultrasound Localisation and TRacking Algorithms for Super Resolution Imaging. **IEEE Transactions on Medical Imaging (IEEE TMI, Impact factor 10.60)**, vol. 43, no. 8, pp. 2970-2987. **(Winner of the ULTRA-SR Challenge)**

JP10 **Md Ashikuzzaman**, Bo Peng, Jingfeng Jiang, and Hassan Rivaz (2024). Alternating Direction Method of Multipliers for Displacement Estimation in Ultrasound Strain Elastography. Medical Physics (Impact factor 4.51), vol. 51, no. 5, pp. 3521-3540.

JP9 **Md Ashikuzzaman**, Ali K. Z. Tehrani, and Hassan Rivaz (2023). Exploiting Mechanics-Based Priors for Lateral Displacement Estimation in Ultrasound Elastography. **IEEE Transactions on Medical Imaging (IEEE TMI, Impact factor 10.60)**, vol. 42, no. 11, pp. 3307-3322.

JP8 Ali K. Z. Tehrani, **Md Ashikuzzaman**, and Hassan Rivaz (2023). Lateral Strain Imaging using Self-supervised and Physically Inspired Constraints in Unsupervised Regularized Elastography. **IEEE Transactions on Medical Imaging (IEEE TMI, Impact factor 10.60)**, vol. 42, no. 5, pp. 1462-1471.

JP7 **Md Ashikuzzaman** and Hassan Rivaz (2022). Second-Order Ultrasound Elastography with $L1$-norm Spatial Regularization. **IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (IEEE TUFFC, Impact factor 3.63)**, vol. 69, no. 3, pp. 1008-1019.

JP6 **Md Ashikuzzaman**, Timothy J. Hall and Hassan Rivaz (2022). Incorporating Gradient Similarity for Robust Time Delay Estimation in Ultrasound Elastography. **IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (IEEE TUFFC, Impact factor 3.63)**, vol. 69, no. 5, pp. 1738-1750.

JP5 **Md Ashikuzzaman**, Noushin Jafarpisheh, Sunil Rottoo, Pierre Brisson, and Hassan Rivaz (2021). Fast and Robust Localization of Surgical Array using Kalman Filter. International Journal of Computer Assisted Radiology and Surgery (Springer IJCARS, Impact factor 2.30), vol. 16, no. 5, pp. 829-837.

JP4 **Md Ashikuzzaman**, Ali Sadeghi-Naini, Abbas Samani, and Hassan Rivaz (2021). Combining First and Second Order Continuity Constraints in Ultrasound Elastography. **IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (IEEE TUFFC, Impact factor 3.63)**, vol. 68, no. 7, pp. 2407-2418. **(a-MEM Challenge-winning algorithm for shear wave particle tracking, employed by Tehrani et al.)**

JP3 Naiyuan Zhang, **Md Ashikuzzaman** and Hassan Rivaz (2020). Clutter Suppression in Ultrasound: Performance Evaluation and Review of Low-Rank and Sparse Matrix Decomposition Methods. BioMedical Engineering OnLine (Impact factor 2.90), vol. 19, no. 37, pp. 1-38.

JP2 **Md Ashikuzzaman**, Clyde Belasso, Md. Golam Kibria, Andreas Bergdahl, Claudine J. Gauthier and Hassan Rivaz (2020). Low Rank and Sparse Decomposition of Ultrasound Color Flow Images for Suppressing Clutter in Real Time. **IEEE Transactions on Medical Imaging (IEEE TMI, Impact factor 10.60)**, vol. 39, no. 4, pp. 1073-1084.

JP1 **Md Ashikuzzaman**, Claudine J. Gauthier and Hassan Rivaz (2019). Global Ultrasound Elastography in Spatial and Temporal Domains. **IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (IEEE TUFFC, Impact factor 3.63)**, vol. 66, no. 5, pp. 876-887.

Conference Papers

CP13 **Md Ashikuzzaman**, Ahmed El-Desoky, and Muyinatu A. Lediju Bell (2025). Autonomous Selection of Energy-Based Ultrasound Speckle Tracking Parameters Using Deep Learning, IEEE International Ultrasonics Symposium (IUS), Utrecht, Netherlands, accepted.

