

OVERVIEW	Strong background in research, algorithm development, and software engineering. Core areas include Surface Reconstruction, Computer Graphics, Computational Geometry, SLAM, Signal Processing, and Computer Vision.		
EDUCATION	University of California - Berkeley		
	Ph.D. in Electrical Engineering and Computer Sciences		May 2015
	M.S. in Electrical Engineering and Computer Sciences		May 2013
	GPA: 4.00/4.00		
	Carnegie Mellon University		
WORK EXPERIENCE	B.S. in Electrical and Computer Engineering		May 2011
	QPA: 3.91/4.00 - Dean's List		
	<i>Minors in Physics, Computer Science</i>		
	Google		03/2016 - Present
	Senior Software Engineer - Daydream AR/VR		
WORK EXPERIENCE	<ul style="list-style-type: none">- Developed real-time passive depth sensing on mobile hardware.- Tech lead on real-time 3D reconstruction techniques with noisy depth on smartphones.- Tech lead on foveated rendering techniques for mobile VR headsets.- Developed custom hardware-foveation displays for VR.- <i>6 patents filed.</i>		
	Indoor Reality, Inc.		06/2015 - 03/2016
	Chief Technology Officer (CTO) and cofounder		
	<ul style="list-style-type: none">- Principal Investigator (PI) on multiple federal grants totalling \$2 Million.- Tech lead in developing hardware, software, and algorithms used for automatic and rapid indoor building 3D modeling via backpack-mounted scanning system.- Developed software for data collection, algorithmic processing, and visualization.- Supervisor for visualization and deployment development team.- <i>3 patents filed.</i>		
	Signetron, Inc.		07/2015 - 03/2016
	Software Architect		
	<ul style="list-style-type: none">- Algorithm and software development for rapid indoor modeling, automatic building energy audits, and virtual tours from handheld scanning system.- Principal engineer on software and hardware development, including localization and 3D modeling algorithms.- Supervisor for team of software engineers.		
	EECS Department - UC Berkeley		01/2015 - 05/2015
	Graduate Student Instructor		
	<ul style="list-style-type: none">- Course EE 122: Introduction to Communication Networks- Taught discussion sections, held office hours, graded homeworks/exams.		
	@Maps		08/2014 - 12/2014
	Principal Engineer		
	<ul style="list-style-type: none">- Developed hardware systems and surface reconstruction software algorithms for indoor building 3D modeling.- Research and development of camera calibration procedures.		

Speir Technologies 01/2013 - 01/2014

Software Development Consultant

- Developed prototype demo application and 3D modeling algorithms for remote viewing medical ultrasound scanning.

- Developed client-server model for remote medical scanning, sensor drivers interface, and 3D meshing techniques for live streaming of patient geometry.

MIT Lincoln Laboratory 05/2011 - 08/2011

Summer Intern - Group 104: Intelligence and Decision Theory

Developed algorithms for creation of synthetic test data for Synthetic Aperture Radar (SAR) Coherent Change Detection (CCD) track-finding.

ECE Department - Carnegie Mellon 01/2011 - 05/2011

Teaching Assistant

Course 18-391: Noisy Signal Processing

Wrote homework reference solutions, taught weekly office hours.

Qualcomm 05/2010 - 08/2010

Software Summer Intern - QCT Modem Integration Team

Developed/automated methodology for optimizing and removing redundancies in client specs of processor builds.

Flatirons Solutions 05/2008 - 08/2008

Summer Intern

Developed flight path modeling application for FAA. Wrote application to estimate cost/efficiency analysis for air traffic routes, interfaced with Google Earth.

RESEARCH EXPERIENCE

Video and Image Processing Lab - U.C. Berkeley 08/2011 - 05/2015

Ph.D. Graduate Student

3D and 2D surface reconstruction algorithms for architectural modeling. Automatic reconstruction of indoor building environments from LiDAR and imagery data on an ambulatory backpack-mounted scanning system. System hardware design and assembly, including developing sensor drivers and processing architecture. Analysis of building geometry for room-layout and energy efficiency modeling.

Spiral Project - Carnegie Mellon 08/2010 - 05/2011

Honors Research Undergraduate

Analysis of efficiency and error for Synthetic Aperture Radar (SAR) algorithm for logic-in-memory implementation.

Spiral Project - Carnegie Mellon 05/2009 - 08/2009

Summer Research Undergraduate

Implementation and analysis of search techniques for Spiral's code optimization engine. Developed genetic search algorithm for optimization of hardware-dependent software implementations of DCT, FFT, and Matrix Multiplication.

Robotics Institute - Carnegie Mellon 09/2008 - 12/2008

Research Assistant

Design of user interface for LiDAR scans exported from variety of autonomous robotic systems.

