TAJWAR ABRAR ALEEF

Vancouver, British Columbia, Canada
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AREAS OF EXPERTISE

Medical Imaging & Analysis | Image Processing | Computer Vision | Artificial Intelligence | Adversarial Training | Ultrasound Imaging | Ultrasound Elastography

EDUCATION

PhD, Biomedical Engineering (in-progress) *Sep 2018 – Present*
University of British Columbia (UBC), Vancouver, Canada
***Dissertation*:** Ultrasound guided prostate cancer diagnosis and treatment.
***Supervisors*:** Dr. Septimiu E. Salcudean & Dr. S. Sara Mahdavi

MSc, ERASMUS+ Joint MSc in Medical Imaging & Applications *Sep 2016 – Sep 2018*
University of Burgundy-France, University of Cassino and Southern Lazio-Italy, University of Girona-Spain, & Radboud University Medical Center-Netherlands
***Dissertation*:** Malignancy estimation of pulmonary nodules using multi-view multi-time point convolutional neural networks.
***Supervisors*:** Dr. Bram van Ginneken & Dr. Colin Jacobs | **CGPA: 8.9/10 (*thesis ranked top 2nd*)**

BSc, Electrical & Electronic Engineering (EEE) *Aug 2012 – Feb 2016*
American International University-Bangladesh (AIUB), Bangladesh
***Dissertation*:** Design and performance measurement of an in-body implantable miniaturized slot dipole rectangular patch antenna for biomedical applications.
***Supervisor*:** Dr. Rashedul Hoque | **CGPA: 3.96/4.00 (*Summa Cum Laude distinction*)**

RESEARCH & TEACHING EXPERIENCE

Research Assistant, Robotics and Control Laboratory, UBC, Canada *Sep 2018 – Present*
***Supervisors*:** Dr. Septimiu E. Salcudean & Dr. S. Sara Mahdavi
– Working on improving ultrasound-guided diagnosis and treatment of prostate cancer. Collaborating with BC Cancer and Vancouver General Hospital (Vancouver, Canada) and developing a multi-parametric ultrasound system to improve non-invasive detection of prostate cancer. My other work includes automating low-dose-rate prostate brachytherapy treatment planning using adversarial networks.

Teaching Assistant, Dept. of Electrical and Computer Engineering & School of Biomedical Engineering, UBC, Canada *Jan 2019 – Present*
• ***CPEN 491, ELEC 491, ELEC 494: Capstone Design Project,* 2020W1, 2020W2, 2021W1 & 2021W2:** Supervisory TA of nine final year engineering projects teams (44 undergraduates) working on solving industrial problems from multiple disciplines.
• ***BMEG 321: Biomedical Instrumentation,* 2021S–2021W1:** Sourcing and purchasing multiple types of medical equipment to be used for taking lab sessions for this course in the coming years. Also in charge of developing the materials to be covered in the lab.
• ***EECE 570: Fundamentals of Visual Computing,* 2018W2 & 2019W2:** Developed & graded assignments, helped students with assignments and course projects.
• ***ELEC 421: Digital Signal and Image Processing,* 2019W1:** Took tutorials and lab sessions, prepared & graded lab assignments.

Graduate Research Student, Diagnostic Image Analysis Group, *Jan 2018 - Sep 2018*
Radboud University Medical Center, Netherlands
***Supervisors*:** Dr. Bram van Ginneken & Dr. Colin Jacobs
- Worked on developing a novel deep learning architecture to estimate malignancy in pulmonary lung nodules. CT images of patients taken over time were utilized here– providing the network with information on disease progression. This produced state-of-the-art results compared to standard single time-point disease estimation.

Graduate Research Intern, Division of Image Processing, *Jun 2017 - Sep 2017*
Leiden University Medical Center, Netherlands & Delft University of Technology, Netherlands
***Supervisors*:** Dr. Marius Staring & Dr. Jan van Gemert
- Developed a deep learning framework for automatically estimating the location and orientation of brachytherapy applicators used during radiation therapy for cervical cancer. This information is required for real-time guided treatment interventions.

PUBLICATIONS [*click here for full list*]

Selected Conferences:

[1] **Tajwar Abrar Aleef**, Ingrid T Spadinger, Michael D Peacock, Septimiu E Salcudean, and S Sara Mahdavi. Rapid treatment planning for low-dose-rate prostate brachytherapy with tp-gan. *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, 2021. [***Oral Presentation***, *link*, *interview*].

