

Matthew McTaggart

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WORK EXPERIENCE

Deep Novo Medical

2024 – Present

Research and Development Engineer

Cayman Islands

- Design and develop convolutional neural network based models for detection, segmentation and classification of lung nodules
- Configure and containerize the deep learning server for multiple engineers
- Organize and construct complex medical datasets for model training and testing

Broncus Medical

Feb. 2019 – 2024

Research and Development Imaging Engineer – Archimedes Total Lung Access Platform

San Jose, CA

Software Development

- Develop and maintain current automatic and manual route planning algorithms for in-airway navigation
- Develop an automatic and manual transthoracic route planning algorithm
- Restructure core library modules with public, private, build, and install interfaces
- Export thoracic segmentations as DICOM-RT objects
- Implement geometrical post-processing for in CT image landmark detection
- Background case processing to expedite user input
- Rewrite CMake build system to be target based instead of directory based
- Upgrade development environment from Visual Studio 2015 to 2022

Systems Engineering

- System integration of the Matrox Orion HD and Clarity UHD capture cards
- System integration of the NDI Vega and Polaris Trackers
- Develop engineering tools to test, verify and integrate new features into our core algorithm modules
- Create utility programs for field personnel to easily extract, modify and analyze problematic patient cases, and equipment calibrations and registrations

Development Operations

- Develop standard operation procedures and protocols from a local team of 4 to a global team of 40
- Migrate self-hosted Gitlab repositories, issue boards, and documentation to Gitlab.com
- Develop and maintain software builds for product releases
- Administrator and maintainer for Gitlab groups and projects

PATENTS

- Woei, Ernest. McTaggart, Matthew. Yu, Kun-Chang. Smith, Abbe. 2023. Intraprocedure 2D to 3D Registration Adjustment Method and System. US/PCT Application No. 18/450,911 filed 8/16/2023. Patent pending.
- McTaggart, Matthew. Yu, Kun-Chang. 2023. Transthoracic Route Planning System and Method. US/PCT Application No. 63/435,009 filed 12/23/2023. Patent pending.

TECHNICAL SKILLS & INTERESTS

- **Languages:** C#, C++, C, Python, PowerShell, CUDA, Verilog, GLSL, CMake, SQL
- **Frameworks & Libraries:** PyTorch, NVIDIA MONAI, .NET Framework, WPF, MFC, VTK, OpenMP, OpenCV, ITK, OpenGL, Vulkan, MIL, NDI, Qt
- **Tools:** Visual Studio, Conan Package Manager, 3DSlicer, DICOM, DICOM-RT, DVTk, Microsoft Office, NVIDIA Clara SDK, Git, SVN, Docker, Virtual Box, MATLAB, Adobe CS, AutoCAD, NI Software Suite
- **Operating Systems:** Windows, Linux
- **Skills:** DevOps; systems integration; software management; business operations; research and development; image processing; computer vision; machine learning; deep learning; containerization
- **Personal Interests:** the ocean; hiking; running; traveling; drumming and music; video games; board games

EDUCATION

Penn State University

M.S. in Electrical Engineering

B.S. in Electrical Engineering – summa cum laude

B.S. in Civil Engineering (Student Marshall) – summa cum laude

Dec. 2018

University Park, PA

RESEARCH & PUBLICATIONS

Medical Visualization and Navigation

2018

- 3D visualization of airway tree with virtual camera navigation
- 2D oblique slice and slab visualization of a 3D CT image using compute shaders
- Developed using C++, Qt, and OpenGL

Robust Video Frame Classification for Bronchoscopy – *M.S. Thesis*

2018

- Utilization of image processing, machine learning and deep learning
- McTaggart, Matthew I., and William E. Higgins. "Robust video-frame classification for bronchoscopy." *Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling*. Vol. 10951. SPIE, 2019.

Use of Adaptive Filtering for Improved Performance in Digital Stethoscopes

2017

- Display acoustical heart signals and heart rate with SIMULINK testing for adaptive noise cancelling
- Hall, Donald L., Matthew I. McTaggart, and William K. Jenkins. "Use of adaptive filtering for improved performance in digital stethoscopes." *2017 51st Asilomar Conference on Signals, Systems, and Computers*. IEEE, 2017.

TEACHING

EE 350 – Continuous-Time Linear Systems (130 Students)

2018

- Host two of six recitation sections to accompany lectures
- Exam creation, supervision and grading

EE 455 – Digital Image Processing (60 Students)

2017

- Host MATLAB tutorials, office hours and grading