CP12 MD Jahin Alam, **Md Ashikuzzaman**, and Muyinatu A. Lediju Bell (2025). ShearMoFit: A Dual-Plane Ultrasound Shear Wave Motion Cleaning Technique, IEEE International Ultrasonics Symposium (IUS), Utrecht, Netherlands, accepted, **oral presentation**.

CP11 **Md Ashikuzzaman** and Muyinatu A. Lediju Bell (2024). $L1$-Norm-Regularized Particle Motion Estimation in Ultrasound Shear Wave Elastography. a-MEM Challenge, IEEE UFFC-Joint Symposium, Taipei, Taiwan, **(Achieved the best overall a-MEM Challenge rank in one phantom data validation)**

CP10 **Md Ashikuzzaman**, Jonny Huang, Steve Bonwit, Azin Etemadimanesh, Preeti Raghavan, and Muyinatu A. Lediju Bell (2024). Deep Learning-Based Displacement Tracking for Post-Stroke Myofascial Shear Strain Quantification. **IEEE International Symposium on Biomedical Imaging**, Athens, Greece.

CP9 **Md Ashikuzzaman**, Jonny Huang, Steve Bonwit, Azin Etemadimanesh, Preeti Raghavan, and Muyinatu A. Lediju Bell (2024). Displacement Tracking Reliability in Muscle Shear Strain Quantification. SPIE Medical Imaging, San Diego, CA, USA, **oral presentation**.

CP8 **Md Ashikuzzaman**, Hassan Rivaz, and Muyinatu A. Lediju Bell (2024). Two-Dimensional Displacement Estimation using Mixed Second-Order Regularization in Total Variation-based Ultrasound Elastography. SPIE Medical Imaging, San Diego, CA, USA, **oral presentation**.

CP7 **Md Ashikuzzaman**, Brandon Helfield, and Hassan Rivaz (2022). Analytic Optimization-based Microbubble Tracking in Ultrasound Super-Resolution Microscopy. ULTRA-SR Challenge, IEEE International Ultrasonics Symposium (IUS), Venice, Italy. **(Jointly won the localization track of the challenge)**

CP6 **Md Ashikuzzaman**, Noushin Jafarpisheh, Sunil Rottoo, Pierre Brisson, and Hassan Rivaz (2021). Fast and Robust Localization of Surgical Array using Kalman Filter. **The 12th International Conference on Information Processing in Computer-Assisted Interventions (IPCAI)**, Munich, Germany.

CP5 **Md Ashikuzzaman**, Timothy J. Hall and Hassan Rivaz (2020). Adaptive Data Function for Robust Ultrasound Elastography. IEEE International Ultrasonics Symposium (IUS), Las Vegas, NV, USA.

CP4 **Md Ashikuzzaman** and Hassan Rivaz (2020). Denoising RF Data via Robust Principal Component Analysis: Results in Ultrasound Elastography. 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (IEEE EMBC), pp. 2067-2070, Montreal, Quebec, Canada, **oral presentation**.

CP3 **Md Ashikuzzaman** and Hassan Rivaz (2020). Incorporating Multiple Observations in Global Ultrasound Elastography. 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (IEEE EMBC), pp. 2007-2010, Montreal, Quebec, Canada, **oral presentation**.

CP2 **Md Ashikuzzaman**, Clyde Belasso, Claudine J. Gauthier and Hassan Rivaz (2019). Suppressing Clutter Components in Ultrasound Color Flow Imaging Using Robust Matrix Completion Algorithm: Simulation and Phantom Study. **IEEE International Symposium on Biomedical Imaging (IEEE ISBI)**, pp. 745-749, Venice, Italy.

CP1 **Md Ashikuzzaman** and Asif Iqbal (2016). Dependence of Modulation Transfer Function on Electric Field Intensity of Photoconductor and Mobility-Lifetime Product of Carriers in Polycrystalline Mercuric Iodide Based Flat Panel X-Ray Detectors: A Quantitative Approach and Error Analysis. 4th International Conference on Computing, Engineering and Communication Technologies, Kuala Lumpur, Malaysia, **oral presentation**.