TECHNICAL SKILLS

Programming Languages: C/C++, Java, Python, Matlab, BASH, x86

Markup Languages: HTML, LaTeX, Markdown

Software: Unity, Autodesk Revit, Recap, Navisworks, AutoCAD, SolidWorks, Visual Studio, Git, SVN

Frameworks: Eigen, Boost, OpenCV, PCL, OpenGL, GLSL, Halide, Qt, Android, Google Tango, Doxygen

AWARDS

Awarded Best Student Paper - GRAPP 2014 01/2014
9th International Joint Conference on Computer Vision, Imaging, and Computer Graphics Theory and Applications

Awarded NSDEF Fellowship 09/2013 - 05/2016
Funded by Office of Naval Research (ONR)

CMU Meeting of the Minds 05/2011
- Won First Place Lockheed Martin ECE Undergraduate Project
- Won Third Place CIT Honors Research Poster Competition

PUBLICATIONS **Depth from Motion for Smartphone AR**, SIGGRAPH Asia 2018

Limits of Peripheral Acuity and Implications for VR System Design, Journal of Society for Information Display 2018

Sensitivity to Peripheral Artifacts in VR Display Systems, Society for Information Display 2018

Phase-Aligned Foveated Rendering for Virtual Reality Headsets, 25th IEEE Conference on Virtual Reality and 3D User Interfaces 03/2018

Foveated Pipeline for AR/VR Head-Mounted Displays, Information Display 11/2017

Identification of Energy Conservation Measures Towards Zero Carbon Building Energy Performance with the Rapid Building Energy Modeler and the Energy Analysis Engine, ZCB 2016 09/2016

Automatic Indoor 3D Surface Reconstruction with Segmented Building and Object Elements, Fifth Joint 3DV Conference 10/2015

3D Modeling of Interior Building Environments and Objects from Noisy Sensor Suites, Ph.D. Thesis, Department of Electrical Engineering and Computer Sciences, University of California Berkeley 05/2015

Multistory Floor Plan Generation and Room Labeling of Building Interiors from Laser Range Data, Communications in Computer and Information Science 2014

Fast, Automated, Scalable Generation of Textured 3D Models of Indoor Environments, Journal of Selected Topics in Signal Processing 08/2014

Image-Based Position of Mobile Devices in Indoor Environments, Multimodal Location Estimation of Video and Images 2014

Floor Plan Generation and Room Labeling of Indoor Environments from

	Laser Range Data , GRAPP 2014	01/2014
	Reduced-Complexity Data Acquisition System for Image Based Localization in Indoor Environments , IPIN 2013	10/2013
	Image Based Localization in Indoor Environments , International Conference on Computing for Geospatial Research and Applications	07/2013
	Watertight Planar Surface Meshing of Indoor Point-Clouds with Voxel Carving , Third Joint 3DV Conference	06/2013
	Watertight Floor Plans Generated From Laser Range Data , Master's Thesis	05/2013
	Inserted Simulated Tracks into SAR CCD Imagery , Society for Modeling & Simulation International (SCS) 2013 Autumn Simulation Multi-Conference (Autumn-Sim'12)	10/2012
	Watertight As-Built Architectural Floor Plans Generated from Laser Range Data , 3DIMPVT	10/2012
	Sharp Geometry Reconstruction of Building Facades Using Range Data , ICIP 2012	09/2012
	Local Interpolation-based Polar Format SAR: Algorithm, Hardware Implementation and Design Automation , Japan Society for the Promotion of Science	06/2012
	Polar Format Synthetic Aperture Radar in Energy Efficient Application-Specific Logic-in-Memory , ICASSP 2012	05/2012
	Energy Efficient Application-Specific Logic-in-Memory for Interpolation in Synthetic Aperture Radar , High Performance Embedded Computing (HPEC)	09/2011
AWARDED PATENTS	METHODS FOR INDOOR 3D SURFACE RECONSTRUCTION AND 2D FLOOR PLAN RECOVERY UTILIZING SEGMENTATION OF BUILDING AND OBJECT ELEMENTS , Patent 10,127,718	11/13/2018
PATENTS UNDER FILE	GP-203795-00-PR , "DEPTH FROM MOTION FOR SMARTPHONE AR" Filed February 2019	
	GP-202593-00-US , "5DOF PHASE-ALIGNED FOVEATED RENDERING" Filed November 2017	
	GP-201637-00-US , "PHASE ALIGNED FOVEATED RENDERING" Filed March 2017	
	GP-201053-02-US , "LOW RESOLUTION RGB RENDERING FOR EFFICIENT TRANSMISSION," Filed November 2016	
	GP-201053-01-US , "EARLY SUB-PIXEL RENDERING," Filed November 2016	
	GP-201053-00-US , "DUAL-PATH FOVEATED GRAPHICS PIPELINE," Filed November 2016	