

# LAMONT SAMUELS

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## EDUCATION

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**August 2016** **Ph.D., Computer Science, *University of Chicago***  
TITLE Declarative Computer Graphics Using Functional Reactive Programming  
RESEARCH Programming Languages, Computer Graphics, Functional Reactive Programming

**June 2013** **M.S., Computer Science, *University of Chicago***  
TITLE Strand Communication in Diderot  
RESEARCH Programming Languages, GPGPU, Image Analysis & Visualization  
3.76 Systems GPA

**June 2010** **B.S., Computer Science, *California Polytechnic State University***  
QUALIFICATIONS Bachelor of Science, *Cum Laude*  
3.8 Major GPA, 3.64 overall

## WORK EXPERIENCE

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**10/16 - Present** **Tanvas Inc. *Chicago, IL***  
POSITION Technical Lead (Software Team)  
DUTIES Leading a team of four software engineers. Implementing a new generation of our C++ API and low-level driver for our hardware (~3k lines of code). Designing the new API and driver to be more modular to allow third-party developers to quickly prototype and integrate their systems/applications with our technologies and hardware. Architecting the API and driver solution to also be modular and scalable to allow my team to easily add on new modules to be more agile and quickly prototype new features for our customers. Implementing the low-level driver to function on various platforms (Windows, Linux, Android).

**06/13 - Present** **University of Chicago *Chicago, IL***  
POSITION Lecturer  
DUTIES Currently, teach the Introductory Java course and functional languages courses in the Computer Science Masters department. Taught “CMSC 15200 - Introduction to Computer Science 2” for the 2013 and 2014 summer sessions. The course provided an introduction to computer programming using the C language and with emphasis on developing general programming skills and familiarity with advance data structures. The course was majority filled with non-computer science majors with a diverse mixture of discipline backgrounds (e.g., humanities, economics, mathematics). Average class sizes were 20 students for each course.

**01/15 - 05/15** **School of the Art Institute of Chicago *Chicago, IL***  
POSITION Lecturer  
DUTIES Taught an introduction to computer science for art students. Designed and planned lessons focused towards providing the students with the fundamentals of programming and then allowing them to apply these skills with exercises and projects gear towards the computer graphics area.

**06/12 - 10/12** **AMD *Sunnyvale, CA***  
POSITION Research Co-Op  
DUTIES Refactored Diderot’s GPU target to run on their next generation graphics architecture to compare the performance to the previous generation. Debugged and developed benchmarks to test their next generation hardware.

**06/09 - 06/10** **Collaborative Agent Design Research Center *San Luis Obispo, CA***  
POSITION Student Developer  
DUTIES Reverse-engineered their previous cargo-planning software, a web application written in ActionScript, to record requirements that needed to be maintained within their next version. Developed behavioral tests based on predefined use cases from our clients. Implemented graphical user interfaces for their various cargo planning domains.

## PROJECT & RESEARCH EXPERIENCE

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### 11/14 - Current Tesel

TECH/LANGUAGE(S) Swift & Metal API & Standard ML of NJ

(TYPE) POSITION (Disseration-Research) Main Developer

DESCRIPTION Tesel is an embedded domain-specific language in Swift that is used to develop efficient and declarative computer graphics applications using the Functional Reactive Programming paradigm.

#### DUTIES

- Devised and developed the language's constructs and combinators as a macOS framework to allow for easy integration into Xcode for programmers
- Constructed a runtime system written in Swift that includes a rendering system that uses the Metal API (~4k lines of code)
- Implemented a compiler written in Standard ML (~4k lines of code) that builds a standalone application using xcode-build and the Tesel runtime and framework.
- Provided parallelism mechanisms using Grand Central Dispatch (GCD) to allow programmers to execute portions of their code in parallel, which led to a 2x speedup in applications.
- Formalized the evaluation model of Tesel by providing a formal operational semantics of the language.

### 11/15 - Current LensIQ

TECH/LANGUAGE(S) Swift & OpenCV

(TYPE) POSITION (Team-based) Lead Developer

DESCRIPTION An innovative mobile application for identifying and providing useful information for progressive lens engravings.

#### DUTIES

- Presented LensIQ to a Fortune 500 company with three Senior Vice Presidents present for potential investment
- Implemented the lens identification algorithm using the k-NN machine learning algorithm
- Designed a custom-made user interface for the entire application in Adobe Photoshop
- Incorporated the user-interface layout into separate Swift storyboards using Auto Layout and custom Swift classes
- Developed the majority of the application, which entails coding 39 model-view-controller (MVC) classes (~3.5k lines of code)

### 06/10 - 08/16 Diderot

TECH/LANGUAGE(S) Standard ML of NJ & C & OpenCL

(TYPE) POSITION (Team-based) Research Assistant

DESCRIPTION Diderot is a parallel domain-specific language that is designed for biomedical image-analysis and visualization algorithms and provides a high-level mathematical programming model.

#### DUTIES

- Programmed the initial GPU-backend in OpenCL using a persistent thread scheduler
- Formulated and built a spatial feature using a KDTree data structure that allows the local agents in language to communicate between each other.
- Implemented and designed global reductions operators (*e.g.*, sum, max, mean) for our parallel and sequential backends
- Integrated the features described above into our various stages compiler written in Standard ML

## TECHNICAL SKILLS

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**Languages:** Proficient in: Java, C, Haskell, Swift

Experience with: C++, Standard ML, HTML, Javascript

**Technologies:** OpenCL, OpenGL, Metal API, Cocoa, FRP related libraries

## AWARDS & ACHIEVEMENTS

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GANN Fellowship, U.S. Department of Education 2010-2011  
JL Moore Fellowship, California Polytechnic State University 2010-2012  
GPU Technology Conference Poster Acceptance 2012

## PUBLICATIONS

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- CONFERENCES “Diderot: a Domain-Specific Language for Portable Parallel Scientific Visualization and Image Analysis,” *VIS 2015*, G Kindlmann, C Chiw, N Seltzer, L Samuels, and J Reppy, 22(1):867876, January 2016.
- “Diderot: A Parallel DSL for Image Analysis and Visualization,” *PLDI 2012*, C. Chiw, G. Kindlmann, J. Reppy, L. Samuels, and N. Seltzer, 2012.
- WORKSHOPS “Bulk-Synchronous Communication Mechanisms in Diderot,” *AGERE!@SPLASH 2015*, J. Reppy, and L. Samuels 2014.
- “Bulk-Synchronous Communication Mechanisms in Diderot,” *CPC 2014*, J. Reppy, and L. Samuels 2014.