

<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>	<p><b>Stanford University</b> Stanford, California Ph.D. Computer Science 2012–2019 <i>Advisor: Pat Hanrahan</i> <i>Dissertation: Trajectory Optimization Methods for Drone Cameras</i></p> <p><b>Harvard University</b> Cambridge, Massachusetts Visiting Research Fellow Summer 2013 <i>Advisor: Hanspeter Pfister</i></p> <p><b>University of Calgary</b> Calgary, Canada M.S. Computer Science 2010</p> <p><b>University of Calgary</b> Calgary, Canada B.S. Computer Science 2007</p>	
<b>EMPLOYMENT</b>	<p><b>Intel Labs</b> Seattle, Washington Research Scientist 2021– <i>Mentor: Vladlen Koltun</i></p> <p><b>Apple</b> Seattle, Washington Research Scientist 2018–2021</p> <p><b>Microsoft Research</b> Redmond, Washington Research Intern Summer 2016, 2017 <i>Mentors: Neel Joshi, Sudipta Sinha</i></p> <p><b>Skydio</b> Redwood City, California Research Intern Spring 2016 <i>Mentors: Adam Bry, Frank Dellaert</i></p> <p><b>Udacity</b> Mountain View, California Course Developer, Introduction to Parallel Computing 2012–2013 <i>Instructors: John Owens, David Luebke</i></p> <p><b>Harvard University</b> Cambridge, Massachusetts Research Fellow 2010–2012 <i>Advisor: Hanspeter Pfister</i></p> <p><b>NVIDIA</b> Austin, Texas Developer Tools Programmer Intern Summer 2009</p> <p><b>Radical Entertainment</b> Vancouver, Canada Graphics Programmer Intern 2005–2006</p>	
<b>HONORS AND AWARDS</b>	<p>Featured in the Highlights of SIGGRAPH session at the FMX Festival 2017 2017 <i>1% selection rate (3 / 467)</i></p> <p>Invited speaker, TEDxBerkeley 2017 2017</p> <p>Excellent reviewer, ACM Human Factors in Computing Systems (CHI) 2017 2017</p> <p>Featured in the SIGGRAPH 2016 Technical Papers Trailer 2016 <i>4% selection rate (19 / 467)</i></p> <p>Featured in the SIGGRAPH Asia 2015 Technical Papers Trailer 2015 <i>4% selection rate (11 / 302)</i></p> <p>Front cover article, Cell 162(3) 2015</p>	

## SELECTED PUBLICATIONS

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

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

**Mike Roberts**, Jason Ramapuram, Anurag Ranjan, Atulit Kumar, Miguel Angel Bautista, Nathan Paczan, Russ Webb, Joshua M. Susskind

*International Conference on Computer Vision (ICCV) 2021*

### **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)

<b>SOFTWARE</b>	Flashlight: A Python Library for Analyzing and Solving Quadrotor Control Problems <a href="https://mikeroberts3000.github.io/flashlight">mikeroberts3000.github.io/flashlight</a>	
<b>INVITED TALKS</b>	<b>Sample-Efficient Learning with Synthetic Data</b>	
	Toyota Research Institute	April 2021
	Facebook AI Research	January 2021
	Stanford University	October 2020
	Intel Labs	
	University of Washington	
	<b>Trajectory Optimization Methods for Drone Cameras</b>	
	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	
	<b>Harnessing the Creative Power of Drones</b>	
	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	
	UC Berkeley	April 2017
	Samsung	
	TEDxBerkeley 2017	
	Autel Robotics	March 2017
	3D Robotics	
	UC Berkeley	February 2017
	Columbia University	November 2016
	Yale University	
	Princeton University	
	Brown University	
	Intel	October 2016
	<b>Generating Dynamically Feasible Trajectories for Quadrotor Cameras</b>	
	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
<b>TEACHING EXPERIENCE</b>	<b>Udacity</b>	2013–2018
	Course Developer, Introduction to Parallel Programming	
	<i>Instructors: John Owens, David Luebke</i>	
	<i>Developed course materials in 2012–2013, over 80,000 students enrolled in 2013–2018</i>	
	<b>Stanford University</b>	Spring 2018
	Course Assistant, Convolutional Neural Networks for Visual Recognition	
	<i>Instructors: Fei-Fei Li, Justin Johnson, Serena Yeung</i>	

<b>Stanford University</b> Course Assistant, Mathematical Methods for Robotics, Vision, and Graphics <i>Instructor: Doug James</i>	Winter 2018
<b>Massachusetts Institute of Technology</b> Guest Lecturer, Advances in Imaging <i>Instructor: Ramesh Raskar</i>	Summer 2016
<b>Harvard University</b> 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>	Fall 2013
<b>Harvard University</b> Teaching Fellow, Visualization <i>Instructor: Hanspeter Pfister</i>	Winter 2012
<b>Harvard University</b> Teaching Fellow, Computing Foundations for Computational Science <i>Instructor: Hanspeter Pfister</i>	Fall 2011
<b>Harvard University</b> Teaching Fellow, Massively Parallel Computing <i>Instructors: Hanspeter Pfister, Nicolas Pinto</i>	Winter 2011
<b>University of Calgary</b> Guest Lecturer, Video Game Programming	Winter 2006, 2007, 2008

## REVIEWING EXPERIENCE

### Conference

Computer Vision and Pattern Recognition (CVPR); Eurographics; High Performance Graphics (HPG); Human Factors in Computing Systems (CHI); International Conference on Robotics and Automation (ICRA); SIGGRAPH; SIGGRAPH Asia

### Journal

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

### Grant Proposal

NSERC

## GAME CREDITS

**Scarface: The World Is Yours** (PC, Playstation 2, Wii, Xbox) 2006  
*Radical Entertainment, Sierra*

## PRESS COVERAGE

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

**Hanspeter Pfister**

An Wang Professor of Computer Science, Harvard University

**Adam Finkelstein**

Professor of Computer Science, Princeton University

**John Owens**

Child Family Professor of Engineering and Entrepreneurship, UC Davis

**Sudipta Sinha**

Principal Researcher, Microsoft Research

**Josh Susskind**

Machine Learning Scientist, Apple