Conference Abstracts

CA11 **Md Ashikuzzaman**, Jonny Huang, Steve Bonwit, Azin Etemadimanesh, Preeti Raghavan, and Muyinatu A. Lediju Bell (2024). Recurrent Neural Network-Based Ultrasonic Speckle Tracking for Post-Stroke Myofascial Shear Strain Quantification. Next Generation Computational Bio-Imaging Conference, Rice University, Houston, TX, USA **(Won the best poster award).**

CA10 Preeti Raghavan, **Md Ashikuzzaman**, Emi Mondragon, Jonny Huang, Lyngyi Zhao, Steve Bonwit, Azin Etemadimanesh, and Muyinatu A. Lediju Bell (2024). Quantifying Myofascial Stiffness Associated with Chronic Post-Stroke Shoulder Pain Using Ultrasound Shear Strain Measurements. 5th Annual NIH HEAL Initiative Scientific Meeting, Washington DC, USA.

CA9 Ahmed El-Desoky, **Md Ashikuzzaman**, and Muyinatu A. Lediju Bell (2023). Automatic Selection of Optimal Speckle-Tracking Parameters using CNN. Leadership Alliance National Symposium (LANS), Hartford, CT, USA **(Mentored NSF-funded Research Experience for Undergraduates (REU) student Ahmed El-Desoky).**

CA8 Preeti Raghavan, **Md Ashikuzzaman**, Emi Mondragon, Jonny Huang, Lyngyi Zhao, Steve Bonwit, Azin Etemadimanesh, and Muyinatu A. Lediju Bell (2023). Quantifying Myofascial Shear Motion in Chronic Post-stroke Shoulder Pain with Ultrasound Shear Strain Measurements. Neuroscience, Washington DC, USA.

CA7 **Md Ashikuzzaman** and Hassan Rivaz (2023). Revealing Tissue Pathology through Ultrasound Strain Elastography. 7th Graduate Student Research Conference (GSRC), Department of Electrical and Computer Engineering, Concordia University, Montreal, Canada.

CA6 **Md Ashikuzzaman** and Hassan Rivaz (2022). Exploiting the Tissue Deformation Physics for High-quality Strain Estimation in Ultrasound Elastography. Quebec Bio-Imaging Network (QBIN) Scientific Day, Sherbrooke, QC, Canada, **oral presentation**.

CA5 **Md Ashikuzzaman** and Hassan Rivaz (2022). Unfolding Tissue Pathology through Ultrasonic Strain Imaging. *6th Graduate Student Research Conference (GSRC), Department of Electrical and Computer Engineering, Concordia University, Montreal, Canada (**Won the third place in the poster competition**).*

CA4 **Md Ashikuzzaman**, Ali Sadeghi-Naini, Abbas Samani, and Hassan Rivaz (2020). Incorporating Second Order Regularization in Ultrasound Elastography. 17th International Tissue Elasticity Conference, virtual, online, **oral presentation**.

CA3 **Md Ashikuzzaman** and Hassan Rivaz (2020). Robust Data Function in Global Ultrasound Elastography. 17th International Tissue Elasticity Conference, virtual, online, **oral presentation**.

CA2 **Md Ashikuzzaman**, Claudine J. Gauthier and Hassan Rivaz (2018). Temporally Regularized Global Ultrasound Elastography. 16th International Tissue Elasticity Conference, Avignon, France (**selected as a finalist for the best student paper award**).

CA1 **Md Ashikuzzaman**, Claudine J. Gauthier and Hassan Rivaz (2018). Incorporating Temporal Priors in Time-Delay Estimation in Ultrasound Elastography. 5th PERFORM Centre Research Conference, Montreal, Canada.

SELECTED FELLOWSHIPS/SCHOLARSHIPS/AWARDS

Best Poster Award | ***worth 200 USD*** Nov 2024
Rice University Houston, TX, USA

- For presenting the best poster in the Next Generation Computational Bio-Imaging Conference at Rice University, Houston, TX.

Distinguished Reviewer Certificate (Gold Level) Oct 2024
IEEE Transactions on Medical Imaging (IEEE TMI) USA

- For reviewing 9 manuscripts for IEEE TMI from September 21, 2023 through October 13, 2024.

