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RESUME – Dr Tonima S Ali

: www.researchgate.net/profile/Tonima_Ali

: https://www.sydney.edu.au/engineering/about/our-people/academic-staff/tonima-ali.html

CAREER GOAL – Conduct innovative research and teaching in the field of medical imaging to address the scientific requirements of academia, industry, and community.

SUMMARY

- Research experience in Magnetic Resonance Imaging (MRI) and Nuclear Magnetic Resonance (NMR), signal processing, optimization of MR workflows, image segmentation and registration, image processing and software development
- Specialised analysis pipeline development for structural MRI, diffusion MRI and quantitative MRI
- Multiple years of teaching experience in the capacity of a course co-ordinator, lecturer, and tutor
- Supervision of PhD, capstone projects, and summer thesis projects - progress of the students reflected by journal papers, abstracts and the timely attainment of milestones
- Hands-on experience and expertise on MRI sequence development, protocol optimisation, scanning and data management at the clinical and ultra-high field strength
- A consistent track record of publications in good quality peer reviewed journals and research conferences
- PhD in Biomedical Engineering and Medical Physics (Queensland University of Technology) with research projects on quantitative assessment of biological tissues using MRI and NMR
- MSc in Biomedical Engineering (University of Calgary, Canada) focused at software development for cancer diagnosis by MR image analysis
- Experience in organizing multi-disciplinary research projects involving academics, MR physicists, radiologist, pathologist, cancer oncologists and lab technicians. Long-term work experience in collaborative environments
- Outstanding research presentation skill recognized by awards at the scientific conferences at the national and international levels, invited talks, invited TV show on research project and radio interviews on research investigations
- Proven ability to envisage, design and implement novel techniques in scientific investigations for developing support systems for making clinical decisions
- Excellent team player. Demonstrated ability on working independently and as part of multi- disciplinary teams
- Highly organised hardworking individual with a keen attention to detail and the ability to manage multiple, competing priorities
- Active in establishing links within the school and the university, with external research facilities, MRI service providers, government departments and schools
- Trainings: MRI operator's training, post-doc career success program, Agile research and communication tools, Artemis HPC
- Specialties: MRI, NMR, dMRI, sequence design, data analysis, image processing, medical imaging, scientific communication, MATLAB, C, C++, Objective C, FSL, FreeSurfer, MRtrix, SPM, MR IDEA

PUBLICATIONS and SELECTED ABSTRACTS

- **Ali TS**, Tourell MC, Hugo HJ, Pyke, C, Yang S, Lloyd T, Thompson EW and Momot KI,Transverse ammographic density and breast tissue composition by single-sided portable NMR. *Magnetic resonance in medicine*, *82(3)* (2019) 1199-1213 (doi: 10.1002/mrm.27781)
- Xuan H, **Ali TS**, Nano T, Blick T, Tse BW, Sokolowski K, Tourell MC, Lloyd T, Thompson EW, Momot KI, Hugo HJ, Quantification of breast tissue density: Correlation between single-sided portable NMR and micro-CT measurements, *Magnetic Resonance Imaging*, 62 (2019) 111-120 (doi: 10.1016/j.mri.2019.06.006)

