

Changyin Zhou

Software Engineer at Google X

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EDUCATION

Ph.D, Computer Science, Columbia University

Oct 2012

Advisor: Prof. Shree K. Nayar

(expected)

Research topic: Computational camera design for 3D reconstruction, high-resolution imaging, and extended depth of field.

M.Phil, Computer Science, Columbia University

Sep 2011

Advisor: Prof. Shree K. Nayar

M.S, Computer Science, Fudan University

Jun 2007

Advisor: Prof. Yanqiu Chen

Thesis: A Study on Machine Vision, from Camera, Image Processing, Feature Selection to Recognition

Graduate with honor

B.S., Statistics, Fudan University

Sep 1996 - Jun 2001

Advisors: Prof. Ming Zheng and Dr. Qinfen Xu

Thesis: A Bayesian Model for Handwritten Character Recognition and its Implementation

REFEREED PUBLICATIONS*

1. **Changyin Zhou**, Alejandro Troccoli, and Kari Pulli, "Robust Stereo with Flash and No-flash Image Pairs", CVPR 2012
2. **Changyin Zhou** and Shree Nayar, "Computational Camera: Convergence of Optics and Processing", IEEE Transactions on Image Processing (TIP), Volume 20, Issue 12, Pages 3322-3340, 2011.
3. **Changyin Zhou**, Stephen Lin, Shree Nayar, "Coded Aperture Pairs for Depth from Defocus and Defocus Deblurring", *International Journal of Computer Vision (IJCV)*, Vol. 93, (53-72), 2011.

4. Sujit Kuthirummal, Hajime Nagahara, **Changyin Zhou**, Shree Nayar, Flexible Depth of Field Photography, *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, Vol. 33 (58-71), Jan 2011.
5. Oliver Cossairt, **Changyin Zhou**, Shree Nayar, "Diffusion Coded Photography for Extended Depth of Field", in *proceeding of SIGGRAPH*, July 2010.
6. **Changyin Zhou**, Shree Nayar, "Aperture Evaluation for Defocus Deblurring and Extended Depth of Field", *Technical Report, CUCS-007-12, Columbia University*, April 2012.
7. Hajime Nagahara, **Changyin Zhou**, Yakuya Watanabe, Hiroshi Ishiguro, Shree Nayar, "Programmable Aperture Photography", *European Conference on Computer Vision (ECCV)*, Oct 2010.
8. **Changyin Zhou**, Oliver Cossairt, Shree Nayar, "Depth from Diffusion", *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun 2010.
Oral presentation < 5% accepted
9. **Changyin Zhou**, Stephen Lin, Shree Nayar, "Coded Aperture Pairs for Depth from Defocus", *IEEE International Conference on Computer Vision (ICCV)*, Sep 2009.
Oral presentation < 5% accepted
10. **Changyin Zhou**, Shree Nayar, "What are Good Apertures for Defocus Deblurring?", *IEEE International Conference on Computational Photography (ICCP)*, Apr 2009.
11. Hajime Nagahara, Sujit Kuthirummal, **Changyin Zhou**, Shree K. Nayar, "Flexible Depth of Field Photography", *European Conference on Computer Vision (ECCV)*, Oct 2008.
Oral presentation < 5% accepted
12. **Changyin Zhou**, Stephen Lin, "Removal of Image Artifacts Due to Sensor Dust", *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2007
Oral presentation < 5% accepted
Featured: <http://research.microsoft.com/en-us/news/features/cvpr2007.aspx>
13. **Changyin Zhou** and Yanqiu Chen, "Improving Nearest Neighbor Classification with Cam Weighted Distance", *Pattern Recognition*, Vol. 39 (635-645), 2006

* In computer vision, two of the leading journals are the *International Journal of Computer Vision*, and the *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*, Leading conferences are *IEEE CVPR*, *ICCV* and *ECCV*. Papers in these conferences are rigorously reviewed, with acceptance rates around 20%, and below 5% for oral presentations In computer graphics, the top conference is *SIGGRAPH*, with acceptance rates around 20%. *SIGGRAPH* papers are published in the *ACM Transactions on Graphics*. *International Conference on Computational Photography (ICCP)* is the top conference in computational photography.

