

# ANDREW X ZHONG

Mountain View, CA 94043 • (217) 550-2869 • axzhong3@gmail.com • <https://ocf.io/andrewxz>

---

## EDUCATION

### **University of California, Berkeley**

*Master of Engineering, Computer Science - Visual Computing and Computer Graphics* 05/2014

### **University of Illinois at Urbana-Champaign**

*Bachelor of Science, ECE with Highest Honors, Overall: 3.89/4.0, Technical: 3.92/4.0* 05/2013

## SKILLS

**Areas:** Computer Vision, Deep Learning, Machine Learning, AR/VR, MoCap, Graphics, Systems, Computer Architecture

**Toolkits:** C/C++, Python, TensorFlow(&Lite), Keras, OpenCV, OpenGL, MATLAB, Android, Google Cloud Platform

## EXPERIENCE

### **Stealth Mode Social Avatar Startup**

Redwood City, CA

#### **Tech Lead, Computer Vision**

02/2018 - Present

- Led computer vision R&D on face tracking and avatar creation towards real-time mobile deployment
- Created 3D avatars with AI to cross “uncanny valley” with help from art designers and animation riggers
- Built and shipped multiple real-time DNNs for tracking landmark/emotion/mouth & eye shape
- Trained and shipped state-of-art face attribute/ethnicity classifiers through custom augmentation/labeling
- Wrote from scratch a real-time 130 fps constrained local model based (CLM) face landmark tracker in C++/Python

### **Magic Leap**

Mountain View, CA

#### **Lead Software Engineer, Computer Vision Data**

11/2015 - 02/2018

- Led eye tracking algorithmic performance and groundtruth data collection for Magic Leap One
- Led first offsite large-scale eye tracking data collection under high scrutiny and coordinated BD, Legal, HF, UI/UX
- Automated and scaled up groundtruth data collection by 10x to 100+ houses and 2000 human subjects in 1 year
- Designed a novel eye tracking groundtruth collection rig with laser-pointer, light sensor and VICON (less user error)
- Built 6DoF head pose capture and timestamp alignment through Vicon on various HW prototypes
- Achieved state-of-art sub-millimeter reprojection error and  $\mu$ s-level temporal alignment accuracy
- Streamlined perception algorithm batch evaluation and visualization on the cloud with 100x speed in 2 years

### **Apple**

Cupertino, CA

#### **Performance and Modeling Engineer, Silicon Engineering Group (iPhone, iPad, etc)**

06/2014 - 11/2015

- Performed use cases performance validation and trade-off analysis for next-generation mobile system-on-chips (SoCs)
- Designed SoC models and interface layers to agent models/RTL and software simulation platforms in C/C++
- Initiated a trace-based system performance/traffic pattern mining and visualization tool

### **Qualcomm Research Silicon Valley and UC Berkeley**

Santa Clara, CA

#### **AR Indoor Navigation (Advised by Prof. Björn Hartmann and Jiajian Chen)**

09/2013 - 05/2014

- Designed an interactive indoor navigation experience through 3D augmented reality user interface
- Demonstrated our application in the CITRIS Invention Lab at Berkeley, providing augmented navigation, interactive device instructions, demo products display and device reservation lookup for lab visitors and apprentices
- Developed on the Android mobile platform powered by OpenGL graphics, orientation sensors and a position simulator

### **Coordinated Science Laboratory, UIUC**

Urbana, IL

#### **Data Mining on Diagnosing Performance Violations (Advised by Prof. Shobha Vasudevan)**

10/2012 - 05/2013

- Localized system latency and throughput violations using a concurrent pattern mining approach
- Applied domain knowledge to filter out up to 92.8% of transaction traces, increasing mining efficiency
- Set up a system-level modeling platform for on-chip bus communication in SystemC and TLM

### **Beckman Institute for Advanced Science and Technology, UIUC**

Urbana, IL

#### **Senior Design: Brain-controlled Tablet Prototype**

01/2013 - 05/2013

- Designed an EEG-signal-controlled tablet prototype with ~2.5 s response time and 95% reliability
- Classified EEG response in frequency domain from subject gazing at 1 (out of 4) flickering LED with the same frequency

### **Qualcomm**

San Diego, CA

#### **Graphics System Design Intern**

05/2013 - 08/2013

- Initiated and developed text processing and pattern matching tools for massive netlist and log files
- Performed MIPI DSI (Display Serial Interface) modeling and video stream simulations