- Tourell MC, **Ali TS**, Hugo HJ, Pyke C, Yang S, Lloyd T, Thompson EW and Momot KI, *T1*-based sensing of mammographic density using single-sided portable NMR. *Magnetic resonance in medicine*, *80*(3) (2018) 1243-1251 (doi: 10.1002/mrm.27098)
- **Ali TS**, Prasadam I, Xiao Y and Momot KI, Progression of Post-Traumatic Osteoarthritis in rat meniscectomy models: Comprehensive monitoring using MRI. *Scientific reports*, ***8*(1)** (2018) 6861 (doi: 10.1038/s41598-018-25186-1)
- **Ali, TS**, Thibbotuwawa N, Gu Y and Momot KI, MRI magic-angle effect in femorotibial cartilages of the red kangaroo. *Magnetic resonance imaging*, **43** (2017) 66-73 (doi: 10.1016/j.mri.2017.07.010)
- **Ali TS**, Bjarnason T, Senger DL, Dunn JF, Joseph JT, Mitchell J, QuantitativeT2: interactive quantitative T2 MRI witnessed in mouse glioblastoma. *Journal of medical Imaging* 0001; **2(3)** (2015) 036002 (doi:10.1117/1.JMI.2.3.036002)
- **Ali TS**, Calamante F, Surface based analysis of cortical di□usion metrics: associations with cortical myeloarchitectureand underlying white matter anisotropy, *ISMRM* (submitted); Vancouver, Canada (2021)
- **Ali TS,** Voort EC, Barth M, Influence of WM fibre orientation on GRE derived tissue parameters, Proc. *ISMRM;* Sydney, Australia (2020)
- **Ali TS**, Itkyal VS, Thapaliya K, Barth M, The effect of noise on myelin assessment by multi- exponential fitting for varying white matter fibre geometries, Proc. *ISMRM;* Sydney, Australia (2020)
- Akbari A, **Ali TS**, Bollmann S, Barth M, Modelling the laminar VASO signal change in human V1 at 7T, Proc. *ISMRM;* Sydney, Australia (2020)
- Masri HA, **Ali TS,** McMohan K and Barth M, MRI quality assurance using the ACR phantom: comparison of automatic and manual analysis of the ACR dataset, Proc. *ISMRM;* Sydney, Australia (2020)
- **Ali TS**, Thapaliya K, Barth M, Myelin water quantification using spin echo and gradient echo at 3T and 7T, *Proc. ANZMAG*, Perth, Australia (2019)
- **Ali TS**, Tourell MC, Huang H, Lloyd T, Hugo HJ, Thompson EW and Momot KI, Assessment of Mammographic Density and Breast Tissue Composition by Single-sided Portable NMR, Proc. 8th Asia- Pacific NMR Symposium, Singapore (2019)
- **Ali TS,** Tourell MC, Hugo HJ, Pyke, C, Yang S, Lloyd T, Thompson EW and Momot KI, *T2*-based assessment of mammographic density and breast tissue composition by NMR MOUSE: a safe and economical alternative, *Proc. IHBI Inspires*, Brisbane, Queensland (2018)
- **Ali TS**, Prasadam I, Xiao Y and Momot KI, Progression of Post-Traumatic Osteoarthritis in rat meniscectomy models: Comprehensive monitoring using MRI, *Proc. The Australian and New Zealand Society of Magnetic Resonance Conference*, Kingscliff, New South Wales (2017)
- **Ali TS**, Prasadam I, Xiao Y and Momot KI, Pathogenesis cascade of post-traumatic osteoarthritis in rat models by MRI, *Proc. Australian and New Zealand Bone and Mineral Society Congress*, Brisbane, Queensland (2017)
- **Ali TS**, Prasadam I, Xiao Y and Momot KI, Quantitative micro-MRI of murine models of PTOA*, Proc. ISMRM Workshop on: Osteoarthritis Imaging*, Sydney, New South Wales (2017)
- **Ali, TS**, Thibbotuwawa N, Gu Y and Momot KI, Collagen anisotropy in tibiofemoral cartilages of kangaroo using magic-angle-effect, *Proc. Australian Institute of Physics Congress*, Brisbane, Queensland (2016)
- **Ali TS**, Bjarnason TA, Laule C, Mitchell JR, QT2Decoder: open-source software for real-time voxel- based quantitative T2 analysis. *Proc. Advanced White Matter Imaging*; Reykjavik, Iceland; P1 (2011).
- **Ali TS**, Bjarnason T, Sun B, Lun X, Senger D, Forsyth P, Dunn J, Mitchell JR, Quantitative *T2* analysis for heterogeneous cancer visualization and segmentation. *Proc. Annual Scientific Meeting of Terry Fox Research Institute*; Vancouver, Canada, 2; 35 (2010).
- **Ali TS**, Bjarnason TA, Sun B, Lun X, Senger DL, Forsyth P, Dunn JF, Mitchell JR, Is quantitative *T2* sensitive to tumor cell infiltration? *Proc. ISMRM*; Stockholm, Sweden, 19; 3163 (2010).
- **Ali TS**, Bjarnason TA, Simpson M, Mitchell JR, A novel method to visualize quantitative *T2* MRI data: qT2-View. *Proc. International Congress and Exhibition of Computer Assisted radiology and Surgery*; Berlin, Germany, 23; S352-3 (2009).