PATENTS

1. US Patent, 2012, “Systems, Methods, and Media For Providing Interactive Refocus in Images”, with Daniel Miao and Shree Nayar
2. US Patent, 2012, “Techniques for Generating Robust Stereo Images”, with Alejandro Troccoli and Kari Pulli.
3. US Patent, 2011, “Non-Planar Focal Surface Lens Assembly”, with Brian Guenter and Neel Joshi.
4. US Patent, 2010, “Systems, Methods, and Media For Recording an Image Using An Optical Diffuser”, with Oliver Cossairt and Shree Nayar
5. US Patent, 2008, “Removal of Image Artifacts from Sensor Dust”, with Stephen Lin and Baining Guo
6. US Patent, 2009, “Methods, Systems, and Media for Controlling Depth of Field in Images”, with Shree Nayar, Sujit Kuthirummal, and Hajime Nagahara.

PROFESSIONAL SERVICES:

Reviewer	IEEE Transactions on Pattern Analysis and Machine Intelligence
or	IEEE Transactions on Image Processing
Program	
Committee:	International Journal of Computer Vision
	ACM Computing Review
	Signal Processing
	Pattern Recognition
	International Conference on Computer Vision 2009 and 2011
	SIGGRAPH Asia 2009 and 2010
	Asian Conference on Computer Vision 2010
	SIGGRAPH Asia 2010
	ACM SIGCHI 2011
	IEEE International Conference on Computational Photography 2011
	European Conference on Computer Vision 2012
	IEEE Conference of Computer Vision and Pattern Recognition 2012

RECENT TALKS

- Oct 2011 **"Diffusion Coded Photography for Extended Depth of Field and Depth Recovery"**, *Graphics Lab, CS Dept., Stanford University.*
- Jan 2011 **"Computational Cameras for Light Field Processing"**, *CS Dept., Columbia University in the City of New York.*
- Jul 2010 **"Diffusion Coded Photography for Extended Depth of Field"**, *ACM SIGGRAPH, July 2010, Los Angeles, CA*
- Jul 2010 **"Designing the Ultimate Camera"**, *Microsoft Research, Redmond*
- Jun 2010 **"Depth from Diffusion"**, *IEEE International Conference on Pattern Recognition and Computer Vision (CVPR), San Francisco, CA*
- Oct 2009 **"Coded Aperture Pairs for Depth from Defocus"**, *IEEE International Conference on Computer Vision (ICCV), Kyoto, Japan*
- Apr 2009 **"What are Good Apertures for Defocus Deblurring?"**, *IEEE International Conference on Computational Photography (ICCP), San Francisco, CA*

WORK EXPERIENCE

Google

Mountain View, CA

Software Engineer of Google X

since Oct 2011

In Google X, I design and build the next generation cameras and computer vision applications by leveraging the most recent advances in computational photography research. (Details on secret projects were left out.)

Columbia University

New York, NY

Research Assistant

Aug 2007 – May 2011

Work with Prof. Shree K. Nayar and Prof. Peter Belhumeur

I developed cutting-edge computational imaging techniques (e.g., aperture coding, diffusion coding, focal sweep, and camera array) for a variety of computer vision and graphics applications, which include high-quality 3D reconstruction, image recovery, and image refocusing. My research work involves both building novel imaging system on the hardware side and developing novel algorithms on the software side.

NVidia Research

Santa Clara, WA

Summer Research Intern

Jun - Aug, 2011

I developed a novel robust stereo technique using mobile devices for high-quality 3D reconstruction.

Microsoft Research

Redmond, WA

Summer Research Intern

May - Aug, 2010

I designed a compact Giga-pixel camera by making a fundamental modification to the existing camera architecture. With the new architecture and the custom designed lenses, a fast and compact camera could be built approaching the diffraction limits.

Microsoft Research Asia

Beijing, China

Research Intern

Mar 2006 – Jun 2007

I developed a robust technique to automatically detect and remove image artifacts due to sensor dust, which is one typical and challenging problem in photography.

Fudan University

Shanghai, China

Research Assistant

Sep 2004 – Sep 2007

Work with Prof. Yanqiu Chen

I developed new pattern classification and feature selection techniques that significantly improved the performance of texture and shape classification.

Microsoft Global Engineering Center

Shanghai, China

Microsoft Platform Support Engineer

Oct 2001 – May 2003

I provided Windows 2000/XP technical supports to high-end Microsoft customers (e.g., IT professionals and enterprise customers) from regions in North America and Europe.

Honors and Certificates

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|------|---|
| 2011 | Demo award, MIRU2011 |
| 2007 | Best Intern Award, Microsoft Research Asia <ul style="list-style-type: none">• 10 out of 300+ interns, and invited by Mr. Bill Gates to visit Microsoft Headquarters and have dinner in his house |
| 2007 | Honor of Excellent Master Graduate Student, Shanghai City |
| 2001 | Microsoft Certified Solution Developer (MCSD)
Microsoft Certified Systems Engineer (MCSE)
Microsoft Certified Database Administrator (MCDBA) |