

ALEX HAGIOPOL

Contact: alexhagiopol@gmail.com Open Source Software and Research: alexhagiopol.com

EXPERIENCE

Facebook (tech.fb.com/ar-vr/)

Software Engineer, Facebook Reality Labs

San Francisco Bay Area, CA

Mar 2020 - Present

- Contributed technical leadership and production software to Facebook's effort to ship the world's next computing platform to consumers. Created the foundation of Oculus augmented reality products by writing fundamental mathematical software, scientific research paper implementations, and software infrastructure in C++ and CUDA.
- Designed and implemented on-device algorithms for scene reconstruction. Performed scientific literature review, software implementation, and evaluation. Influenced hardware teams to implement my work into on-product silicon.
- Designed and implemented a GPGPU mathematical algorithm pipeline used to simulate silicon implementations of on-product computer vision algorithms. Unblocked research and development efforts across a 300+ person organization by providing algorithm results in a live application 1+ year before the physical silicon itself could be tested. Designed and implemented linear algebra library, computational geometry library, numerical optimizer library, the computer vision algorithms in question, and build and testing infrastructure all in multithreaded modern C++ and CUDA.
- Led my team's software engineering standards committee. Designed and executed software quality standards and metrics that influenced 10+ engineers to contribute to code quality, design documentation, and unit test coverage.

Microsoft (microsoft.com/en-us/mixed-reality)

Software Engineer, AI Perception and Mixed Reality Group

San Francisco Bay Area, CA

Oct 2017 - Nov 2019

- Collaborated with Microsoft Research (MSR) to develop scientific research papers into features for the [HoloLens 2](#) augmented reality headset. Contributed machine learning and computer vision research in addition to production software in modern C++, CUDA, and Python.
- Designed and implemented my organization's core computer vision technology in the form of a GPU-accelerated dense 3D scene reconstruction system. Designed and implemented the core mathematical algorithms in the following areas: linear algebra, image processing, computational geometry, computer vision, and machine learning. This work replaced a legacy technology in 10X fewer lines of code with 10X faster performance.
- Designed and implemented a machine learning system for high-precision segmentation system based on research in statistical learning and deep learning. Designed and implemented the core statistical learning algorithms in C++ and CUDA. Leveraged Python and TensorFlow for neural network components. This work advanced the group's state-of-the-art in the problem domain and led to first-authoring a patent application, "[Segmentation for Holographic Images](#)".
- Maintained, refactored, and unit tested MSR algorithm codebases as the code moved from research to production. Created a unit testing system, removed over 3 million lines of C++ and CUDA code through refactoring, and converted the codebases' version control systems from deprecated internal tools to Git.

DroneDeploy (dronedeploy.com)

Software Engineer, Computer Vision Group

San Francisco Bay Area, CA

May 2016 - June 2017

- Contributed to a C++ computational geometry engine that computes 3D maps using 2D drone-captured imagery.
- Contributed C++ software features yielding a 3D mapping reliability increase from < 50% to 99.9% in 8 months without affecting result quality or computation speed.
- Contributed new product features including neural network based classifier for map regions of interest, and fast 2D map preview using feature detection, feature matching, and image transformations.

NASA (nasa.gov)

Research Intern, Autonomy Incubator Group

Hampton, VA & Remote

May 2015 - May 2016

- Researched and implemented computer vision and machine learning algorithms applied to autonomous robotics.
- Investigated computer vision based localization techniques applied to NASA's prototype robots for Mars exploration. Contributed implementation improvements, literature research, and visualization tools for performance evaluation.
- Collaborated with NASA researchers to develop a 3D reconstruction system based on frame-to-frame region-of-interest tracking and numerical optimization of 3D planar region poses. Implemented region-of-interest detection, region tracking, optimization mathematics, visualization pipeline in C++. Presented results at AIAA conference and to NASA leadership which led to earning grant funding for my M.Sc. studies.

EDUCATION

Georgia Institute of Technology (cc.gatech.edu)

M.Sc. in Computer Science (GPA: 3.8, Full Scholarship, Dean's List)

Atlanta, GA

Dec 2016

Studied Computer Vision, Machine Learning, Computational Photography, Advanced Algorithm Design & Analysis, and Robotics.

B.Sc. in Mechanical Engineering (GPA: 3.9, Full Scholarship, Dean's List, Vice President of Tau Beta Pi)

May 2012

Studied Linear Algebra, Calculus, Statistics, Numerical Methods, Data Structures, Algorithm Design & Analysis, and Robotics.