WORK EXPERIENCE

University of Sydney, Australia

Postdoctoral Research Fellow
August 2020 – Present

Key Accomplishments:

- Research: Leading projects on MRI-based brain fingerprinting, structural correlation between white matter and grey matter as observed by structural and diffusion MRI, and on longitudinal assessment of MS lesions in brain.
- Preliminary results have been submitted for ISMRM 2021
- Teaching: Guest lecturer for Biomedical Image Analysis and breast MRI
- Supervision: Supervising two capstone projects on neuroimaging
- Co-supervising a 4000 level Industry and Community Project Unit on Democratising Healthcare through Technology
- Engagement: Established collaboration between research teams of Brain and Mind Centre
- Established collaboration between Centre for Advanced Imaging at the University of Queensland and Brain and Mind Centre at the University of Sydney
- Developed processing pipeline for analysing Quantitative Susceptibility Images (QSM) obtained by 3T GE scanner for Sydney Imaging
- Performed coil testing for 3T GE scanner n phantoms

Major Accountabilities:

- Conduct quality research on neuroimaging
- Support the research students using MRI facilities in research and data analysis
- Support the teaching and learning program offered by the University of Sydney

University of Queensland & National Imaging Facility, Australia

7T Facility Fellow
January 2019 – July 2020

Key Accomplishments:

- Research: Leading a project on white matter imaging protocols and processing pipelines at clinical and ultra-high field MRI, results obtained have been presented in ANZMAG 2019 and ISMRM 2020
- Secured NIF Professional Development Grant (worth $5,000) for specialised training on ultra-high field MRI
- Improved the acquisition parameters for GRE and GRE ASPIRE sequence by sequence development using MR IDEA for Siemens scanners
- Optimised the imaging protocols for MPRAGE, MP2RAGE, SE, GRE, DWI and VASO at 7T and 3T field strengths and have made the protocols available to the MRI facility users at CAI
- Have developed robust analysis pipelines for processing GRE, SE and DWI data using Matlab and MRtrix
- Supervision: Successful project completion of two Honours students - two abstracts have been submitted to ISMRM 2020 with the results obtained
- Ongoing supervision of three PhD students – progress of the students reflected by publication on peer-reviewed journals, abstracts and the timely attainment of milestones
- Engagement: Established STEM engagement program with CAI
- Represented Centre for Advanced Imaging (CAI) and National Imaging Facility (NIF) at conferences and meetings

Major Accountabilities:

- Facilitate the users of Magnetom 7T Whole body MRI and Magnetom Prisma 3T Whole Body MRI
- Provide technical support for protocol setup and image analysis for the user of MRI facility
- Support the research students using MRI facilities in protocol development, imaging and programming
- Support the teaching and learning program offered by CAI as a teacher, tutor and marker

Queensland University of Technology, Australia

PhD Candidate
March 2013 – December 2018

Key Accomplishments:

- Thesis: Transverse relaxation based magnetic resonance techniques for quantitative assessment of biological tissues
- Published 4 original research papers in peer reviewed journals, research outcomes were featured in TV shows, web portals, radio, news and print media
- Identified collagen architecture of kangaroo knee cartilages and classified associated biomechanical functionalities
- Developed a MRI-only measurement protocol for whole joint knee evaluation and revealed the developmental pathway of post-traumatic-osteoarthritis using that protocol
- Demonstrated the capabilities of portable NMR for measuring mammographic density and tissue composition
- Received QUT Postgraduate Research Award

Major Accountabilities:

