

# NEEL S. JOSHI

## CONTACT INFORMATION

Microsoft Research  
One Microsoft Way  
Redmond, WA 98052-6399

neel@microsoft.com  
<http://research.microsoft.com/~neel>

## EDUCATION

- 09/2008                      University of California, San Diego  
Ph.D. in Computer Science  
  
Dissertation: Enhancing Photographs using Content-Specific Image Priors  
Advisor: Dr. David Kriegman
- 03/2004                      Stanford University  
M.S. with Distinction in Research in Computer Science
- 05/2000                      Brown University  
B.S. in Computer Science

## RESEARCH INTERESTS

Computer vision, computer graphics, computational photography and video, learning for graphics and vision, data-driven graphics, image-based rendering, inverse rendering, appearance modeling

## RESEARCH & WORK EXPERIENCE

- 11/2008 – Present        **Microsoft Research, Redmond, WA**  
*Post-Doctoral Researcher*
- 09/2004 – 09/2008      **University of California, San Diego, Computer Science & Engineering Department**  
*Ph.D. Student, Research Assistant, NSF IGERT Fellow*  
Research with Dr. David Kriegman and Dr. Henrik Jensen and on multi-camera methods, appearance measurement, multi-view and photometric stereo, and image deblurring, super-resolution, and color correction
- 01/2008                      **Adobe Systems, Creative Technology Lab, Newton, MA**  
*Intern*  
Research with Dr. Wojciech Matusik on deblurring, super-resolution, lighting and shadow correction, and color correction for face images
- 06/2007 – 09/2007      **Microsoft Research, Redmond, WA**  
*Intern*  
Research with Dr. Richard Szeliski and Dr. C. Lawrence Zitnick on image deblurring

- 06/2006 – 09/2006 **Mitsubishi Electric Research Laboratories, Cambridge, MA**  
06/2005 – 02/2006 *Intern*  
Research with Dr. Shai Avidan, Dr. Wojciech Matusik, and Dr. Hanspeter Pfister on multi-camera alpha matte extraction and multi-camera tracking
- 06/2006 – 09/2006 **Bosch Research and Technology Center, Palo Alto, CA**  
*Consultant*  
Design of a camera array system for Dr. David Krum
- 06/2004 – 11/2004 **Stanford University, Center for the Study of Language and Information, Stanford, CA**  
*Research Assistant*  
Research in interactive educational toys using RFID technology to promote social awareness. In collaboration with CSLI, MediaX, the School of Education, Department of Mechanical Engineering, and The Sesame Workshop
- 06/2002 – 03/2004 **Stanford University, Computer Science Department, Stanford, CA**  
*Research Assistant*  
Research with Dr. Mark Horowitz and Dr. Marc Levoy on color calibration, high speed video, synthetic aperture video, high-performance imaging, view interpolation and optical flow with the Stanford Multi-Camera Array
- 04/2002 – 09/2002 **Stanford University, Computer Science Department, Stanford, CA**  
*Independent Research Project*  
Research with Dr. Kenneth Salisbury in haptics and stereo displays for surgical simulation
- 06/2000 – 01/2002 **Tiqit Computers, Menlo Park, CA**  
**Chairman and CTO: Dr. Vaughan Pratt, Stanford University**  
*Computer Engineer*  
Schematic design for Crusoe, ZF Micro, and GEODE mobile computers, hardware layout and prototyping, bluetooth development, microcontroller development, Linux and Windows drivers and applications
- 09/1999 – 12/1999 **Brown University, Computer Science Department, Providence, RI**  
*Independent Research Project*  
Research with Dr. Steve Reiss in Programming Environments, developed a Java/XML based integrated development environment for programming in Java
- 06/1999 – 09/1999 **GTE Government Systems (now General Dynamics), Taunton, MA**  
*Summer Intern*  
Development of a Python/C++ based TCP/IP system for use with networking hardware
- 05/1998 – 09/1998 **Bell Atlantic, Directory Graphics, Norristown, PA**  
*Summer Intern*  
Visual Basic, Access, and Oracle SQL programming, ad production system upgraded to Windows NT 4

09/1997 – 05/1998 **Brown University, Mathematics Department, Providence, RI**  
*Homework Grader*  
Homework grading for Second Semester Introductory Calculus

