MOTAZ ALQAOUD

Senior AI/ML Engineer • Healthcare Technology • Medical AI Innovation

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SUMMARY

Senior AI/ML Engineer at Abbott and Ph.D. Biomedical Engineer, currently leading AI integration into current healthcare product lines. Proven track record spanning industry and doctoral research: from directing cross-functional teams translating AI into scalable clinical solutions at Abbott, to developing a real-time AI-driven surgical navigation system for breast cancer surgery in doctoral work. Skilled in deep learning, patient-specific modeling, biomechanical simulation, R&D, and clinical translation. Pursuing an MBA to complement deep technical expertise with business strategy and leadership.

WORK EXPERIENCE

Senior AI/ML Engineer — Team Lead, AI Integration

Abbott — Healthcare Technology & Medical AI 2025 – Present

- Serve as team lead responsible for integrating AI/ML capabilities into current healthcare product lines, directing technical direction and cross-team execution.
- Develop and deploy AI/ML models supporting healthcare technology and medical device applications.
- Collaborate with cross-functional teams of engineers, clinicians, and product stakeholders to translate AI research into scalable clinical solutions.
- Apply deep learning and computer vision to complex medical data, improving outcome accuracy and clinical workflow efficiency.
- Contribute to innovation initiatives integrating artificial intelligence into next-generation healthcare technologies.

Ph.D. Researcher — Surgical Navigation & Medical Imaging ML/AI

Old Dominion University · Supervisor: Michel Audette, Ph.D. July 2020 – December 2024

- Developed a novel, real-time AI-driven surgical navigation system for breast cancer surgery, spanning diagnosis through the surgical procedure by integrating deep learning, patient-specific modeling, and biomechanical simulation.
- Achieved high-accuracy lesion localization (within 4.6 mm) using medical image segmentation, registration, and FE-based tissue modeling.
- Implemented and deployed deep neural networks for surgical guidance using high-performance computing for real-time analysis.
- Collaborated with surgical and radiology teams at Eastern Virginia Medical School to translate research into clinical applications.
- First-authored multiple peer-reviewed conference publications (EMBC, ANNSIM) on breast imaging innovations.
- Emphasized clinical data handling and ethical research standards.

Graduate Teaching Assistant

Batten College of Engineering & Technology, Old Dominion University · Department Chair: Oscar Gonzalez, Ph.D. September 2020 – December 2024

- Conducted labs, held office hours, graded homework, and supervised quizzes for:
  - ECE 111: Information Literacy and Research (Fall 2023)
  - ENGN 150: Computer Programming for Engineering Problem Solving (Spring 2022, 2024)
  - ECE 201/202: Circuit Analysis I and II (Fall 2022, Spring/Summer 2023)
  - ECE 304: Probability and Statistics for Reliability (Fall 2021, 2024)
  - ECE 381: Discrete-Time Signal Processing (Fall 2022, Spring/Summer 2023)
  - BME 403: Medical Image Analysis (Fall 2020, Spring 2021)
- Served as ECE Department Tutor (Fall 2023 & Fall 2024).

Biomedical Researcher — Bioelectric/Cellular Engineering

Frank Reidy Center for Bioelectrics · Supervisor: Anna Bulysheva, Ph.D. October 2019 – April 2020

- Investigated the effects of nanosecond electric pulses on cardiomyocytes and cancer cells.
- Assisted with anesthetization and operations on animal models; gained proficiency in sterile cell culture and chemical fume vent techniques.

- Trained in various cell assays and fluoroscopy techniques.

Graduate Teaching Assistant
Tagliatela College of Engineering, University of New Haven · Supervisor: Saion Sinha, Ph.D. September 2018 – May 2019
- Assisted students in creating EMG, EEG, ECG, and thermometer circuits using ELVIS II + National Instruments Workstation with LabVIEW for the Biosensors & Instrumentation lab course.

