

<b>RESEARCH INTERESTS</b>	Using <b>photorealistic synthetic data</b> for <b>computer vision</b> ; motion planning, trajectory optimization, and control methods for robotics; reconstructing 3D scenes from images; continuous and discrete optimization; submodular optimization; software tools and algorithms for creativity support.	
<b>EDUCATION</b>	<b>Stanford University</b> Stanford, California Ph.D. Computer Science 2012–2019 Advisor: Pat Hanrahan Dissertation: <i>Trajectory Optimization Methods for Drone Cameras</i>	
	<b>Harvard University</b> Cambridge, Massachusetts Visiting Research Fellow Summer 2013 John A. Paulson School of Engineering and Applied Sciences Advisor: Hanspeter Pfister	
	<b>University of Calgary</b> Calgary, Canada M.S. Computer Science 2010	
	<b>University of Calgary</b> Calgary, Canada B.S. Computer Science 2007	
<b>EMPLOYMENT</b>	<b>Apple</b> Seattle, Washington Research Scientist 2018–	
	<b>Microsoft Research</b> Redmond, Washington Research Intern Summer 2016, 2017 Advisors: Neel Joshi, Sudipta Sinha	
	<b>Skydio</b> Redwood City, California Research Intern Spring 2016 Mentors: Adam Bry, Frank Dellaert	
	<b>Udacity</b> Mountain View, California Course Developer, Introduction to Parallel Computing 2012–2013 Instructors: John Owens, David Luebke	
	<b>Harvard University</b> Cambridge, Massachusetts Research Fellow, John A. Paulson School of Engineering and Applied Sciences 2010–2012 Advisor: Hanspeter Pfister	
	<b>NVIDIA</b> Austin, Texas Developer Tools Programmer Intern Summer 2009	
	<b>Radical Entertainment</b> Vancouver, Canada Graphics Programmer Intern 2005–2006	
<b>HONORS AND AWARDS</b>	Featured in the Highlights of SIGGRAPH session at the FMX Festival 2017 2017 1% selection rate (3 / 467)	
	Invited speaker, TEDxBerkeley 2017 2017	
	Excellent reviewer, ACM Human Factors in Computing Systems (CHI) 2017 2017	
	Featured in the SIGGRAPH 2016 Technical Papers Trailer 2016 4% selection rate (19 / 467)	
	Featured in the SIGGRAPH Asia 2015 Technical Papers Trailer 2015 4% selection rate (11 / 302)	
	Front cover article, Cell 162(3) 2015	
	NSERC Alexander Graham Bell Canada Graduate Scholarship 2012 3 year fellowship for Canadian PhD students, 14% selection rate (233 / 1628)	

## SELECTED PUBLICATIONS

My publications are also listed on [Google Scholar](#).

### **Hypersim: A Photorealistic Synthetic Dataset for Holistic Indoor Scene Understanding**

**Mike Roberts**, Nathan Paczan

*arXiv (preprint)*

### **Submodular Trajectory Optimization for Aerial 3D Scanning**

**Mike Roberts**, Debadeepta Dey, Anh Truong, Sudipta Sinha, Shital Shah, Ashish Kapoor, Pat Hanrahan, Neel Joshi

*International Conference on Computer Vision (ICCV) 2017*

### **Generating Dynamically Feasible Trajectories for Quadrotor Cameras**

**Mike Roberts**, Pat Hanrahan

*ACM Transactions on Graphics 35(4) (SIGGRAPH 2016)*

*Featured in the Highlights of SIGGRAPH session at the FMX Festival 2017*

*Featured in the SIGGRAPH 2016 Technical Papers Trailer*

### **An Interactive Tool for Designing Quadrotor Camera Shots**

Niels Joubert\*, **Mike Roberts**\*, Anh Truong, Floraine Berthouzoz, Pat Hanrahan

*ACM Transactions on Graphics 34(6) (SIGGRAPH Asia 2015)*, \* Authors contributed equally

*Featured in the SIGGRAPH Asia 2015 Technical Papers Trailer*

### **Saturated Reconstruction of a Volume of Neocortex**

Narayanan Kasthuri, Kenneth Jeffrey Hayworth, Daniel Raimund Berger, Richard Lee Schalek, Jose Angel Conchello, Seymour Knowles-Barley, Dongil Lee, Amelio Vazquez-Reina, Verena Kaynig, Thouis Raymond Jones, **Mike Roberts**, Josh Lyskowski Morgan, Juan Carlos Tapia, H. Sebastian Seung, William Gray Roncal, Joshua Tzvi Vogelstein, Randal Burns, Daniel Lewis Sussman, Carey Eldin Priebe, Hanspeter Pfister, Jeff William Lichtman