GSA Conference Travel Award | ***worth 240 CAD*** Feb 2023
Graduate Students' Association (GSA), Concordia University Montreal, QC, Canada

- To attend IEEE IUS 2022, Venice, Italy.

Concordia University Conference and Exposition Award | ***worth 3776.49 CAD*** April 2019 - Oct 2022
Concordia University Montreal, QC, Canada

- For attending IEEE ISBI 2019, IEEE EMBC 2020, ITEC 2020, IPCAI 2021, QBIN Scientific Day 2022, and IEEE IUS 2022.

The Verasonics Joint Winner Award (Localization Category) | ***worth 750 USD*** Oct 2022
ULTRA-SR Challenge, IEEE IUS 2022 Venice, Italy

- **Jointly ranked first** in the localization track of the Ultrasound Localisation and TRacking Algorithms for Super Resolution (ULTRA-SR) Challenge hosted by IEEE IUS, the flagship conference of the IEEE UFFC society. ULTRA-SR is the most successful scientific challenge (with **50+ initial submissions**) in the history of IEEE IUS.

Best Poster Award (Third Place) | ***worth 100 CAD*** March 2022
Department of ECE, Concordia University Montreal, QC, Canada

- For presenting the third-best poster at the 6th Graduate Student Research Conference (GSRC).

GSA Academic Excellence Award | ***worth 500 CAD*** May 2021
Graduate Students' Association (GSA), Concordia University Montreal, QC, Canada

- Awarded to the **best-performing graduate students** of Concordia selected through a competitive process.

FRQNT Doctoral Research Fellowship (PBEEE, V1 category) | ***worth 33334 CAD*** April 2021
The Government of Quebec Quebec, Canada

- The most prestigious doctoral fellowship awarded by the Government of Quebec to foreign students doing research in Quebec. I was one of the four PhD students nominated by Concordia University to participate in the provincial competition. **My research proposal and overall profile ranked first in this competition.**

FRQNT Doctoral Research Fellowship (B2X category) | ***worth 70000 CAD*** April 2021
The Government of Quebec Quebec, Canada

- The most prestigious doctoral scholarship awarded by the Government of Quebec to students doing research in Quebec. B2X is an open-call competition where any PhD student from Quebec institutions can participate. **In this provincial competition, my research proposal and overall profile ranked first.**

International Tuition Award of Excellence | ***worth 39,280 CAD*** Jan 2020
Concordia University Montreal, QC, Canada

- International tuition remission award, which is awarded to outstanding candidates for PhD admission.

Quebec Bio-Imaging Network (QBIN) PhD Scholarship | ***worth 7000 CAD*** Sep 2019
The Government of Quebec Quebec, Canada

- For conducting a research project on ultrasound vascular imaging. QBIN is an enterprise of the Government of Quebec. The application process involved writing a research proposal that received highly positive feedback.

Gina Cody School of ENCS Graduate Scholarship | ***worth 60,000 CAD*** June 2019
Concordia University Montreal, QC, Canada

- **One of the most prestigious entrance scholarships** awarded to only a few incoming PhD students in the faculty of ENCS. The awardees are selected through an intra-faculty competition among the outstanding freshmen nominated by the prospective research advisors.

Mitacs Globalink Research Award | ***worth 6000 CAD*** Jan 2019
Mitacs Canada

- For an international internship at SINTEF and NTNU: Norwegian University of Science and Technology, Trondheim, Norway. A research proposal on 3D brain ultrasound elastography was submitted that obtained overwhelmingly positive reviews (declined).

QBIN Conference Travel Award | ***worth 500 CAD*** Jan 2019
Quebec Bio-Imaging Network (QBIN) Quebec, Canada

- For attending IEEE International Symposium on Biomedical Imaging 2019 (IEEE ISBI 2019).

Concordia Merit Scholarship | ***worth 5000 CAD*** March 2017
Concordia University Montreal, QC, Canada

- Entrance scholarship awarded to the outstanding incoming MASc students.

Dean's List May 2010 - May 2012
Bangladesh University of Engineering and Technology Dhaka, Bangladesh

- For securing a GPA above 3.75/4.00.

Admission Test Excellency Scholarship Oct 2009
Bangladesh University of Engineering and Technology Dhaka, Bangladesh

- For securing the **47th position in BUET admission test**, the nation's most competitive undergraduate entrance examination.