- Conduct independent research investigations using µMRI (Bruker 7T) and portable NMR (NMR-MOUSE) system
- Carry out all necessary steps required for MRI and NMR experiments including shimming, sequence optimization, sequence modification and scanning
- Develop software codes in MATLAB for data analysis, image processing, image segmentation and statistical analysis
- Perform MRI based tissue classification, identification of tissue abnormalities and quantitative assessment of structure and composition of biological tissues
- Train new students on the use of µMRI and MATLAB coding for MR data processing
- Organize collaborative research groups for human and animal study and maintain communications

Queensland University of Technology, Australia

Sessional Academic
June 2014 – December 2018

Key Accomplishments:

- Finalist for the Sessional Teaching and Reflection Showcase (STARS) at QUT
- Highly positive feedbacks from students, peers and course co-ordinators
- Continued appointments for the same courses every semester

Major Accountabilities:

- Lecture, conduct tutorials and workshops for SEB 115 – Experimental Science 1
- Demonstrate laboratory experiments for PCB 150 –Biomedical Physics and LQB 286 – Biomedical Skills 2
- Lecture on the laws of physics and explain the fundamental theories behind the scientific experiments
- Ensure scientific practise in experimental procedures, data collection, calculations and data analysis
- Responsible for smooth functioning of experimental equipment and optimum experimental outcome

Translational Research Institute, Australia

Research Assistant
March 2018 – June 2018

Key Accomplishments:

- Validated the sensitivity and accuracy of portable NMR for assessing mammographic density
- Published 1 original research paper in a peer reviewed journal

Major Accountabilities:

- Perform NMR scanning on breast tissue samples of varying densities for obtaining *T1* and *T2* relaxationdecays
- Develop software codes for NMR data processing

American International University Bangladesh, Bangladesh

Lecturer
May 2011 – January 2013

Key Accomplishments:

- Appointed as a course co-ordinator of Analog Electronics following excellent student and peer feedback
- Introduced, designed and offered a 4th year level course on Biomedical Sensors and Image Processing

Major Accountabilities:

- Lectured courses in the discipline of Electrical Engineering and Electronics
- Designed laboratory experiments and instructed laboratory classes on Signal Processing and Analog Electronics
- Developed structures and procedures for course evaluation and student feedback
- Prepared, coordinated and moderated questionnaire for midterm examinations and semester finals
- Marked assignments and exam papers, compiled course evaluation marks and prepared grades for courses

University of Calgary, Canada

MSc Candidate and Research Assistant
August 2008 – December 2010

Key Accomplishments:
- Thesis: Real-time Voxel-based Quantitative *T2* MRI Analysis and Applications
- Published 1 original research paper in a peer reviewed journal
- Research work presented at 7 national and international conferences
- Presentations on this research project won multiple awards including awards for oral presentation, poster presentation and travel awards

Major Accountabilities:
- Development of a software package (named Q*T2*Decoder) in Objective C and C++ for real-time voxel-based quantitative *T2* analysis
- Test the efficacy of Q*T2*Decoder by diagnosing, segmenting and analysing brain tumours in murine models
- Perform confocal microscopy evaluations for histological assessment of brain tumours in murine models
- Organize and lead a multi-disciplinary research group for animal study on murine tumours
- Train stuff and research students in Xcode and Objective-C language for macOS platform, assist in MRI based researches of fellow researchers

University of Alberta, Canada

Dean's Research Scholar
September 2007 – April 2008

Key Accomplishments:
- Received Dean's Research Award for excellent academic standing

Major Accountabilities:
- Assist senior researchers in data collection and documentation
- Attend group meetings and prepare report on research progression

EDUCATION

Queensland University of Technology, Australia

Doctor of Philosophy in Biomedical Engineering and Medical Physics (2019)

University of Calgary, Canada

Master of Science in Biomedical Engineering (2010)

University of Alberta, Canada

Bachelor of Science in Electrical Engineering (2008)

AWARDS AND SCHOLARSHIPS

- **National Imaging Facility Professional Development Grant:** University of Queensland, 2019.
- Awarded for **Associate Fellowship** by the **Higher Education Academy,** QUT Academy of Learning and Teaching for demonstrating excellence in teaching practise.
- **QUT Postgraduate Research Award:** Queensland University of Technology (2013 - 2016).
- **1st in poster presentation:** The 4th Canadian Student Conference on Biomedical Computing, March 12 – 14, 2009, Vancouver, Canada.