[2] Megha Kalia†, **Tajwar Abrar Aleef**†, Nassir Navab, Septimiu E Salcudean, and Peter Black. Co-generation and segmentation for generalized surgical instrument segmentation on unlabelled data. *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, 2021. [***Oral Presentation; received MICCAI Travel Award***, *link*].

[3] **Tajwar Abrar Aleef**, Ingrid T Spadinger, Michael D Peacock, Septimiu E Salcudean, and S Sara Mahdavi. Centre-specific autonomous treatment plans for prostate brachytherapy using cgans. *International Conference on Information Processing in Computer-Assisted Interventions (IPCAI)*, 2021. [***Oral Presentation; received Honorary Award for Best Oral Presentation***, *link*].

[4] Md Kamrul Hasan, **Tajwar Abrar Aleef**, and Shidhartho Roy. Automatic mass classification in breast using transfer learning of deep convolutional neural network and support vector machine. In *2020 IEEE Region 10 Symposium (TENSYMP)*, pages 110–113. IEEE, 2020. [***Oral Presentation***, *link*].

[5] **Tajwar Abrar Aleef** and Akash Biswas. Design and measurement of a flexible implantable stripline-fed slot antenna for biomedical applications. In *Electrical Engineering and Information Communication Technology (ICEEICT), 2016 3rd International Conference on*, pages 1–5. IEEE, 2016. [*link*].

[6] Nasim Al Islam, **Tajwar Abrar Aleef**, Ussash Arafat, and Akib Jayed Islam. Design improvement and performance comparison of an existing slot dipole bendable antenna for biomedical applications. In *Informatics, Electronics and Vision (ICIEV), 2016 5th International Conference on*, pages 508–512. IEEE, 2016. [***Oral Presentation***, *link*].

[7] Nasim Al Islam, **Tajwar Aleef Aleef**, Ussash Arafat, Akib Jayed Islam, and Rashedul Hoque. Design and performance measurement of an in-body implantable miniaturized slot dipole rectangular patch antenna for biomedical applications. In *Advances in Electrical Engineering (ICAEE), 2015 International Conference on*, pages 59–63. IEEE, 2015. [***Oral Presentation***, *link*].

† Indicates joint first author

Selected Journals:

[1] **Tajwar Abrar Aleef**, Ingrid T Spadinger, Michael D Peacock, Septimiu E Salcudean, and S Sara Mahdavi. Centre-specific autonomous treatment plans for prostate brachytherapy using cgans. *International Journal of Computer Assisted Radiology and Surgery*, pages 1–10, 2021. [*link*].

[2] Yeman Brhane Hagos, Vu Hoang Minh, Saed Khawaldeh, Usama Pervaiz, and **Tajwar Abrar Aleef**. Fast pet scan tumor segmentation using superpixels, principal component analysis and k-means clustering. *Methods and Protocols*, 1(1):7, 2018. [*link*].

[3] **Tajwar Abrar Aleef**, Yeman Brhane Hagos, Vu Hoang Minh, Saed Khawaldeh, and Usama Pervaiz. Design and simulation-based performance evaluation of a miniaturised implantable antenna for biomedical applications. *Micro & Nano Letters*, 12(10):821–826, 2017. [*link*].

Conference Abstract Poster Presentations:

[1] **Tajwar Abrar Aleef**, Ingrid T Spadinger, Michael D Peacock, Septimiu E Salcudean, and S Sara Mahdavi. Rapid treatment planning for low-dose-rate prostate brachytherapy. *Image-Guided Therapeutics Diagnostics*, 2021.

[2] **Tajwar Abrar Aleef**, Ingrid T Spadinger, Michael D Peacock, Septimiu E Salcudean, and S Sara Mahdavi. Stepping towards intra-operative treatment planning for low-dose-rate prostate brachytherapy with rapid automatic ai-based planner. *SBME 2021 Symposium*, 2021.

[3] **Tajwar Abrar Aleef**, Ingrid T Spadinger, Michael D Peacock, Septimiu E Salcudean, and S Sara Mahdavi. Further evaluation of an automatic treatment planning technique for prostate brachytherapy. *SBME Research Day*, 2021.