Education Board Talent-pool Scholarship July 2009
Dhaka Education Board Dhaka, Bangladesh

- For an outstanding result in Higher Secondary Certificate (HSC) Examination (GPA: 5.0/5.0). Only a few HSC examinees receive this scholarship based on the total score earned.

Education Board Talent-pool Scholarship June 2007
Dhaka Education Board Dhaka, Bangladesh

- For an outstanding result in Secondary School Certificate (SSC) Examination (GPA: 5.0/5.0). Only a few SSC examinees receive this scholarship based on the total score earned.

Oral Presentations/Posters

Invited Talks/Posters

I8 **From Innovation to Impact: Are We There Yet With Computational Medical Ultrasound?**, University of Rhode Island, Kingston, RI, March 2025.

I7 **From Innovation to Impact: Are We There Yet With Computational Medical Ultrasound?**, Rochester Institute of Technology, Rochester, NY, February 2025.

I6 **From Innovation to Impact: Are We There Yet With Computational Medical Ultrasound?**, University of Missouri-Kansas City, Kansas City, MO, January 2025.

I5 **From Innovation to Impact: Are We There Yet With Computational Medical Ultrasound?**, University of Texas at El Paso, El Paso, TX, January 2025.

I4 **Recurrent Neural Network-Based Ultrasonic Speckle Tracking for Post-Stroke Myofascial Shear Strain Quantification**, Rice University, Houston, TX, November 2024, **won the best poster award**.

I3 **Invited flash talk/elevator pitch**, Rice University, Houston, TX, November 2024.

I2 **Computational Medical Ultrasound: Are We There Yet?**, Kennesaw State University, Kennesaw, GA, October 2024.

I1 **Two-Dimensional Displacement Estimation using Mixed Second-Order Regularization in Total Variation-based Ultrasound Elastography**, Johns Hopkins University, Baltimore, MD, USA, February 2024.

Conference/Symposium Presentations

C15 Poster presentation at IEEE UFFC-JS 2024, Taipei, Taiwan, September 2024.
C14 Poster presentation at IEEE ISBI 2024, Athens, Greece, May 2024.
C13 Two oral presentations at SPIE Medical Imaging 2024, San Diego, CA, USA, February 2024.
C12 Poster at GSRC 2023, Montreal, QC, Canada, March 2023.
C11 Oral Presentation at ULTRA-SR Challenge, IEEE IUS 2022, Venice, Italy, October 2022, **won the localization track of the challenge.**
C10 E-poster at ULTRA-SR Challenge, IEEE IUS 2022, Venice, Italy, October 2022.
C9 Flash Talk at QBIN Scientific Day 2022, Sherbrooke, QC, Canada, June 2022.
C8 Poster at GSRC 2022, Montreal, QC, Canada, March 2022, **won the third place.**
C7 Oral Presentation at IPCAI 2021, Virtual, Online, June 2021.
C6 Oral Presentation at ITEC 2020, Virtual, Online, September 2020.
C5 Poster at IEEE IUS 2020, Las Vegas, NV, USA, September 2020.
C4 Oral Presentation at IEEE EMBC 2020, Montreal, QC, Canada, July 2020.
C3 Poster at IEEE ISBI 2019, Venice, Italy, April 2019.
C2 Poster at 5th PCRC, Montreal, QC, Canada, May 2018.
C1 Oral Presentation at 4th ICCECT, Kuala Lumpur, Malaysia, October 2016.

Dissertation Defense Presentations

D3 **PhD defense: Development of Novel Energy-Based Displacement Estimation Methods: From Ultrasound Elastography to Super-Resolution Ultrasound**, Concordia University, Montreal, QC, Canada, March 2023, **Ranked: Outstanding.**

D2 **MASc defense: Estimation and Enhancement of Tissue Motion using Ultrasound Imaging**, Concordia University, Montreal, QC, Canada, August 2019, **Ranked: Outstanding.**

D1 **Bsc defense: Modulation Transfer Function of Mercuric Iodide-Based Flat Panel X-ray Detector**, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh, September 2015.