05/1997 – 09/1997 **HBO & Company (now McKessonHBOC), Malvern, PA**  
*Summer Intern*  
Testing of database end user tools and porting of company products to the Windows 95 platform

### **TEACHING EXPERIENCE**

*Spring 2008* Teaching Assistant for “Introduction to Computer Graphics” at UC San Diego

*Spring 2002* Teaching Assistant for “C++ and Object-Oriented Programming” at Stanford University

*Winter 2002* Teaching Assistant for “Object-Oriented Programming: From a Modeling and Simulation Perspective” at Stanford University

*Spring 2000* Teaching Assistant for “Introduction to Scientific Computing “ at Brown University

*Fall 1999* Teaching Assistant for “Introduction to Computer Systems” at Brown University

### **PUBLICATIONS**

*Full Conference Papers* **Joshi, N.**, Zitnick, C.L., Szeliski, R., and Kriegman, D. Image Deblurring and Denoising using Color Priors. Proceedings of IEEE CVPR 2009 (to appear).

**Joshi, N.**, Szeliski, R., and Kriegman, D. PSF Estimation using Sharp Edge Prediction. Proceedings of IEEE CVPR 2008.

**Joshi, N.**, Avidan, S., Matusik, W., and Kriegman, D. Tracking through Occlusions using Multiple Cameras. Proceedings of IEEE ICCV 2007. **Oral Presentation.**

**Joshi, N.** and Kriegman, D. Shape from Varying View and Illumination. Proceedings of IEEE ICCV 2007.

**Joshi, N.**, Matusik, W., and Avidan, S. Natural Video Matting using Camera Arrays. Proceedings of ACM SIGGRAPH 2006.

Wilburn, B., **Joshi, N.**, Vaish, V., Tavala, E-V., Antunez, E., Barth, A., Adams, A., Horowitz, M , and Levoy, M. High Performance Imaging Using Large Camera Arrays. Proceedings of ACM SIGGRAPH 2005.

Wilburn, B., **Joshi, N.**, Vaish, V., Levoy, M., and Horowitz, M. High Speed Video Using a Dense Camera Array. Proceedings of IEEE CVPR 2004. **Oral Presentation.**

Vaish, V., Wilburn, B., **Joshi, N.**, and Levoy, M. Using Plane + Parallax for Calibrating Dense Camera Arrays. Proceedings of IEEE CVPR 2004. **Oral Presentation.**

*Journal Papers*

**Joshi, N.**, Matusik, W., Avidan, S., Pfister, H., and Freeman, W.T. Exploring Defocus Matting: Non-Parametric Acceleration and Super-Resolution. IEEE Computer Graphics and Applications, Special Issue on Computational Photography. March/April 2007 (Vol. 27, No. 2) pp 43-52.

**Joshi, N.**, Donner, C., and Jensen, H.W. Non-invasive scattering anisotropy measurement in turbid materials using non-normal incident illumination. Optics Letters Vol 31, No 7, pp 936-938 (April 1, 2006).

*Peer-reviewed Posters*

Morris, D., and **Joshi, N.** Alternative "Vision": A Haptic and Auditory Assistive Device. Student Poster. Proceedings of ACM SIGCHI 2003 Extended Abstracts.

*Technical Reports*

**Joshi, N.** and Jensen, H.W. Single Image Appearance Measurement. UCSD CSE Technical Report, October 2006.

Morris D. and **Joshi, N.** Hybrid Rendering for Interactive Virtual Scenes. Stanford University, Technical Report CSTR 2006-04, 2006.

**Joshi, N.**, Wilburn, B., Vaish, V., Levoy, M., and Horowitz, M. Automatic color calibration for large camera arrays. UCSD CSE Technical Report CS2005-0821, May 11, 2005.

Wilburn B., **Joshi, N.**, Chou, K., Levoy, M., and Horowitz, M. Spatiotemporal Sampling and Interpolation for Dense Camera Arrays. Technical Report CSTR 2004-01 1/21/04 3/30/04 Stanford University, 2004.

*Master's Thesis*

**Joshi, N.** Color calibration for arrays of inexpensive image sensors. Master's Thesis, Stanford University, Technical Report CSTR 2004-02, 2004.

*Ph.D. Dissertation*

**Joshi, N.** Enhancing Photographs using Content-Specific Image Priors. Ph.D. Dissertation, University of California, San Diego.

