

# Marc Khoury

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## Education

- 2013-PRESENT **University of California, Berkeley**, Berkeley, CA  
Ph.D., Computer Science  
Advisor: Jonathan Shewchuk
- 2012-2013 **University of Cambridge**, Cambridge, England, UK  
MASt, Mathematics, with Honours
- 2008-2012 **The Ohio State University**, Columbus, Ohio  
Bachelor of Science, Computer Science and Engineering  
Summa cum laude with Honors Research Distinction

## Research Experience

- 2013-PRES **University of California, Berkeley**  
Department of Electrical Engineering & Computer Sciences  
Advisor: Prof. Jonathan Shewchuk  
Developing algorithms for manifold reconstruction from dense point samples using the restricted Delaunay triangulation operator.
- Summer 2012 **Microsoft Research**  
Research Intern, RiSE Group  
Advisor: Dr. Lev Nachmanson  
Developed a progressive graph data structure that dynamically refines and coarsens a graph around a focus region for interactive visualization of large graphs.
- 2010-2012 **The Ohio State University**  
Department of Computer Science and Engineering  
Advisor: Prof. Rephael Wenger  
Designed an efficient algorithm for local fractal dimension computation and used it to improve the quality of noise filters for isosurface construction.
- Summer 2011 **AT&T Labs Research**  
Research Intern, Information Visualization Group  
Advisors: Drs. Carlos Scheidegger, Yifan Hu, Stephen North  
Developed a scalable stress majorization technique using approximate linear algebra to

generate large graph drawings.

- 2011 **The Ohio State University**  
Department of Computer Science and Engineering  
Advisor: Prof. Rephael Wenger  
Developed a fractal dimension metric for streamlines to identify important regions in vector fields for flow visualization.
- Summer 2010 **Ohio Wesleyan University**  
Department of Mathematics and Computer Science  
Advisor: Prof. Craig Jackson  
Derived a representation for the braid group using quantum algebras and showed that it is equivalent to the representation derived using homology theory.
- 2009-2010 **The Ohio State University**  
Department of Computer Science and Engineering  
Advisor: Prof. Rephael Wenger  
Rigorously described the complexity of isosurfaces and derived a formula for the average fractal dimension as a function of noise present in a data set.

## Publications

### CONFERENCE AND JOURNAL ARTICLES

- [1] **Drawing Large Graphs by Low-Rank Stress Majorization**, Marc Khoury, Yifan Hu, Shankar Krishnan, Carlos Scheidegger, Computer Graphics Forum 31, 3pt1, pp. 975-984, June 2012 (Proceedings of EuroVis)
- [2] **On the Fractal Dimension of Isosurfaces**, Marc Khoury, Rephael Wenger, IEEE Transactions on Visualization and Computer Graphics, pp. 1198-1205, November/December, 2010 (Proceedings of Vis)

### POSTERS

- [3] **Exploring Flow Fields Using Fractal Analysis of Field Lines**, Abon Chaudhuri, Teng-Yok Lee, Han-Wei Shen, Marc Khoury, Rephael Wenger, IEEE Scientific Visualization Conference (SciVis) 2012, Seattle, WA, Oct 2012. **Best Poster Award**

### MAGAZINE

- [4] **On Computable Functions**, Marc Khoury, Eureka (Cambridge), issue 63, 2014

### TECH REPORTS

- [5] **Exploring Flow Fields Using Fractal Analysis of Field Lines**, Abon Chaudhuri, Teng-Yok Lee, Han-Wei Shen, Marc Khoury, Rephael Wenger, OSU-CISRC-4/11-TR15, April 2011

## THESES

[6] **The Nature of the Isosurface Fractal Dimension**, Undergraduate Thesis, The Ohio State University

## Invited Talks

Progressive Graphs for Large Graph Visualization, The Ohio State University, Dept. of Computer Science and Engineering, Sept. 2012

The Fractal Dimension of Isosurfaces, Ohio Wesleyan University, Dept. of Mathematics and Computer Science, Dec. 2010

## Work Experience

Summer 2014 **Twitter**

Software Engineer Intern

Developed applications that enable mobile developers to support advertisements.

9/2011-12/2011 **Amazon.com**

Software Engineer Intern

Developed a framework to collect, store, and analyze data from fraud cases to further automate Amazon's fraud investigations.

## Service

### COMMITTEES

8/2013-PRES **Computer Science Graduate Student Association**

University of California, Berkeley

Social Committee

9/2010 - 6/2012 **Undergraduate Honors Committee**

Department of Engineering

Assisting with issues regarding undergraduate research and the honors program.

9/2009 - 2/2010 **CS&E Semester Task Force**

Department of Computer Science and Engineering

Assisted in the development of the new curriculum for the upcoming conversion from quarters to semesters.

### REVIEWS

**Reviewer** EuroVis 2013, GD 2015

## Teaching Experience

- Spring 2015 **University of California, Berkeley**  
Co-lecturer, CS 274, Computational Geometry  
Prepared and presented half of the lectures for graduate-level computational geometry.
- Spring 2014 **We Teach Science**  
Tutor  
Private algebra tutor for middle school students in the Bay Area.
- 9/2010-6/2011 **The Ohio State University**  
Math and Statistics Learning Center  
Tutor for the introductory honors calculus sequence, discrete mathematics, foundations of higher mathematics, and linear algebra.

## Software

### **mars**

A scalable graph drawing program that uses approximate linear algebra to make stress majorization feasible for large graphs. To be added to Graphviz.

### **Local Fractal**

A toolkit that identifies noisy regions in an isosurface mesh based on local fractal dimension and provides filters to smooth the data.

### **IsoRender**

IsoRender dynamically computes isosurfaces, allowing the user to visualize changes in the isosurface over incremental changes in the isovalue.

## Skills

Languages: C/C++, Python, Java, PHP, C#, SQL  
Graphics: OpenGL, GLSL, GLUI, Graphviz  
Development: Unix, Subversion,  $\LaTeX$ , Doxygen

## Honors and Awards

- 2015 Tong Leong Lim Pre-Doctoral Prize, UC Berkeley  
2014 Finalist, Hertz Fellowship  
2012 NSF Graduate Research Fellowship  
2012 Churchill Scholarship  
2012 EECS Chair's Excellence Award, UC Berkeley  
2012 Honorable Mention, CRA Outstanding Undergraduate Researcher Award  
2011 Computer Science Undergraduate Research Award, Ohio State University

2011-2012 Undergraduate Research Scholar in Engineering, Ohio State University  
2011 Computer Science Department Founders Scholarship, Ohio State University  
2011 Phi Kappa Phi Academic Honor Society  
2011 Upsilon Pi Epsilon Honor Society  
2010 TechColumbus TechTomorrow Scholarship  
2010 Computer Science Undergraduate Scholarship, Ohio State University  
2010 Tau Beta Pi Engineering Honor Society  
2009-2012 Woodley Scholarship, Ohio State University  
2009 Certificate of Recognition in Mathematics, Ohio State University  
2009 Nationally Ranked Rubik's Cuber

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