Research Experience

Postdoctoral Fellow May 2023 – May 2025
PULSE Lab, Johns Hopkins University Baltimore, MD, USA

- Worked with Professor **Muyinatu Bell** on ultrasound & photoacoustic imaging, elastography, segmentation, shear strain-based biomarker development to characterize post-stroke shoulder stiffness, and advanced beamforming for transcranial imaging and neurological disorder quantification.

Visiting Graduate Scholar April 2023 – May 2023
PULSE Lab, Johns Hopkins University Baltimore, MD, USA

- Worked with Professor **Muyinatu Bell** on quantifying ultrasound shear strain as a biomarker for post-stroke shoulder pain.

Graduate Research Assistant Sep 2017 – April 2023
IMPACT Lab, Concordia University Montreal, QC, Canada

- Worked with Professor **Hassan Rivaz** on ultrasonic displacement tracking, ultrasonic clutter suppression in vascular imaging, surgical tracking, and super-resolution ultrasound.

Research Intern June 2020 – May 2021
THINK Surgical Inc. Montreal, QC, Canada

- Worked with the Think Surgical R & D team on surgical tracking in total knee arthroplasty.

Undergraduate Researcher Jul 2014 – Sep 2015
Bangladesh University of Engineering and Technology Dhaka, Bangladesh

- Worked on the modulation transfer function of a Flat Panel X-ray Detector.

Intern Sep 2014 – Nov 2014
Samsung R & D Institute, Bangladesh (SRBD) Dhaka, Bangladesh

- Worked on device drivers of the Android operating system during the 180 hours of internship.

Professional Teaching Experience

Graduate Teaching Assistant Jan 2018 – Dec 2021
Concordia University Montreal, QC, Canada

- **Probability and Statistics (Winter 2018-2020, Fall 2021)**: Responsibilities included grading the assignments and projects associated with an undergraduate-level Probability and Statistics course.
- **Probability and Statistics for Computer Science (Winter 2021)**: Key responsibility was to grade the assignments and projects associated with a Probability and Statistics course designed for computer science.
- **Medical Image Processing (Fall 2018, 2019 & 2020)**: Responsibilities included explaining different image processing techniques to **graduate- and undergraduate-level students**, helping students with their assignments and projects, and grading the assignments and projects. The course syllabus contained basic linear algebra, convolution, correlation, image filtering, image denoising, image clustering, edge detection, medical imaging modalities, elastography, image registration, and Deep learning in medical image processing.
- **Probability and Statistics (Fall 2018)**: My core responsibility was to **deliver lectures to an undergraduate class.** The course syllabus comprised probability theory, distributions, statistical theorems, confidence interval, hypothesis testing, statistical errors, and sample size calculation.

Lecturer Sep 2015 – Jun 2017
Daffodil International University Dhaka, Bangladesh

- **Signals and Systems**: Signals and their properties, basic signal operations, Fourier series, Fourier transform, Laplace transform
- **Digital Signal Processing**: Discrete signals and sampling, linear system analysis, z-transform, discrete Fourier transform, digital filters and applications, wavelet transform
- **Digital Signal Processing Laboratory**: Sampling theorem, convolution sum, z-transform, discrete Fourier transform, digital filters, circular convolution
- **Numerical Techniques Laboratory**: Introduction to MATLAB, matrix operations, matrix decomposition, eigenvalues and eigenvectors, system of linear equations, interpolation, extrapolation, regression, root finding, numerical differentiation, numerical integration

Freelance Teaching Experience

Scientific Content Creator Jun 2020 – Present
YouTube Channel Online

- Preparing explanatory video content on different topics of science for my own YouTube channel (**10K+ subscribers**). My scientific content received thousands of views and inspiring feedback.

Mathematics Lecturer Jan 2010 – Aug 2017
UDVASH Academic and Admission Care Dhaka, Bangladesh

- Delivered **hundreds of lectures** on higher secondary level mathematics at UDVASH, the best shadow education platform in Bangladesh. My teaching activities at UDVASH ranged from lecturing to preparing educational material for a classroom audience.

