

**RESEARCH
INTERESTS**

Using **photorealistic synthetic data** for **computer vision**; 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.

EDUCATION

Stanford University Stanford, California
Ph.D. Computer Science 2012–2019
Advisor: Pat Hanrahan
Dissertation: Trajectory Optimization Methods for Drone Cameras

Harvard University Cambridge, Massachusetts
Visiting Research Fellow Summer 2013
John A. Paulson School of Engineering and Applied Sciences
Advisor: Hanspeter Pfister

University of Calgary Calgary, Canada
M.S. Computer Science 2010

University of Calgary Calgary, Canada
B.S. Computer Science 2007

EMPLOYMENT

Apple Seattle, Washington
Research Scientist 2018–

Microsoft Research Redmond, Washington
Research Intern Summer 2016, 2017
Advisors: Neel Joshi, Sudipta Sinha

Skydio Redwood City, California
Research Intern Spring 2016
Mentors: Adam Bry, Frank Dellaertx

Udacity Mountain View, California
Course Developer, Introduction to Parallel Computing 2012–2013
Instructors: John Owens, David Luebke

Harvard University Cambridge, Massachusetts
Research Fellow, John A. Paulson School of Engineering and Applied Sciences 2010–2012
Advisor: Hanspeter Pfister

NVIDIA Austin, Texas
Developer Tools Programmer Intern Summer 2009

Radical Entertainment Vancouver, Canada
Graphics Programmer Intern 2005–2006

**HONORS AND
AWARDS**

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/mikeroberts3000/ml-hypersim

SOFTWARE

Flashlight: A Python Library for Analyzing and Solving Quadrotor Control Problems
mikeroberts3000.github.io/flashlight

INVITED TALKS

Sample-Efficient Learning with Synthetic Data

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

Massachusetts Institute of Technology	Summer 2016
Guest Lecturer, Advances in Imaging	
<i>Instructor: Ramesh Raskar</i>	
Harvard University	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>	
Harvard University	Winter 2012
Teaching Fellow, Visualization	
<i>Instructor: Hanspeter Pfister</i>	
Harvard University	Fall 2011
Teaching Fellow, Computing Foundations for Computational Science	
<i>Instructor: Hanspeter Pfister</i>	
Harvard University	Winter 2011
Teaching Fellow, Massively Parallel Computing	
<i>Instructors: Hanspeter Pfister, Nicolas Pinto</i>	
University of Calgary	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

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

Doug James

Professor of Computer Science, Stanford University
djames@cs.stanford.edu

Hanspeter Pfister

An Wang Professor of Computer Science, Harvard University
pfister@seas.harvard.edu

Adam Finkelstein

Professor of Computer Science, Princeton University
af@cs.princeton.edu

John Owens

Child Family Professor of Engineering and Entrepreneurship, University of California, Davis
jowens@ece.ucdavis.edu

Sudipta Sinha

Researcher, Microsoft Research
sudipta.sinha@microsoft.com