

Ravi Ramamoorthi

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EDUCATION

- 6/98-8/02 **Stanford University**
Ph.D in Computer Science
Thesis: *A Signal-Processing Framework for Forward and Inverse Rendering*
- 9/94-6/98 **California Institute of Technology**
BS in Engineering and Applied Science, MS in Computer Science, MS in Physics

EMPLOYMENT

- 1/09-present **University of California at Berkeley**, Associate Professor of EECS (Acting 1/09-6/09)
- 1/07-12/08 **Columbia University**, Associate Professor of Computer Science (tenure effective 7/1/08)
- 9/02-12/06 **Columbia University**, Assistant Professor of Computer Science

RESEARCH INTERESTS

The goal of my research is to develop the *theoretical foundations, mathematical representations, and computational algorithms* for the *visual appearance* of objects, digitally recreating or *rendering* the complexity of natural appearance. My work explores practical applications in a variety of areas in *computer graphics* rendering and related topics in computer vision, including

- mathematical foundations* of rendering and visual appearance
- real-time photorealistic rendering*
- a digital data-driven visual appearance pipeline*
- physics-based computer vision, and the vision-graphics interface*

HONORS

Best Paper Award at 2011 ACM Symposium on Interactive 3D graphics, “Real-Time Rough Refraction.”
Cover image of inaugural Siggraph Asia 2008, inset page of Siggraph 2011.

Presidential Early Career Award for Scientists and Engineers (The PECASE is conferred by the President and is the highest honor bestowed by the US Govt on early career researchers), White House, Dec 19, 2008.

ACM SIGGRAPH Significant New Researcher Award (highest early career award for computer graphics researchers; 1 award made per year among all “new” academic/industrial researchers), Aug 2007. See video introducing my work at <http://www.cs.berkeley.edu/~ravir/RaviR.wmv>

ONR Young Investigator Award “Mathematical Models of Illumination and Reflectance for Image Understanding and Machine Vision” (2 awards per year in computer science), Office of Naval Research, Mar 2007.

Sloan Fellowship in Computer Science (14 awards per year in computer science to junior faculty; only award in computer graphics in 2005), Alfred P. Sloan Foundation, Sep 2005.

NSF CAREER award, “Mathematical and Computational Fundamentals of Visual Appearance for Computer Graphics” (usually 3 awards per year in computer graphics), National Science Foundation, Feb 2005.

Stanford Graduate Fellowship (awarded to 1% of PhD applicants), 1998-2002.

Green Prize for creative Scholarship, California Institute of Technology (1 or 2 awards made per year among all undergraduates for outstanding research), 1997.

RECENT INVITED TALKS (last 3 years)

- Feb-Mar 2011 “Sampling and Reconstruction of High-Dimensional Visual Appearance”, *University of Maryland, NUS, ASTAR Singapore, MIT [Oct 2010]*
- Oct 2010 “Computational Models of Visual Appearance for Computer Vision”, *ONR*
- Jul-Aug 2009 “Lighting, Reflections and Rendering: Appearance for Computer Graphics”, *Industrial Light and Magic, Adobe, Pacific Data Images, UC Berkeley [Oct 2008]*
- Feb-Apr 2008 “Representations of Visual Appearance for Computer Graphics and Vision”, *Universities of California at Berkeley, San Diego, Los Angeles, IIT Hyderabad [Jul 08]*
- Oct 2007 “High Quality Real-Time Rendering”, *University of Washington, Bungie Studios Seattle*

