

# Andrew Adams

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## Research Interests

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Computational Photography, Image Processing, Programming Languages.

My research focuses on the underlying architectures, languages, and algorithms that advance computational photography. I was a lead architect of the “Frankencamera” programmable camera platform and FCam API, which comprise a new architecture and API for camera control. My dissertation explores new data structures and algorithms for the kinds of non-linear image filtering commonly used in photography. I am currently working on bringing these image processing techniques onto the camera through domain-specific languages for image processing.

## Education

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09/2006 - 07/2011	PhD in Computer Science Stanford University, Stanford, CA Advisor: Marc Levoy Dissertation: High-Dimensional Gaussian Filtering for Computational Photography
09/2004 - 09/2006	MS in Computer Science Stanford University, Stanford, CA
03/2000 - 12/2003	BS in Computer Science and Mathematics with first class honors and university medal University of New South Wales, Sydney, Australia

## Awards and Honors

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2010	Walter J. Gores Award for Excellence in Teaching, Stanford University
2010	Eurographics Conference 2 <sup>nd</sup> -Best Paper Award
2008	Centennial Teaching Assistant Award, Stanford School of Engineering
2008	Forsythe Teaching Award, Stanford Computer Science Department
2006 - present	Stanford Graduate Fellowship
2004	University Medal in Computer Science, University of New South Wales
2000 - 2003	Science Faculty Scholarship, University of New South Wales

## Refereed Publications

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Natasha Gelfand, Andrew Adams, Sung Hee Park, Kari Pulli.  
Multi-exposure Imaging on Mobile Devices.  
In Proceedings of ACM Multimedia 2010.

Andrew Adams, Eino-Ville Talvala, Sung Hee Park, David E. Jacobs, Boris Ajdin, Natasha Gelfand, Jennifer Dolson, Daniel Vaquero, Jongmin Baek, Marius Tico, Hendrik P. A. Lensch, Wojciech Matusik, Kari Pulli, Mark Horowitz, Marc Levoy.  
The Frankencamera: An Experimental Platform for Computational Photography.  
In Proceedings of ACM SIGGRAPH 2010.

Andrew Adams, Jongmin Baek, Abe Davis.  
Fast High-Dimensional Filtering Using the Permutohedral Lattice.  
In Proceedings of Eurographics 2010 (2<sup>nd</sup> Best Paper).

Andrew Adams, Natasha Gelfand, Jennifer Dolson, Marc Levoy.  
Gaussian KD-Trees for Fast High-Dimensional Filtering.  
In Proceedings of ACM SIGGRAPH 2009.

Andrew Adams, Natasha Gelfand, Kari Pulli.  
Viewfinder Alignment.  
In Proceedings of Eurographics 2008.

Andrew Adams, Marc Levoy.  
General Linear Cameras with Finite Aperture.  
In Proceedings of Eurographics Symposium on Rendering 2007.

Eino-Ville Talvala, Andrew Adams, Mark Horowitz, Marc Levoy.  
Veiling Glare in High Dynamic Range Imaging.  
In Proceedings of ACM SIGGRAPH 2007.

Marc Levoy, Ren Ng, Andrew Adams, Matthew Footer, Mark Horowitz.  
Light Field Microscopy.  
In Proceedings of ACM SIGGRAPH 2006.

Bennett Wilburn, Neel Joshi, Vaibhav Vaish, Eino-Ville Talvala, Emilio Antunez, Adam Barth, Andrew Adams, Mark Horowitz, Marc Levoy.  
High Performance Imaging Using Large Camera Arrays.  
In Proceedings of ACM SIGGRAPH 2005.

## Released Projects

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The FCam camera control API for the Nokia N900. Enables easy construction of computational photography applications on the N900, with precise per-frame control over all sensor settings at full frame rate. 147,000 downloads as of 11/9/2010.  
<http://fcam.garage.maemo.org/>.

ImageStack: A command-line stack calculator for images. A toolkit for computational photography. Includes implementations of many recent papers in the field, as well as my own image processing work on fast non-linear filters.  
<http://code.google.com/p/imagestack>.

The Stanford Light Field Archive. A repository of high resolution light fields available for research purposes.

<http://lightfield.stanford.edu/>.

Flash applets on some technical aspects of photography. Developed for the digital photography course at Stanford. <http://graphics.stanford.edu/courses/cs178-10/applets/>.

## Employment

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01/2005 - present	Stanford University, Stanford, CA Graduate Research Assistant, Course Assistant, & Teaching Fellow Research with Marc Levoy. Course assistant for Marc Levoy and Kurt Akeley.
06/2008 - 09/2008	Google, Mountain View, CA Engineering Intern Created tools to visualize & debug Google Street View camera trajectories.
06/2007 - 09/2007	Nokia Research Center, Palo Alto, CA Research Intern Developed algorithm for real-time global alignment of viewfinder images on camera phones (see Viewfinder Alignment under publications).
03/2001 - 06/2004	University of New South Wales, Sydney, Australia Section Leader Lead sections & labs, and designed assignments for introductory Computer Science courses.

## Teaching Experience

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Fall 2009 Stanford University	CS448F: Image Processing for Photography and Vision Created and taught this graduate-level course.
Spring 2009 Stanford University	CS178: Digital Photography Co-designer and Course Assistant with Marc Levoy.
Spring 2008 Stanford University	CS448A: Computational Photography on Mobile Computing Platforms Co-taught with Marc Levoy and Kari Pulli.
Fall 2007-2009 Stanford University	CS248: Introduction to Computer Graphics Course Assistant for Marc Levoy (07-08) & Kurt Akeley (09).
Spring 2001 - 2003 UNSW	COMP1721 Higher Computing 1B Section Leader for Andrew Taylor
Fall 2001 - 2004 UNSW	COMP1711 Higher Computing 1A Section Leader for Richard Buckland

## Advising

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Summer 2009	Katie Dektar & Nora Willett Applets for Teaching Photography
Summer 2010	Taesung Park Synthetic Panning Shots
Summer 2010	Ben Olson Image-Guided Metering and White Balance

## Media Coverage

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Greene, Kate. A Camera with a Brain. Stanford Magazine, 09/2010.

Simonite, Tom. New Focus for Digital Photography. MIT Technology Review, 07/30/2010.

Orenstein, David. Stanford 'Frankencamera' platform available on Nokia N900 ahead of unveiling at graphics conference. Stanford Report, 07/21/2010.

Giles, Jim. Computational cameras perfect your photos for you. New Scientist, 11/17/2009.

Raz, Guy. 'Frankencamera': A Giant Leap For Digital Photos?. NPR, 10/11/2009.

Rettie, John. Open Source Cameras in Your Future. Rangefinder Magazine, 10/2009.

Orenstein, David. Open-source camera could revolutionize digital photography. Stanford Report, 08/31/2009. Picked up by all major tech sites (Slashdot, Engadget, Crunchgear, Popular Science, Make, CNET news, ZDNet, Linux Magazine, HotHardware, HardOCP, Techradar, etc), and some international newspapers (La Repubblica, Spiegel Online, Sina.com, etc).