*Cell 162(3), 2015*

*Front cover article*

### **Large-Scale Automatic Reconstruction of Neuronal Processes from Electron Microscopy Images**

Verena Kaynig, Amelio Vazquez-Reina, Seymour Knowles-Barley, **Mike Roberts**, Thouis R. Jones, Narayanan Kasthuri, Eric Miller, Jeff Lichtman, Hanspeter Pfister

*Medical Image Analysis 22(1), 2015*

### **Design and Evaluation of Interactive Proofreading Tools for Connectomics**

Daniel Haehn, Seymour Knowles-Barley, **Mike Roberts**, Johanna Beyer, Narayanan Kasthuri, Jeff W. Lichtman, Hanspeter Pfister

*IEEE Transactions on Visualization and Computer Graphics 20(12) (SciVis 2014)*

### **Neural Process Reconstruction from Sparse User Scribbles**

**Mike Roberts**, Won-Ki Jeong, Amelio Vazquez-Reina, Markus Unger, Horst Bischof, Jeff Lichtman, Hanspeter Pfister

*Medical Image Computing and Computer Assisted Intervention (MICCAI) 2011*

### **A Work-Efficient GPU Algorithm for Level Set Segmentation**

**Mike Roberts**, Jeff Packer, Mario Costa Sousa, Joseph Ross Mitchell

*High Performance Graphics 2010*

## DATASETS

Hypersim: A Photorealistic Synthetic Dataset for Holistic Indoor Scene Understanding  
[github.com/apple/ml-hypersim](https://github.com/apple/ml-hypersim)

## SOFTWARE

Flashlight: A Python Library for Analyzing and Solving Quadrotor Control Problems  
[mikeroberts3000.github.io/flashlight](https://mikeroberts3000.github.io/flashlight)

## INVITED TALKS

### Sample-Efficient Learning with Synthetic Data

Facebook AI Research

January 2021

Stanford University

October 2020

Intel Labs

University of Washington

### Trajectory Optimization Methods for Drone Cameras

Oculus Research

June 2018

Snapchat Research

May 2018

Carnegie Mellon University

Boston University

March 2018

Google Research

Adobe Research

Toyota Technological Institute at Chicago

NVIDIA Research

February 2018

Simon Fraser University

### Harnessing the Creative Power of Drones

Charles University in Prague

November 2017

Hacker Connect Conference 2017, opening keynote

August 2017

Google

June 2017

University College London

May 2017

Disney Research

ETH Zurich

University of Oxford

Max Planck Institute for Informatics

University of California, Berkeley

April 2017

Samsung

TEDxBerkeley 2017

Autel Robotics

March 2017

3D Robotics

University of California, Berkeley

February 2017

Columbia University

November 2016

Yale University

Princeton University

Brown University

Intel

October 2016

### Generating Dynamically Feasible Trajectories for Quadrotor Cameras

FMX Festival 2017, Highlights of SIGGRAPH session

May 2017

Adobe Research

September 2016

Apple

August 2016

Massachusetts Institute of Technology

Skydio

February 2016

Cape Productions

3D Robotics

January 2016

## TEACHING EXPERIENCE

### Udacity

2013–2018

Course Developer, Introduction to Parallel Programming

*Instructors: John Owens, David Luebke*

*Developed course materials in 2012–2013, over 80,000 students enrolled in 2013–2018.*

### Stanford University

Spring 2018

Course Assistant, Convolutional Neural Networks for Visual Recognition

*Instructors: Fei-Fei Li, Justin Johnson, Serena Yeung*

### Stanford University

Winter 2018

Course Assistant, Mathematical Methods for Robotics, Vision, and Graphics

*Instructor: Doug James*

<b>Massachusetts Institute of Technology</b>	Summer 2016
Guest Lecturer, Advances in Imaging	
<i>Instructor: Ramesh Raskar</i>	
<b>Harvard University</b>	Fall 2013
Course Contributor, Data Science	
<i>Instructors: Hanspeter Pfister, Joe Blitzstein</i>	
<i>Contributed lecture notes to the initial offering of Harvard's Data Science course in Fall 2013.</i>	
<b>Harvard University</b>	Winter 2012
Teaching Fellow, Visualization	
<i>Instructor: Hanspeter Pfister</i>	
<b>Harvard University</b>	Fall 2011
Teaching Fellow, Computing Foundations for Computational Science	
<i>Instructor: Hanspeter Pfister</i>	
<b>Harvard University</b>	Winter 2011
Teaching Fellow, Massively Parallel Computing	
<i>Instructors: Hanspeter Pfister, Nicolas Pinto</i>	
<b>University of Calgary</b>	Winter 2006, 2007, 2008
Guest Lecturer, Video Game Programming	

