

# Jonathan Cole

## SOFTWARE DEVELOPER

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## Summary

Multifaceted developer with a strong track record of rapid integration and innovation in a wide variety of software projects and interaction media. Skilled with **virtual / augmented reality**, **computer vision**, **iOS**, and **frontend web development**. Looking for new ways to bring innovation to human-centric computing.

## Skills

<b>Programming</b>	C#, Python, JavaScript, Swift, C++, Java
<b>Virtual Reality</b>	Unity3D, Interactive Design, HTC Vive, Oculus Rift, Leap Motion
<b>Augmented Reality</b>	OpenCV, Computer Vision, Video / Image Processing, ARKit
<b>Web Development</b>	ES6, Node, Babel, WebGL, Frontend Development
<b>App Development</b>	iOS, macOS, Metal

## Work Experience

### Virtual Environment and Multimodal Interaction Laboratory

*University of Maine, Orono, ME*

SOFTWARE DEVELOPER

*Sept. 2011 - Present*

- Worked in close collaboration with researchers to develop and prototype several VR simulations using Unity3D; responsible for code and design in solo and team projects
- Provided leadership in lab environment to push into new territories with self-directed and wide-ranging projects, from the development of a custom-built wearable AR platform to the usage of VR to prototype AR techniques for enhancing human spatial perception
- Mentored for more than 30 students in programming and design
- Integrated VR technologies with Unity3D before official support, often involving hardware hacking or creating native plugins
- Developed VR experiences for multiple human interface platforms, including the HTC Vive, Oculus Rift, Leap Motion, Microsoft Kinect, and optical marker tracking systems by Phasespace and WorldViz
- Created a full-stack implementation of the W3C Web Annotation Model for Dartmouth's Media Ecology Project
- Created native and Unity3D-based iOS apps for AR and data visualization contexts

### Maine Children's Discovery Museum (Contract)

*Bangor, ME*

EXPERIENCE DESIGNER

*2016 - 2017*

- Sea What Grows aquaculture exhibit kiosk: Created iOS-based kiosk as part of a wider exhibit to teach children about the ocean
- The X-Ray Hand: Developed interactive exhibit that uses Leap Motion to show an x-ray visualization of a visitor's hand

### Computer Science Department

*University of Maine, Orono, ME*

GRADUATE TEACHING ASSISTANT

*Sept. 2015 - Dec. 2016*

- Courses include Introductory Visual Basic, Introductory C++, Introductory Python, and Data Structures in C++
- Graded and consulted for ~80 students per semester
- Provided consultation for student homework and projects

### Best Buy

*Bangor, ME*

COMPUTER SALESMAN

*Aug. 2009 - Sept. 2011*

- Responsible for customer interaction and computer sales in an interactive team environment
- Learned about the climate of the consumer electronics market

## Projects

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### Kino

MASTER'S THESIS

2017

- Expanded Oculus Eye into a full software platform with a plugin architecture. This allows researchers to rapidly design computer vision experiments for wearable AR headsets without needing to worry about threading, camera synchronization, or OS details. An example plugin was developed for real-time object recognition via machine learning.

### Waldorf / Statler

FULL-STACK WEB APP

2017

- Created the frontend and backend implementations of the W3C Web Annotation Model for Dartmouth's Media Ecology Project. Waldorf (the frontend) comprises an embeddable video player which allows users to create and edit rich annotations for web videos, while Statler (the backend) is a RESTful Rails backend that manages these annotations. The purpose of this system was to provide researchers with an interface for automatic tagging of videos via computer vision techniques.

### Morpho

REACTION-DIFFUSION SIMULATOR

2017

- Developed a macOS (and soon iOS) app that simulates various models of visually interesting reaction-diffusion systems. The purpose of this app is to educate users about the mathematics of these models while providing an outlet for creativity. Custom Metal compute shaders used to achieve high resolutions and framerates. Available for sale on the App Store.

### Oculus Eye

UNDERGRADUATE THESIS

2015

- Created a custom-built wearable augmented reality headset and the software to drive it using OpenCV. The research context of this project was to establish the usefulness of edge detection as a means of restoring depth information to users with age-related visual contrast sensitivity loss.

### Driving Simulator for Spatial Navigation Research

IMMERSIVE VR RESEARCH PLATFORM

2012, 2013

- Developed an immersive VR driving simulator in Unity3D for the purpose of studying the effects of age-related eye problems on spatial navigation. This simulator was used to perform foundational research for another student's Ph.D. work. This project was sponsored under three consecutive grants by the Center for Undergraduate Research at the University of Maine.

## Education

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### University of Maine

*Orono, ME*

B.S. IN COMPUTER SCIENCE

*May 2015*

- Focused on object-oriented programming, algorithms, data structures, operating system architecture
- Languages include Python, C, C++, Java

### University of Maine

*Orono, ME*

M.S. IN SPATIAL INFORMATION SCIENCE AND ENGINEERING

*Dec. 2017*

- Skills/domains learned include ArcGIS, R, Prolog, spatial statistics, databases, and data streams
- Research focused on augmented reality for sensory compensation

## More

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- Published developer on Apple's App Store
- Presented live programming sessions at the Maine Science Festival (2014-2016)
- Developed many personal projects in Unity3D, including a networked multiplayer VR movie theater to enhance the Bee Movie experience
- Mensa member
- Second-degree black belt in Taekwondo