Online Mathematics Tutor Jan 2010 – Aug 2017
Onnorokom Pathsala - An unorthodox school YouTube, Online

- Prepared video lectures on higher secondary level mathematics with the sponsorship of "Onnorokom Pathsala", a very popular YouTube channel **(900K+ subscribers)** in Bangladesh. My lectures received **millions of views** and overwhelming positive feedback, creating a significant impact on a large number of underserved juvenile students in Bangladesh.

Mentoring Experience

Postdoc Mentor Jun 2023 – May 2025
Johns Hopkins University Baltimore, MD, USA

- **Determining the Field of View of a 3D Miniaturized Photoacoustic System for Lung Cancer Imaging:** Mentored an undergraduate (initially an undergrad and later a master's) student in determining the field of view of a 3D miniaturized photoacoustic system designed for lung cancer imaging. I developed the tentative plan and the simulation model for the photoacoustic system and trained the mentee on how to run the simulation iteratively and infer the field of view. I assigned weekly tasks, monitored the progress, and provided focused guidance based on the findings.
- **Advancing Ultrasound Shear Wave Elastography through Deep Learning and Analytic Optimization:** Mentored a PhD student in developing deep learning- and analytic optimization-based models to improve the current state of ultrasound shear wave elastography. I developed a tentative research pathway and trained the mentee on different aspects of the research project. I monitored the progress and guided the mentee in carrying the research forward.
- **Deep Learning-Based Fascia Segmentation in Post-Stroke Ultrasound Images:** Mentored a master's research student in developing deep learning models for automatic fascia segmentation in ultrasound images. I developed the research idea, prepared a tentative research plan, and trained the mentee on how to move this project forward. I monitored the progress of the project on a weekly basis and guided the mentee based on the week's research findings.
- **Creating a Large-Scale Segmentation Dataset from clinical ultrasound data:** Mentored two undergraduate researchers in creating a large-scale segmentation dataset from post-stroke ultrasound images. My mentorship roles included coming up with the clinically important project idea, creating the reference annotations, training the mentees on what and how to segment, assigning weekly tasks, monitoring the mentees' progress in weekly meetings, and providing guidance to resolve any challenges faced.
- **Automatic selection of optimal speckle-tracking parameters using convolutional neural network:** Mentored an REU student on an AI-based automation project. I came up with the research idea, prepared the detailed weekly plans for the mentee, collected weekly reports to monitor the progress, assessed the weekly research outcomes, and guided the mentee to achieve our research goals. This project led to a symposium presentation, a conference paper (IEEE IUS 2025, Utrecht, Netherlands), and a journal article (IEEE Trans. UFFC, revision requested).

PhD Mentor May 2022 – Aug 2022
Concordia University Montreal, QC, Canada

- **Second-Order Ultrasound Elastography: MATLAB to Python:** Mentored an undergraduate researcher in converting the code of my paper (Ashikuzzaman *et al.*, IEEE Trans. UFFC, 2021) from MATLAB to Python for integration into deep learning models. My mentorship roles ranged from algorithm explanation to code monitoring.

Research Proposal Writing Experience

Society of Photographic Instrumentation Engineers (SPIE) June 2024
Johns Hopkins University Baltimore, MD, USA

- Wrote a Berns-SPIE SPARK Research Grant as a postdoc PI.

The Advanced Research Projects Agency for Health (ARPA-H) Sep 2023
Johns Hopkins University Baltimore, MD, USA

- Assisted Professor **Muyinatu Bell** in writing a research grant for ARPA-H. **The application was successful in securing the grant.**

Fonds de recherche du Québec – Nature et technologies (FRQNT) Oct 2020
Concordia University Montreal, QC, Canada

- Wrote a research proposal on ultrasound elastography for FRQNT PBEEE Doctoral Research Fellowship. **The application ranked first and won a fellowship worth 33,334 CAD.**

Fonds de recherche du Québec – Nature et technologies (FRQNT) Oct 2020
Concordia University Montreal, QC, Canada

- Wrote a research proposal on ultrasound elastography for FRQNT B2X Doctoral Research Fellowship. **The application ranked first and won a fellowship worth 70,000 CAD.**

Quebec Bio-Imaging Network (QBIN) Sep 2019
Concordia University Montreal, QC, Canada

- Wrote a research proposal on vascular ultrasound for QBIN Doctoral Research Scholarship. **The application won a scholarship worth 7,000 CAD.**

Canadian Institutes of Health Research (CIHR) May 2019
Concordia University Montreal, QC, Canada

- Assisted Professor **Hassan Rivaz** in writing two grants for Canadian Institutes of Health Research (CIHR).