Ravi Ramamoorthi (1/8)
ravir@cs.berkeley.edu
Jun 30, 2011

PUBLICATIONS

ARCHIVAL JOURNALS¹

1. “Fast Construction of Accurate Quaternion Splines” by **R. Ramamoorthi** and A. Barr. *In proceedings of SIGGRAPH 1997*, pages 287–292.
2. “Creating Generative Models from Range Images” by **R. Ramamoorthi** and J. Arvo. *In proceedings of SIGGRAPH 1999*, pages 195–204.
3. “Efficient Image-Based Methods for Rendering Soft Shadows” by M. Agrawala, **R. Ramamoorthi**, A. Heirich and L. Moll. *In proceedings of SIGGRAPH 2000*, pages 375–384.
4. “A Signal-Processing Framework for Inverse Rendering” by **R. Ramamoorthi** and P. Hanrahan. *In proceedings of SIGGRAPH 2001*, pages 117–128.
5. “An Efficient Representation for Irradiance Environment Maps” by **R. Ramamoorthi** and P. Hanrahan. *In proceedings of SIGGRAPH 2001*, pages 497–500.
6. “On the Relationship between Radiance and Irradiance: Determining the Illumination from Images of a Convex Lambertian Object” by **R. Ramamoorthi** and P. Hanrahan. *Journal of the Optical Society of America A*, volume 18(10), Oct 2001, pages 2448–2459.
7. “Frequency Space Environment Map Rendering” by **R. Ramamoorthi** and P. Hanrahan. *ACM Transactions on Graphics* 21(3) [SIGGRAPH 2002], pages 517–526.
8. “Analytic PCA Construction for Theoretical Analysis of Lighting Variability in Images of a Lambertian Object” by **R. Ramamoorthi**. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 24(10), 1322–1333, Oct 2002.
9. “All-Frequency Shadows Using Non-Linear Wavelet Lighting Approximation” by R. Ng, **R. Ramamoorthi** and P. Hanrahan. *ACM Transactions on Graphics* 22(3) [SIGGRAPH 2003], pages 376–381.
10. “Structured Importance Sampling of Environment Maps” by S. Agarwal, **R. Ramamoorthi**, S. Belongie and H. Jensen. *ACM Transactions on Graphics* 22(3) [SIGGRAPH 2003], pages 605–612.
11. “Wavelet Triple Product Integrals for All-Frequency Relighting” by R. Ng, **R. Ramamoorthi** and P. Hanrahan. *ACM Transactions on Graphics* 23(3) [SIGGRAPH 2004], pages 477–487.
12. “Efficient BRDF Importance Sampling Using a Factored Representation” by J. Lawrence, S. Rusinkiewicz and **R. Ramamoorthi**. *ACM Transactions on Graphics* 23(3) [SIGGRAPH 2004], pages 494–503.
13. “A Signal-Processing Framework for Reflection” by **R. Ramamoorthi** and P. Hanrahan. *ACM Transactions on Graphics*, 23(4), 1004–1042, Oct 2004.
14. “A Fourier Theory for Cast Shadows” by **R. Ramamoorthi**, M. Koudelka and P. Belhumeur. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 27(2), 288–295, Feb 2005.
15. “Spacetime Stereo: A Unifying Framework for Depth from Triangulation” by J. Davis, D. Nehab, **R. Ramamoorthi** and S. Rusinkiewicz. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 27(2), 296–302, Feb 2005.
16. “Efficiently Combining Positions and Normals for Precise 3D Geometry” by D. Nehab, S. Rusinkiewicz, J. Davis and **R. Ramamoorthi**. *ACM Transactions on Graphics* 24(3) [SIGGRAPH 2005], pages 536–543.
17. “A Practical Analytic Single Scattering Model for Real-Time Rendering” by B. Sun, **R. Ramamoorthi**, S. Narasimhan and S. Nayar. *ACM Transactions on Graphics* 24(3) [SIGGRAPH 2005], pages 1040–1049.
18. “Efficient Shadows from Sampled Environment Maps” by A. Ben-Artzi, **R. Ramamoorthi** and M. Agrawala. *Journal of Graphics Tools*, 11(1), 13–36, Jan 2006.
19. “Inverse Shade Trees for Non-Parametric Material Representation and Editing” by J. Lawrence, A. Ben-Artzi, C. Decoro, W. Matusik, H. Pfister, **R. Ramamoorthi** and S. Rusinkiewicz. *ACM Transactions on*