## REVIEWING EXPERIENCE

### Conference

SIGGRAPH; SIGGRAPH Asia; Computer Vision and Pattern Recognition (CVPR); International Conference on 3D Vision (3DV); International Conference on Robotics and Automation (ICRA); Human Robot Interaction (HRI); Human Factors in Computing Systems (CHI); Virtual Reality (VR); Eurographics; High Performance Graphics (HPG)

### Journal

Transactions on Graphics (TOG); Transactions on Visualization and Computer Graphics (TVCG); Robotics and Automation Letters (R-AL)

## GAME CREDITS

<b>Prototype</b> (PC, Playstation 3, and Xbox 360)	2009
<i>Radical Entertainment, Activision</i>	
<b>Scarface: The World Is Yours</b> (PC, Wii, Xbox, and Playstation 2)	2006
<i>Radical Entertainment, Sierra</i>	

## PRESS COVERAGE

Skydio R1 Review: The Ultimate Follow-Me Drone Comes at a Price  
*Engadget* (April 2nd, 2018)

Skydio R1 Review: A Mesmerizing, Super-Expensive Self-Flying Drone  
*TechCrunch* (April 2nd, 2018)

This Drone Can Follow and Record You From the Sky, No Controller Required  
*CNBC* (February 14th, 2018)

The Skydio R1 Might Be the Smartest Consumer Drone in the Sky  
*Engadget* (February 13th, 2018)

Skydio Demonstrates Incredible Obstacle-Dodging Full Autonomy With New R1 Consumer Drone  
*IEEE Spectrum* (February 13th, 2018)

Drones That Dodge Obstacles Without Guidance Can Pursue You Like Paparazzi  
*MIT Technology Review* (February 13th, 2018)

The Autonomous Selfie Drone Is Here. Are We Ready For It?  
*The New York Times* (February 13th, 2018)

New App Lets Drone Pilots Customize Flight Path and Camera Movement Before Takeoff  
*Digital Trends* (October 19th, 2015)

Researchers Create Software for Designing Pro Drone Shots in a Virtual World  
*Petapixel* (October 16th, 2015)

Interactive Drone App Lets You Capture Aerial Shots Like a Pro  
*Engadget* (October 15th, 2015)

These Stunning Images Will Take You on a Journey Through the Brain  
*Huffington Post* (August 4th, 2015)

3D Color Images of the Brain Reveal its Glorious Unseen Detail  
*Popular Science* (July 31st, 2015)

3D Brain Map Reveals Connections Between Cells in Nano-Scale  
*The Guardian* (July 30, 2015)

Crumb of Mouse Brain Reconstructed in Full Detail  
*Nature News* (July 30, 2015)

A Voyage into the Brain  
*National Geographic* (February 2014)

What Makes Us Human?  
*BBC Horizon* (July 3rd, 2013)

In Pursuit of a Mind Map, Slice by Slice  
*The New York Times* (December 27th, 2010)

## REFERENCES

### **Pat Hanrahan**

CANON USA Professor of Computer Science and Electrical Engineering, Stanford University  
[hanrahan@cs.stanford.edu](mailto:hanrahan@cs.stanford.edu)

### **Hanspeter Pfister**

An Wang Professor of Computer Science, Harvard University  
[pfister@seas.harvard.edu](mailto:pfister@seas.harvard.edu)

### **Adam Finkelstein**

Professor of Computer Science, Princeton University  
[af@cs.princeton.edu](mailto:af@cs.princeton.edu)

### **John Owens**

Child Family Professor of Engineering and Entrepreneurship, University of California, Davis  
[jowens@ece.ucdavis.edu](mailto:jowens@ece.ucdavis.edu)

### **Sudipta Sinha**

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[sudipta.sinha@microsoft.com](mailto:sudipta.sinha@microsoft.com)