Mitacs, Canada Nov 2018
Concordia University Montreal, QC, Canada

- Wrote a research proposal on ultrasound elastography for Mitacs Globalink Research Award. **An award worth 6,000 CAD was granted.**

Professional Service

Associate Editor

April 2025 – Present: Medical Physics (Wiley)

Technical Reviewer

June 2025 - Present: Frontiers in Cardiovascular Medicine
March 2025 – Present: IEEE Open Journal of Engineering in Medicine and Biology (IEEE OJEMB)
March 2025 – Present: Journal of the Acoustical Society of America (JASA)
March 2025 – Present: Medical Image Analysis (MedIA)
August 2024 – Present: IEEE Journal of Biomedical and Health Informatics (IEEE J-BHI)
August 2024 – Present: Computational and Structural Biotechnology Journal
January 2024 – Present: Medical Physics
November 2023 – Present: Frontiers in Physiology
September 2023 – Present: Expert Systems with Applications
September 2023 – Present: IEEE Transactions on Computational Imaging (TCI)
June 2022 – Present: IEEE Transactions on Biomedical Engineering (TBME)
May 2022 – Present: International Conference of the IEEE Engg. in Medicine & Biology Society (EMBC)
August 2021 – Present: Computer Methods and Programs in Biomedicine (CMPB)
April 2020 – Present: International Conf. Med. Image Computing and Computer Assisted Inter. (MICCAI)
January 2020 – Present: Ultrasonics
October 2019 – Present: Ultrasound in Medicine and Biology (UMB)
July 2019 – Present: IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (TUFFC)
July 2019 – Present: IEEE Transactions on Medical Imaging (TMI), **Gold-level distinguished reviewer**

Leadership Experience

Competition Judge June 2025
Bangladesh University of Engineering and Technology (BUET) Dhaka, Bangladesh

- Served as a **judge** for the article writing segment at National Numbers Carnival organized by the Brain Teaser Club of BUET.

Session Chair Sep 2023
IEEE IUS 2023 Montreal, QC, Canada

- Served as the **Session Chair** of a Poster Session at IEEE IUS 2023, the flagship conference of the IEEE UFFC society.

Competition Judge Sep 2023
IEEE IUS 2023 Montreal, QC, Canada

- Served as a **judge of the Student Pitch Competition** at IEEE IUS 2023, the flagship conference of the IEEE UFFC society.

Organizing Chair Sep 2022 – Sep 2023
IEEE IUS 2023 Montreal, QC, Canada

- Served as the **organizing chair of the student events** at IEEE IUS 2023, the flagship conference of the IEEE UFFC society.

Member Sep 2022 – April 2023
Concordia University Montreal, QC, Canada

- I worked as a member of Concordia's PERFORM Centre's student action committee (PSAC), which advocates for **equity and inclusion in higher education.**

Media Highlights

QBIN Monthly Newsletter Feb 2023
Quebec Bio-Imaging Network Quebec, Canada

- Quebec Bio-Imaging Network (QBIN), an enterprise of the government of Quebec, featured my win in the Ultra-SR challenge

Gina Cody School Media Communications Nov 2022
Concordia University Montreal, QC, Canada

- Gina Cody School of Engineering and Computer Science at Concordia University ran stories about my win in the Ultra-SR challenge.

Gina Cody School Media Communications July 2021
Concordia University Montreal, QC, Canada

- Gina Cody School of Engineering and Computer Science at Concordia University featured my receipt of the prestigious FRQNT PBEEE and B2X fellowships.

References

Hassan Rivaz, PhD
Professor
Department of Electrical and Computer Engineering
Concordia University, Montreal, QC, Canada
Email: hrivaz@ece.concordia.ca
Phone: +1 514-848-2424 ext. 8741

Muyinatu Bell, PhD
Associate Professor
Department of Electrical and Computer Engineering
Johns Hopkins University, Baltimore, MD, USA
Email: mledijubell@jhu.edu
Phone: +1 410-516-5817