¹The ACM SIGGRAPH conference (and since 2008, SIGGRAPH Asia) is the leading venue for publishing research in computer graphics, with acceptance rates ranging from 15% – 20%. Since 2002, the proceedings have also been published as a special issue of the ACM Transactions on Graphics (TOG), the leading journal in graphics. Moreover since 2008, regular TOG papers are also presented at SIGGRAPH, further blurring the distinction. For consistency, and to reflect the true significance of these papers, I also include my 5 SIGGRAPH papers published earlier than 2002 under archival journals. The EuroGraphics Symposium on Rendering (EGSR) is the leading venue for rendering research (second only to the SIGGRAPH conference), and has a competitive acceptance rate of 30 – 40%. Since 2008, the proceedings also appear in a special Computer Graphics Forum journal issue. Both SIGGRAPH and EGSR papers are fully reviewed, and considered terminal publications. In computer vision, one the leading journals are the IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), and the International Journal of Computer Vision (IJCV). 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.

Graphics 25(3) [SIGGRAPH 2006], pages 735–745.

20. “A Compact Factored Representation of Heterogeneous Subsurface Scattering” by P. Peers, K. von Borge, W. Matusik, **R. Ramamoorthi**, J. Lawrence, S. Rusinkiewicz and P. Dutre. *ACM Transactions on Graphics 25(3) [SIGGRAPH 2006], pages 746–753.*
21. “Time-Varying Surface Appearance: Acquisition, Modeling and Rendering” by J. Gu, C. Tu, **R. Ramamoorthi**, P. Belhumeur, W. Matusik and S. Nayar. *ACM Transactions on Graphics 25(3) [SIGGRAPH 2006], pages 762–771.*
22. “Real-Time BRDF Editing in Complex Lighting” by A. Ben-Artzi, R. Overbeck and **R. Ramamoorthi**. *ACM Transactions on Graphics 25(3) [SIGGRAPH 2006], pages 945–954.*
23. “Acquiring Scattering Properties of Participating Media by Dilution” by S. Narasimhan, M. Gupta, C. Donner, **R. Ramamoorthi**, S. Nayar and H. Jensen. *ACM Transactions on Graphics 25(3) [SIGGRAPH 2006], pages 1003–1012.*
24. “Reflectance Sharing: Predicting Appearance from a Sparse Set of Images of a Known Shape” by T. Zickler, **R. Ramamoorthi**, S. Enrique and P. Belhumeur. *IEEE Transactions on Pattern Analysis and Machine Intelligence, 28(8), 1287–1302, Aug 2006.*
25. “First Steps Toward an Electronic Field Guide for Plants” by G. Agarwal, P. Belhumeur, S. Feiner, D. Jacobs, W. Kress, **R. Ramamoorthi**, N. Dixit, D. Mahajan, H. Ling, R. Russell, S. Shirdhonkar, K. Sunkavalli and S. White. *Taxon, 55(3), 597–610, Aug 2006.*
26. “A First Order Analysis of Lighting, Shading, and Shadows” by **R. Ramamoorthi**, D. Mahajan and P. Belhumeur. *ACM Transactions on Graphics (TOG), 26(1), Article 2, 1–21, Jan 2007.*
27. “Time-Varying BRDFs” by B. Sun, K. Sunkavalli, **R. Ramamoorthi**, P. Belhumeur and S. Nayar. *IEEE Transactions on Visualization and Computer Graphics, 13(3), 595–609, May 2007.*
28. “Frequency Domain Normal Map Filtering” by C. Han, B. Sun, **R. Ramamoorthi** and E. Grinspun. *ACM Transactions on Graphics 26(3) [SIGGRAPH 2007], article 28.*
29. “A Theory of Locally Low Dimensional Light Transport” by D. Mahajan, I. Kemelmacher Shlizerman, **R. Ramamoorthi** and P. Belhumeur. *ACM Transactions on Graphics 26(3) [SIGGRAPH 2007], article 62.*
30. “A Theory of Frequency Domain Invariants: Spherical Harmonic Identities for BRDF/Lighting Transfer and Image Consistency” by D. Mahajan, **R. Ramamoorthi** and B. Curless. *IEEE Transactions on Pattern Analysis and Machine Intelligence, 30(2), 197–213, Feb 2008.*
31. “A Precomputed Polynomial Representation for Interactive BRDF Editing with Global Illumination” by A. Ben-Artzi, K. Egan, **R. Ramamoorthi** and F. Durand. *ACM Transactions on Graphics 27(2), Article 13, pages 1–13, Apr 2008.* Presented at SIGGRAPH 2008 TOG papers session on Rendering Materials.
32. “An Analysis of the In-Out BRDF Factorization for View-Dependent Relighting” by D. Mahajan, Y. Tseng and **R. Ramamoorthi**, *Computer Graphics Forum 27(4) [EGSR 2008], pages 1137–1145, Jun 2008.*
33. “Multiscale Texture Synthesis” by C. Han, E. Rissler, **R. Ramamoorthi** and E. Grinspun. *ACM Transactions on Graphics, 27(3) [SIGGRAPH 2008], article 51.*
34. “Light Field Transfer: Global Illumination Between Real and Synthetic Objects” by O. Cossairt, S. Nayar and **R. Ramamoorthi**. *ACM Transactions on Graphics, 27(3) [SIGGRAPH 2008], article 57.*
35. “Using Specularities in Comparing 3D Models and 2D Images” by M. Osadchy, D. Jacobs, **R. Ramamoorthi** and D. Tucker. *Computer Vision and Image Understanding, 111(3), pages 275–294, Sep 2008.*
36. “A Layered, Heterogeneous Reflectance Model for Acquiring and Rendering Human Skin” by C. Donner, T. Weyrich, E. D’Eon, **R. Ramamoorthi** and S. Rusinkiewicz. *ACM Transactions on Graphics, 27(5) [SIGGRAPH Asia 2008], article 140. Front Cover Image of Inaugural SIGGRAPH Asia.*
37. “Compressive Light Transport Sensing” by P. Peers, D. Mahajan, B. Lamond, A. Ghosh, W. Matusik, **R. Ramamoorthi** and P. Debevec. *ACM Transactions on Graphics 28(1), Article 3, 3:1-3:18, Jan 2009.* Presented at SIGGRAPH 2009.
38. “Affine Double and Triple Product Wavelet Integrals for Rendering” by B. Sun and **R. Ramamoorthi**. *ACM Transactions on Graphics 28(2), Article 14, 14:1-14:17, Apr 2009.* Presented at SIGGRAPH 2009.
39. “Precomputation-Based Rendering” by **R. Ramamoorthi**. *Foundations and Trends in Computer Graphics and Vision, 3(4), pages 281–369, 2007 (backdated issue; actually published in Apr 2009).*
40. “Frequency Analysis and Sheared Reconstruction for Rendering Motion Blur” by K. Egan, Y. Tseng, N. Holzschuch, F. Durand and **R. Ramamoorthi**. *ACM Transactions on Graphics 28(3) [SIGGRAPH 2009], Article 93, 93:1–93:13, Jul 2009.*