Graduate Research Assistant — Drug Delivery / Polymers
Center for Integrative Materials Discovery · Supervisor: Dequan Xiao, Ph.D. August 2018 – December 2018
- Synthesized block copolymers; performed IR and 1H NMR analysis of copolymer structures and formation data.

Quality Assurance & Data Researcher
The Center for Analytics, University of New Haven · Supervisor: Samantha Carlisto October 2017 – February 2019
- Supervised daily tasks of data entry, collection, and research; participated in team meetings on efficiency and productivity improvements.

EDUCATION

Old Dominion University — Norfolk, VA
Doctor of Philosophy (Ph.D.) in Biomedical Engineering *December 2024*
- Dissertation: "Real-Time Navigation System for Breast Cancer Surgery with Pre- and Intra-Operative Imaging Using Neural Networks."
- Supervisor: Michel Audette, Ph.D.
- Relevant Coursework: Medical Image Analysis, Machine Learning, Biomaterials, Biomechanics, Modern Biomedical Instrumentation, Digital Signal Processing I, Regenerative Medicine, Responsible Conduct of Research, Cellular/Molecular Biology.

University of New Haven — West Haven, CT
Master of Science (M.S.) in Biomedical Engineering *May 2019*
- Supervisor: Kagya Amoako, Ph.D.
- Relevant Coursework: Nanobiotechnology, Biomedical Polymers, Tissue Engineering, Design of Experiments, Biosensors and Instrumentation, Mechanical Engineering Analysis.

Cairo University — Giza, Cairo, Egypt
Bachelor of Engineering (B.E.) in Biomedical and Systems Engineering *May 2014*
- Relevant Coursework: Computer Systems, Electronic Devices and Circuits, Signals Systems and Networks, Clinical Engineering, Bioelectronics and Measurements, Medical Electronic Systems, Systems Engineering, Physiology and Anatomy, Biochemistry.

CERTIFICATIONS & CONTINUING EDUCATION

- Reinforcement Learning Specialization — University of Alberta & Amii (Coursera): Fundamentals of RL, Sample-based Learning Methods, Prediction & Control with Function Approximation, Complete RL System (Capstone).
- AI for Medical Diagnosis — DeepLearning.AI: CNN models for image classification and segmentation to diagnose lung and brain disorders.
- TensorFlow Developer Professional Certificate — DeepLearning.AI: Intro to TensorFlow, CNNs in TensorFlow, NLP in TensorFlow.
- Develop Generative AI Applications: Get Started — IBM.
- AI Agent Fundamentals with Azure AI Foundry — Microsoft.
- Foundations of AI & Machine Learning; Machine Learning Pipelines with Azure ML Studio; Perform Data Science with Azure Databricks — Microsoft.
- DevOps, DataOps, MLOps — Duke University.
- Data Engineering in AWS — Whizlabs: data gathering, missing-data handling, feature extraction/selection using PCA and variance thresholds.
- Advanced Machine Learning and Deep Learning — Packt.
- Digital Twins — University of Michigan; Mastering Digital Twins — 28DIGITAL.
- Innovate with ANSYS Simulation Tools — Coursera.
- Machine Learning — O.P. Jindal Global University.

CONFERENCES & PROFESSIONAL EVENTS

- World Agentic AI Summit — Luxatia International. Berlin, Germany (February 2026). Executive summit on autonomous AI systems, multi-agent architectures, and enterprise AI governance.
- Simulation World Central — ANSYS. Minneapolis, MN (May 2026). Industry event on advanced simulation across healthcare, automotive, and aerospace applications.
- RAPS Twin Cities Chapter — MN Medical Devices Essentials. Medtronic Headquarters, Minneapolis, MN (June 2026). Regulatory symposium: FDA submissions, biocompatibility, AI in MedTech, EU MDR/IVDR.
- Current Applications and Future of Artificial Intelligence in Cardiology — Mayo Clinic. Napa, CA (October 2026). CME course on generative AI, predictive modeling, and clinical decision support in cardiology.