**PATENTS PENDING**

2007

Avidan, S., Matusik, W., and **Joshi, N.** System and Method for Tracking Objects with a Synthetic Aperture. US Patent App 11866645.

2005

Wilburn, B., **Joshi, N.**, Levoy, M., and Horowitz, M. Apparatus and Method for Capturing a Scene using Staggered Triggering of Dense Camera Arrays. US Patent App 20070030342.

**INVITED TALKS**

- December 2008 **Joshi, N.** Enhancing Photographs using Content-Specific Image Priors. VASC Seminar, Robotics Institute, Carnegie Mellon University, Pittsburgh, PA.
- June 2008 **Joshi, N.** High Performance Imaging and Image Enhancement. Pixar Animation Studios, Emeryville, CA.
- May 2008 **Joshi, N.** Enhancing Photographs using Content-Specific Image Priors. Nokia Research Center, Palo Alto, CA.
- May 2008 **Joshi, N.** High Performance Imaging and Image Enhancement. Walt Disney Imagineering R&D, Glendale, CA.
- April 2008 **Joshi, N.** Enhancing Photographs using Content-Specific Image Priors. Microsoft Research, Redmond, WA.
- February 2008 **Joshi, N.** Personal Image Enhancement using Prior Images. Adobe Systems Technology Summit, San Jose, CA.
- November 2006 **Joshi, N.** Natural Video Matting using Camera Arrays. HP Labs, Palo Alto, CA.
- March 2004 Morris, D. and **Joshi, N.** Haptic Battle Pong: a networked haptic game. Experimental Gameplay Workshop at the 2004 Game Developer's Conference, San Jose, CA

#### **PRESS AND MEDIA COVERAGE**

- December 2004 "High-Speed Video Using a Dense Camera Array", Slashdot
- June 2002 "Haptic Battle Pong... Future of Game Interface?", Slashdot
- May 2002 "Tiqit Handheld PC", Slashdot
- April/May 2000 "Tetris of Titans", Time Magazine; "Ultimate Tetris, on a Very Big Screen", New York Times; "Tetris takes over tower block", BBC News Online; "Brown students create massive Tetris game on building", CNETNews.com; "The World's Largest Game Of Tetris", Slashdot

#### **AWARDS**

- 2004 National Science Foundation IGERT (Integrative Graduate Education and Research Traineeship ) Graduate Fellowship
- 1996 National Merit Scholarship Finalist

## PROFESSIONAL ACTIVITIES

|                             |   |
|-----------------------------|---|
| <i>Session Chair</i>        | SIGGRAPH 2008 – “Ride, Watch, and Learn” Talk Session   |
| <i>Committee Member</i>     | CVPR 2008, 2009 – Program Committee<br>ICCV 2007 – Program Committee<br>SIGGRAPH 2008 – General Program Jury, Late-Breaking Work  |
| <i>Reviewer</i>             | CVPR 2007, 2008, 2009<br>EGSR 2005, 2006, 2008<br>Eurographics 2006, 2007, 2008<br>ICCV 2005, 2007, 2009<br>IEEE CG&A May 2007<br>Journal of Visual Communication and Image Representation May 2008<br>SIGGRAPH 2006, 2007, 2008, 2009<br>SIGGRAPH ASIA 2008<br>Transactions on Image Processing May 2008 |
| <i>Student Volunteer</i>    | CVPR 2005<br>CHI 2007   |
| <i>Departmental Service</i> | UCSD CSE Representative to the Grad Student Assoc. ( <i>Fall 2004 to Spring 2006</i> )<br>Stanford CS M.S. Student-Faculty Representative ( <i>Fall 2002 to Spring 2003</i> )<br>Stanford CS M.S. Admissions Committee Representative ( <i>Fall 2001 to Spring 2002</i> )                                 |

## ACTIVITIES

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|------------------------|--|
| <i>Extracurricular</i> | Recreational Projects ( <a href="http://techhouse.brown.edu/~neel/projects.html">http://techhouse.brown.edu/~neel/projects.html</a> )<br>Visual Art (portfolio available at <a href="http://techhouse.brown.edu/~neel/art.html">http://techhouse.brown.edu/~neel/art.html</a> )<br>Vice President of Technology House at Brown University ( <i>1999 to 2000</i> )<br>Recreational guitar and vocal performance |
|------------------------|--|