41. “Moving Gradients: A Path-Based Method for Plausible Image Interpolation” by D. Mahajan, F. Huang, W. Matusik, **R. Ramamoorthi**, and P. Belhumeur. *ACM Transactions on Graphics* 28(3) [SIGGRAPH 2009], Article 42, 42:1–42:11, Jul 2009.
42. “An Empirical BSSRDF Model” by C. Donner, J. Lawrence, **R. Ramamoorthi**, T. Hachisuka, H. Jensen and S. Nayar. *ACM Transactions on Graphics* 28(3) [SIGGRAPH 2009], Article 30, 30:1–30:10.
43. “Removing Image Artifacts Due to Dirty Camera Lenses and Thin Occluders” by J. Gu, **R. Ramamoorthi**, P. Belhumeur and S. Nayar. *ACM Transactions on Graphics* 28(5) [SIGGRAPH Asia 2009], Article 144, 144:1–144:10, Dec 2009.
44. “Adaptive Wavelet Rendering” by R. Overbeck, C. Donner and **R. Ramamoorthi**. *ACM Transactions on Graphics* 28(5) [SIGGRAPH Asia 2009], Article 140, 140:1–140:12, Dec 2009.
45. “Sparsely Precomputing the Light Transport Matrix for Real-Time Rendering” by F. Huang and **R. Ramamoorthi**, *Computer Graphics Forum* 29(4) [EGSR 2010], pages 1335–1345, Jun 2010.
46. “Example-Based Wrinkle Synthesis for Clothing Animation” by H. Wang, F. Hecht, **R. Ramamoorthi** and J. O’Brien. *ACM Transactions on Graphics* 29(4) [SIGGRAPH 2010], Jul 2010.
47. “Multi-Resolution Isotropic Strain Limiting” by H. Wang, J. O’Brien and **R. Ramamoorthi**. *ACM Transactions on Graphics* 29(6) [SIGGRAPH Asia 2010], Dec 2010.
48. “Frequency Analysis and Sheared Filtering for Shadow Light Fields of Complex Occluders” by K. Egan, F. Hecht, F. Durand and **R. Ramamoorthi**. *ACM Transactions on Graphics* 30(2), Apr 2011.
49. “Optimizing Environment Maps for Material Depiction” by A. Bousseau, E. Chapoulie, **R. Ramamoorthi** and M. Agrawala. *Computer Graphics Forum* 30(4) [EGSR 2011], pages 1171–1180, Jun 2011.
50. “Illumination Decomposition for Material Recoloring with Consistent Interreflections” by R. Carroll, M. Agrawala and **R. Ramamoorthi**. *ACM Transactions on Graphics* 30(4) [SIGGRAPH 2011], Jul 2011.
51. “Data-Driven Elastic Models for Cloth: Modeling and Measurement” by H. Wang, J. O’Brien and **R. Ramamoorthi**. *ACM Transactions on Graphics* 30(4) [SIGGRAPH 2011], Jul 2011.
52. “On the Duality of Forward and Inverse Light Transport” by M. Chandraker, J. Bai, T. Ng and **R. Ramamoorthi**. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, in press.
53. “From the Rendering Equation to Stratified Light Transport Inversion” by T. Ng, R. Pahwa, J. Bai, K. Tan and **R. Ramamoorthi**. *International Journal of Computer Vision*, in press.