[4] **Tajwar Abrar Aleef**, Ingrid T Spadinger, Michael D Peacock, Septimiu E Salcudean, and S Sara Mahdavi. Ai-assisted automatic centre-specific treatment plans for prostate brachytherapy. *Emerging Technologies: BC's AI Showcase*, 2020.

SCHOLARSHIPS & AWARDS

- **Affiliated Doctoral Scholarship, 2020–2021 (16,000 CAD)** – Offered to only a handful of highly meritorious students after university-wide competition (based on academic excellence) by the Faculty of Graduate and Postdoctoral Studies at the University of British Columbia.
- **Faculty of Applied Science Graduate Award, International Tuition Award, & President's Academic Excellence Initiative PhD Award, 2018–2021 (18,106 CAD)** – In recognition of academic achievements provided by the University of British Columbia.
- **Erasmus Mundus Joint Master (EMJMD) scholarship, 2016–2018 (65,184 CAD)** – Highly competitive & prestigious scholarship offered to top-ranked applicants covering full MSc tuition fees with a monthly stipend for 24 months provided by the European Union.
- **Academic Scholarship, 2012–2016 (7,866 CAD)** – Consistent merit based academic scholarship for exceptional academic performance throughout BSc from American International University-Bangladesh.
- **Summa Cum Laude Distinction, 2016** – Highest academic honor from American International University-Bangladesh for completing BSc with a CGPA of 3.96/4.00 under full course load.
- **Full tuition waiver, 2014 (39,385 CAD)** – Ranked as top applicant and was offered 100% tuition waiver for BSc in Electrical and Electronics Engineering from Middle East Technical University, Turkey (***declined***).

- **Edexcel's High achievers' Award, 2012 –** From Pearson Edexcel & British Council (United Kingdom) for obtaining world's highest marks (600/600) in GCE Advanced level Accounting.
- **Daily Star Award, 2012 –** Awarded for obtaining highest possible grades in GCE Advanced level courses with one world's highest marks.
- **Daily Star Award, 2010 –** Awarded for obtaining highest possible grades in GCE Ordinary level courses.

SELECTED VOLUNTEERING ACTIVITIES

- **Treasurer, Electrical and Computer Engineering Graduate Student Association (ECEGSA), UBC:** Worked as a treasurer for the association. ECEGSA organizes social, academic, and professional development events tailored to building a stronger community of students within the department.
- **Executive Member and Treasurer, Biomedical Engineering Graduate Association (BMEGA), UBC:** Worked as a treasurer and executive member for the association. BMEGA strives in improving the quality of life of biomedical engineering graduate students at UBC by organizing academic, social, and industrial events.
- **Content Developer and Volunteer, IEEE AIUB Student Branch, AIUB:** Developed video content for promotional events of the club, mentored in departmental workshops, and volunteered in organizing several university events.
- **Video content developer, Light of Hope Bangladesh:** Developed educational video materials to be used with their product Sputnique: A solar-powered digital school in a backpack. This project aims to make high-quality education easily accessible to all corners of Bangladesh by fitting everything needed to run a classroom in a single backpack.
- **Volunteer, Jaago Foundation (non-profit organization):** Volunteered to raise funds used for building schools and providing free education for poverty-stricken children in Bangladesh.
- **Founder, Robot Maniacs Club:** A student-run club with the main motive of inspiring members into learning robotics through practical problem-solving challenges. We also held regular events for showcasing projects and hosted robot building contests to encourage iterative improvement in design and promote healthy competitions.
- **Academic Reviewer:** Reviewed several conference and journal articles from Information Processing in Computer-Assisted Interventions (IPCAI), Artificial Intelligence In Medicine (IF: 5.3), Physica Medica: European Journal of Medical Physics (IF: 2.7), and World Journal of Surgical Oncology (1.9).

TECHNICAL SKILLS

Programming languages: Python*, MATLAB*, C++, Java
Machine learning libraries: Keras*, TensorFlow*, PyTorch, fast.ai, Tensorlayer, SciPy*, Scikit-Learn*, NumPy*, Pandas*, Matplotlib*, OpenCV*, Seaborn

REFERENCES

Dr. Septimiu E. Salcudean
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