PUBLICATIONS

- M. Alqaoud, M. A. Audette, et al., "Simulation of Breast Deformation Due to US Probe," Annual Modeling and Simulation Conference (ANNSIM), Madrid, Spain, 2025.
- M. Alqaoud, "Real-Time Navigation System for Breast Cancer Surgery with Pre- and Intra-Operative Imaging Using Neural Networks," Ph.D. Dissertation, Old Dominion University, 2024. (ODU Digital Commons)
- M. Alqaoud, J. Plemmons, E. Feliberti, S. Dong, K. Kaipa, G. Fichtinger, Y. Xiao, M. A. Audette, "nnU-Net-based Multi-modality Breast MRI Segmentation and Tissue-Delineating Phantom for Robotic Tumor Surgery Planning," 44th Annual Intl. Conf. IEEE EMBC, 2022, pp. 3495–3501. doi:10.1109/EMBC48229.2022.9871109.
- M. Alqaoud, J. Plemmons, E. Feliberti, K. Kaipa, S. Dong, G. Fichtinger, Y. Xiao, M. A. Audette, "Multi-Modality Breast MRI Segmentation Using nnU-Net for Preoperative Planning of Robotic Surgery Navigation," Annual Modeling and Simulation Conf. (ANNSIM), 2022, pp. 317–328. doi:10.23919/ANNSIM55834.2022.9859361.
- M. Alqaoud, J. Plemmons, E. Feliberti, K. Kaipa, G. Fichtinger, Y. Xiao, T. Rashid, M. A. Audette, "Multi-Material, Approach-Guided, Controlled-Resolution Breast Meshing for FE-Based Interactive Surgery Simulation," Annual Modeling and Simulation Conf. (ANNSIM), 2023, pp. 402–412.

NATIONAL / INTERNATIONAL CONFERENCE PRESENTATIONS

- M. Alqaoud et al., "nnU-Net-based Multi-modality Breast MRI Segmentation and Tissue-Delineating Phantom for Robotic Tumor Surgery Planning," 44th Annual Intl. Conf. IEEE EMBC, Glasgow, Scotland, July 11–15, 2022.
- M. Alqaoud et al., "Multi-Modality Breast MRI Segmentation Using nnU-Net for Preoperative Planning of Robotic Surgery Navigation," ANNSIM, San Diego, CA, July 18–20, 2022.
- M. Alqaoud et al., "Multi-Material, Approach-Guided, Controlled-Resolution Breast Meshing for FE-Based Interactive Surgery Simulation," ANNSIM, Hamilton, ON, Canada, May 23–26, 2023.
- M. Alqaoud, M. A. Audette, et al., "Simulation of Breast Deformation Due to US Probe," ANNSIM, Complutense University of Madrid, Spain, May 2025.

LOCAL CONFERENCE PRESENTATIONS

- "Multi-Modality Breast MRI Segmentation Using nn-UNet for Preoperative Planning of Robotic Surgery Navigation," 15th Annual Modeling, Simulation, and Visualization Student Capstone Conference, VMASC, Suffolk, VA, April 14, 2022.
- "Real-Time Navigation for Robotic Breast Cancer Surgery Using Open-Source Toolkits and Intra-Operative Imaging," 14th Annual VMASC Student Capstone Conference, Suffolk, VA, April 22, 2021.
- "Multi-Material, Approach-Guided, Controlled-Resolution Breast Meshing for FE-Based Interactive Surgery Simulation," 16th Annual VMASC Student Capstone Conference, Suffolk, VA, April 20, 2023.

INVITED TALKS

- Electrical & Computer Engineering Graduate Seminar, Old Dominion University, April 2022.
- Electrical & Computer Engineering Graduate Seminar, Old Dominion University, February 2023.