REFEREED INTERNATIONAL CONFERENCES

54. “Spacetime Stereo: A Unifying Framework for Depth from Triangulation” by J. Davis, **R. Ramamoorthi** and S. Rusinkiewicz. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2003*, pages II-359–II-366 (Early version of [15]).
55. “Using Specularities for Recognition” by M. Osadchy, D. Jacobs and **R. Ramamoorthi**. *International Conference on Computer Vision (ICCV) 2003*, pages 1512–1519 (Early version of [35]).
Oral presentation < 5% accepted.
56. “A Fourier Theory for Cast Shadows” by **R. Ramamoorthi**, M. Koudelka and P. Belhumeur. *European Conference on Computer Vision (ECCV) 2004*, pages I-146–I-162 (Early version of [14]).
57. “Practical Rendering of Multiple Scattering in Participating Media” by S. Premoze, M. Ashikhmin, J. Tesendorf, **R. Ramamoorthi** and S. Nayar. *Eurographics Symposium on Rendering 2004*, pages 363–374.
58. “Adaptive Numerical Cumulative Distribution Functions for Efficient Importance Sampling” by J. Lawrence, S. Rusinkiewicz and **R. Ramamoorthi**. *Eurographics Symposium on Rendering 2005*, pages 11–20.
59. “Reflectance Sharing: Image-Based Rendering from a Sparse Set of Images” by T. Zickler, S. Enrique, **R. Ramamoorthi** and P. Belhumeur. *Eurographics Symposium on Rendering 2005*, pages 253–264.
60. “Exploiting Temporal Coherence for Incremental All-Frequency Relighting” by R. Overbeck, A. Ben-Artzi, **R. Ramamoorthi** and E. Grinspun. *Eurographics Symposium on Rendering 2006*, pages 151–160.
61. “A Theory of Spherical Harmonic Identities for BRDF/Lighting Transfer and Image Consistency” by D. Mahajan, **R. Ramamoorthi** and B. Curless. *European Conference on Computer Vision (ECCV) 2006, vol IV*, pages 41–55 (Early version of [30]). **Oral presentation < 5% accepted.**
62. “Time Varying BRDFs” by B. Sun, K. Sunkavalli, **R. Ramamoorthi**, P. Belhumeur and S. Nayar. *Eurographics Workshop on Natural Phenomena 2006*, pages 15–24. (Early version of [27]).
63. “4D Compression and Relighting with High-Resolution Light Transport Matrices” by E. Cheslack-Postava, N. Goodnight, R. Ng, **R. Ramamoorthi** and G. Humphreys. *ACM Symposium on Interactive 3D*

Graphics and Games 2007, pages 81–88.