#### **Algorithm and System Design Intern**

06/2012 - 08/2012

- Implemented the color processing algorithm based on 3D look-up table gamut mapping for Mirasol Display
- Optimized memory placement algorithm and reduced look-up table size by a factor of 4

## PUBLICATIONS

Improving User Experiences in Indoor Navigation with Augmented Reality, *Technical Report No. UCB/EECS-2014-74*  
Diagnosing Root Causes of System Level Performance Violations, *Computer-Aided Design, IEEE/ACM ICCAD 2013*  
Troubleshooting Performance Violations at System Level Using Data Mining, *Design Automation Conference 2013 WIP*  
High-field Transport and Thermal Reliability of Sorted Carbon Nanotube Network Devices, *ACS Nano 2012*

## HONORS

Awesome Award for Significant Contribution in Magic Leap, 2017  
Highest Honors at Graduation, O. Thomas and Martha S. Purl Scholarship, Dean's List  
Research Award in Senior Design Hall of Fame in UIUC, 2013  
Eta Kappa Nu, Tau Beta Pi, National Society of Collegiate Scholars, IEEE, SIAM  
First-Class Scholarship for Outstanding Merits, 2008-2009  
First Prize in National Physics Contest in Jiangsu, China, 2007

## PROJECTS

- Webcam-based Eye Tracker** 02/2018
- Designed a coarse eye tracker (10-15° accuracy) based on head pose and a calibrated webcam for attention tracking
- 360° VR Film Storytelling** - Garage Stories Hackathon, Palo Alto 06/2017
- Practised VR storytelling and created a film with 360° camera in 36 hours on a team of 5
- Driving Behavior Cloning on Simulator Tracks with DNN** - Udacity Self Driving Car Challenge 02/2017
- Collected and generalized multiple laps of my own driving data on a Unity simulator
  - Trained in Keras the NVIDIA end-to-end model architecture, which successfully drives the car around track
- Advanced Lance Detection and Vehicle Tracking** - Udacity Self Driving Car Challenge 12/2016
- Designed and fine-tuned a robust lane detection algorithm based on traditional CV features (color space gradients on perspective transformed undistorted images)
  - Trained and robustified a Linear SVM on YCrCb HOG features with GTI and KITTI vehicle datasets
- Data Visualization Framework on VR Systems** - AT&T VR Mobile App Hackathon - San Francisco 06/2015
- Designed an immersive virtual reality framework for real-time data visualization on Gear VR with Unity Game Engine
  - Enabled users to literally walk into big data represented by dots and curves, zoom, pinch and travel in 4 dimensions
- Machine Learning** - CS Berkeley 01/2014 - 05/2014
- Applied logistic regression, SVM, decision trees, random forests, neural networks, K-means, PCA and etc. on various supervised/unsupervised classification/regression problems
  - Predicted day of the week with 98.84% accuracy with 15 months of daily traffic data in the bay area
- Parallel Computing** - CS Berkeley 01/2014 - 05/2014
- Parallelized matrix multiplication, particle simulation and Knapsack problem with OpenMP, MPI, CUDA or UPC
  - Implemented a generic parallelized framework of A\* search with both CUDA and OpenMP
- Augmented Object Detector - Android App** - CS Berkeley 09/2013 - 02/2014
- Detected objects from Android camera video stream with Haar-like features
  - Rendered the detected objects in a 3D virtual scene on top of camera view with OpenGL ES 2
- Operating Systems** - CS Berkeley and ECE UIUC 01/2013 - 02/2014
- Developed a multi-threaded HTTP server that supports asynchronous IO and thread-safe caching
  - Built a Linux-based OS in C and x86: paging, interrupts, system calls, program loader, page allocator, multiple terminals, scheduling, signals, sound and mouse support, shell extensions and GUI
  - Achieved 4th place out of 30 teams in the Microsoft Operating System Design Competition
- Computer Graphics and Computer Vision** - CS Berkeley 09/2013 - 11/2013
- Coded in C++ from scratch: a ray tracer that implements Phong shading, refraction and .obj file inputs
  - Developed in OpenGL: uniform subdivision, adaptive tessellation, obj & mtl inputs, vertex shading
  - Explored homography rectification, 3D reconstruction, edge detection, texture and digit recognition
- Pipelined Processor Design** - ECE UIUC 09/2012 - 12/2012
- Designed and verified datapath, control and cache of a 5-stage pipelined processor based on LC3b
  - Achieved 2nd place out of 22 teams in the AMD Processor Design Competition