- **2nd in poster presentation:** 23rd International Congress and Exhibition of Computer Assisted Radiology and Surgery, June 22 – 25, 2009, Berlin, Germany.
- **3rd in oral presentation:** South Alberta Cancer Research Institution Research Day, June 18th (2010), Calgary, Canada.
- **Biomedical Engineering Graduate Scholarship:** University of Calgary (2009 - 2010).
- **Travel Awards:** Hotchkiss Brain Institute (2009 – 2010); Faculty of Graduate Studies (2009); The 4th Canadian Student Conference on Biomedical Computing (2009).
- **Jason Lang scholarship:** Government of Alberta (2007-2008).
- **Dean's Research award:** University of Alberta (2007-2008).

INVITED PARTICIPATION and MEDIA APPEARANCE

- **Invited talk on MRI workshop:** Quantitative Assessment of Breast Tissue Density by Single-sided portable NMR, ANZMAG 2019, Perth, Australia.
- **MRM Highlights:** Q&A with Tonima S. Ali and Konstantin I. Momot on the Editor's pick for September 2019 – Transverse relaxation-based assessment of mammographic density and breast tissue composition by single-sided portable NMR, Brisbane Australia.
- **Guest Lectures:** lectured for the course **MRES 7400** – MRI pulse sequence construction and image contrast for the program Master of Magnetic Resonance Technology and **ENGG 7811** – Research Methods offered by the School of Information Technology and Electrical Engineering, **University of Queensland**.
- **Scope TV Show:** "Kangaroos don't get knee injuries" (Season 3, Episode 148), a brief showcase of research work on kangaroo knee cartilage, May 2017, Brisbane, Australia.
- **ABC Radio** Canberra: a brief interview of research work on kangaroo knee cartilage, November 2016, Brisbane, Australia.
- **ABC Radio** Hobart: a brief interview of research work on kangaroo knee cartilage, November 2016, Brisbane, Australia.
- **Invited Talk:** Physics of Magnetic Resonance Imaging and its application in cancer diagnosis: 2009.
- Department of biomedical physics and engineering, Dhaka University, Dhaka, Bangladesh.
- **Tutorial leader of workshop:** Tips & Tricks 1: Relaxation acquisition and analysis tutorial session: 2011. International workshop of the Advanced White Matter Imaging, Reykjavik, Iceland.

PROFESSIONAL AFFILIATIONS

Member of **IEEE**, **ISMRM**, **ANZMAG, Engineers Australia**, **CSIRO** Education and Outreach

VOLUNTEER EXPERIENCE

CSIRO Scientists in School, QLD, NSW

July 2018 – Present

As part of CSIRO's Scientists in School initiative, I partnered with primary school science teachers to help, encourage and facilitate year 2 - year 6 students with their study of science. I organized scientific experiments for students to participate in and to improve their understanding of the laws of science in everyday life.

Radio 4EB

October 2013 – September 2015

I was a broadcaster and presenter of community radio programs hosted by Radio4EB. I was the convener for Bangla language group in 2014-2015 with responsibilities of fund raising and maintaining group activities.

Oxfam Australia

April 2014 – Present

I have been an active fundraiser for Oxfam Australia and have been an active participant of the 100 km trail walks organized by Oxfam Australia for fund raising purposes.

ADDITIONAL EXPERIENCES AND SKILLS

- Marker for posters at the annual conference of Brain and Mind Centre, the University of Sydney 2020.
- Organisation of journal club presentations at the University of Queensland (2019 - 2020) and the University of Sydney (2020 - 2021).
- Reviewer of "Introduction to Quantitative *T2* with Emphasis on Medical Imaging" edited by Thorarin A Bjarnason, Electronic book, Edition 1.0
- Reviewer of University of Calgary Graduate Student Conference, Calgary; May 5 – 7, 2010
- NAATI enlisted translator and interpreter between English and Bangla Language, worked as a freelancer and for Immigration Australia
- Author of a book poetry published in 2006, written in Bangla

REFERENCES

Provided on request