64. “Viewpoint-Coded Structured Light” by M. Young, E. Beeson, J. Davis, S. Rusinkiewicz and **R. Ramamoorthi**. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2007*.

65. “A Real-Time Beam Tracer with Application to Exact Soft Shadows” by R. Overbeck, **R. Ramamoorthi** and W. Mark. *EuroGraphics Symposium on Rendering, 2007*, pages 85–98.

66. “Dirty Glass: Rendering Contamination on Transparent Surfaces” by J. Gu, **R. Ramamoorthi**, P. Belhumeur and S. Nayar. *EuroGraphics Symposium on Rendering, 2007*, pages 159–170.

67. “Large Ray Packets for Real-time Whittted Ray Tracing” by R. Overbeck, **R. Ramamoorthi** and W. Mark. *IEEE Symposium on Interactive Ray Tracing 2008*.

68. “Searching the World’s Herbaria: A System for Visual Identification of Plant Species” by P. Belhumeur, D. Chen, S. Feiner, D. Jacobs, W.J. Kress, H. Ling, I. Lopez, **R. Ramamoorthi**, S. Sheorey, S. White and L. Zhang. *European Conference on Computer Vision (ECCV) 2008, vol IV*, pages 116–129.

69. “Compressive Structured Light for Recovering Inhomogeneous Participating Media” by J. Gu, S. Nayar, E. Grinspun, P. Belhumeur and **R. Ramamoorthi**. *European Conference on Computer Vision (ECCV) 2008, vol IV*, pages 845–858. **Oral presentation <5% accepted.**

70. “A Dual Theory of Inverse and Forward Light Transport” by J. Bai, M. Chandraker, T. Ng and **R. Ramamoorthi**. *European Conference on Computer Vision (ECCV) 2010, vol II*, pages 294–307. (Early version of [52]).

71. “Real-Time Rough Refraction” by C. de Rousiers, A. Bousseau, K. Subr, N. Holzschuch and **R. Ramamoorthi**. *ACM Symposium on Interactive 3D Graphics and Games 2011, Feb 2011*. **Best Paper Award (1 of 64 submissions).**

72. “A Theory of Differential Photometric Stereo for Unknown Isotropic BRDFs” by M. Chandraker, J. Bai and **R. Ramamoorthi**. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pages 2505–2512, Jun 2011. **Oral presentation 3.5% accepted.**

73. “What an Image Reveals about Material Reflectance” by M. Chandraker and **R. Ramamoorthi**. *IEEE International Conference on Computer Vision (ICCV) 2011, in press*. **Oral presentation 3% accepted.**

NON-REFEREED PUBLICATIONS (Technical Reports, Abstract-Reviewed Conferences, and Theses)

74. “Local Generation of Infragravity Energy in the Swash Zone? Model Evaluation” by A. Murray, B. Werner and **R. Ramamoorthi** *Abstract OS12B-01 of American Geophysical Union Fall Meeting, 1996*.

75. “Dynamic Splines with Constraints for Animation” by **R. Ramamoorthi**, C. Ball and A. Barr. *Caltech Tech. Report CS-TR-97-03*.

76. “A General Resource Reservation Framework for Scientific Computing” by **R. Ramamoorthi**, A. Rifkin, B. Dimitrov and K. Chandy. *ISCOPE 97*, pages 283–290.

77. “Creating Generative Models from Range Images” by **R. Ramamoorthi**. Masters Thesis, *Caltech Tech. Report CS-TR-98-05 (see SIGGRAPH paper on this work [2])*.