HONORS & AWARDS

- Best Graduate Teaching Assistant — ECE Department, Old Dominion University (2023–2024).
- Best Paper (Medical Track) — Modeling & Simulation Student Capstone Conference (2022, 2023).

- Best Overall Paper — Modeling & Simulation Student Capstone Conference (2022).
- Best Presenter, General Sciences & Engineering Track — Modeling & Simulation Student Capstone Conference (2021).
- Reviewer — Clinical Breast Cancer Journal (Elsevier); recognized by editors for significant contributions.
- ECE Department Assistantship, Old Dominion University (2019–2024).
- Tagliatela College of Engineering Scholarship, University of New Haven (2017–2019).

LEADERSHIP SKILLS

- Lead AI integration at Abbott as team lead, directing the technical roadmap for embedding AI/ML capabilities into current healthcare product lines and coordinating execution across engineering, clinical, and product teams.
- Drive cross-functional alignment between engineers, clinicians, and product stakeholders, translating AI research into decisions and scalable clinical solutions.
- Mentor and guide engineers on AI/ML best practices and model deployment within a regulated healthcare environment.
- Taught over 200 students across circuit analysis, computer programming, discrete-time signal processing, and medical image analysis, fostering a collaborative learning environment.
- Tutored students in the ECE department at Old Dominion University, prioritizing inquiry, innovation, and critical thinking.
- Presented research at national and international conferences, communicating complex ideas to diverse audiences.
- Awarded for teaching excellence, demonstrating strong instructional leadership and commitment to student development.
- Engaged in academic leadership, organizing and presenting seminars and conferences within the engineering department.
- Reviewer for Clinical Breast Cancer (Elsevier); recognized by the journal's editors for significant contributions to the field.

TECHNICAL & SOFT SKILLS

- **AI & Machine Learning:** Deep Learning, CNNs, GNNs, RNNs, Reinforcement Learning, Generative AI, LLM & Agentic AI, NLP, Image Processing and Analysis, Image Segmentation & Registration, Patient-Specific Approach Treatment. Tools: Python, PyTorch, TensorFlow.
- **Medical Imaging & Image-Guided Surgery:** DICOM, NIfTI, MINC, MRI, 2D/3D Ultrasound, Image-Guided Therapy, Surgical Planning. Tools: 3D Slicer, PLUS Toolkit, Image-Guided Surgical Tools, Surgical Tracker, ITK/VTK, MS Visual Studio, CMake, CUDA, HPC.
- **MLOps & Cloud:** DevOps/DataOps/MLOps, Azure ML, Azure Databricks, AWS Data Engineering, Docker.
- **Biomedical Device Development, CAD & 3D Modeling:** Design of Experiments (DOE), Factorial Design, ANOVA, Patient-Specific Mesh Generation, Customized Modeling, Personalized Soft-Tissue Modeling, Biomechanics Testing, 3D Printing, Finite Element Analysis (FEA), Digital Twins. Tools: SolidWorks, Abaqus, ANSYS, CGAL, Blender, MeshLab, LabVIEW, Minitab.
- **Regulatory & Compliance:** FDA Submissions, Software as a Medical Device (SaMD), Biocompatibility, EU MDR/IVDR, Clinical Validation, AI in MedTech.
- **Soft Skills:** Teamwork, Flexibility, Adaptability, Communication, Problem-Solving, Time Management, Leadership, Documentation, Critical Thinking, Research Translation, Clinical Collaboration, Presentation Skills.
- **Productivity & Collaboration:** Microsoft Word, Excel, PowerPoint, Visio, OneNote, EndNote, Teams, SharePoint, Outlook, Zoom, Slack, Google Workspace (Docs, Sheets, Slides, Drive).

AFFILIATIONS & MEMBERSHIPS

- Institute of Electrical and Electronics Engineers (IEEE), 2021–2024.
- Old Dominion University Biomedical Student Engineering Association, 2019–2024.
- Old Dominion University Table Tennis Club, 2022–2024.