78. “Analysis of Planar Light Fields from Homogeneous Convex Curved Surfaces under Distant Illumination” by **R. Ramamoorthi** and P. Hanrahan. *Human Vision and Electronic Imaging VI 2001*, pages 195–208.

79. “Analytic PCA construction for theoretical analysis of lighting variability, including attached shadows, in a single image of a convex Lambertian object” by **R. Ramamoorthi**. *CVPR 01, workshop on Identifying Objects Across Variations in Lighting (early version of [8])*.

80. “Acquiring Material Models Using Inverse Rendering” by **R. Ramamoorthi**, S. Marschner, S. Boivin, G. Drettakis, H. Lensch, Y. Yu. *SIGGRAPH 2002 course 39 (note chapter on Inverse rendering under complex illumination by R. Ramamoorthi)*.

81. “A Signal-Processing Framework for Forward and Inverse Rendering” by **R. Ramamoorthi**. PhD Thesis, *Stanford University, Aug 2002*.

82. “Time-Varying Textures: Definition, Acquisition and Synthesis” by S. Enrique, M. Koudelka, P. Belhumeur, J. Dorsey, S. Nayar, and **R. Ramamoorthi**. *Columbia Tech. Report CUCS-023-05*.

BOOKS (REFEREED)

83. “Modeling Illumination Variation with Spherical Harmonics” by **R. Ramamoorthi** in *Face Processing: Advanced Modeling Methods* (edited by Rama Chellappa and Wenyi Zhao), *Acad. Press 2006*, pp 385–424.

84. “Precomputation-Based Rendering” by **R. Ramamoorthi**. *NOW Publishers Inc. 104 pages, Apr 2009. ISBN 978-1-60198-220- (originally published as [39])*.

TEACHING

CS 348a (Stanford)	Computer Graphics: Mathematical Methods. Teaching Assistant, winter 1999.
CS 148 (Stanford)	Introductory Computer Graphics, Summer 2001. Instructor for course.
SIGGRAPH 2002	Course Organizer (with Marschner): Acquiring Material Models by Inverse Rendering
COMS 4160 (Columbia)	Computer Graphics. Redesigned introductory undergraduate graphics course, and taught it each year, usually in fall. Spring 2003 (45 students), Fall 2003 (28 students), Fall 2004 (39 students), Fall 2005 (39 students), Fall 2006 (39 students), Spring 2008 (35 students), Fall 2008 (25 students)
COMS 4162 (Columbia)	Advanced Computer Graphics. Developed new undergraduate course. Spring 2005 (25 students), Spring 2006 (14 students). Was intended to be offered in alternate years.
COMS 6160 (Columbia)	Topics in Computer Graphics. Developed new graduate course taught every two years (content changes with each offering). Fall 2002 COMS 6998 Appearance Models (9 students), Fall 2004 Real-Time High Quality Rendering (23 students), Spring 2007 Visual Appearance Representations for Rendering (17 students).
CS 283 (Berkeley)	Developed CS 283 (earlier 294-13) as the basic graduate graphics course, taught yearly in the fall. First version co-taught with Prof. O'Brien in Fall 2009 (21 students), and sole instructor in Fall 2010 (8 students).
CS 184 (Berkeley)	Reorganized and taught CS 184, Foundations of Computer Graphics (basic undergraduate graphics course) in Spring 2010 (76 students).

FUNDING

- “Sparse Reconstruction and Frequency Analysis for Computer Graphics Rendering and Imaging” with F. Durand (MIT), \$500,000 Oct 1, 2011 - Sep 30, 2014.
- “Scalable Visual Rendering” (with K. Bala, D. Greenberg [Cornell] as part of Intel Science and Technology Center for Visual Computing), \$50,000/yr Apr 2011 – present.
- “Beyond Flat Images: Acquiring, Processing and Fabricating Visually Rich Material Appearance” [one of 6 PIs], \$3,000,000 Sep 1, 2010 - Aug 31, 2015.
- “Computational Models of Appearance for Computer Vision and Image Understanding” [PI] ONR PECASE Program, \$1,000,000 Apr 1, 2009 - Mar 31, 2014.
- Gift from Pixar Animation Studios [PI], \$60,000 Mar 1, 2009 – present.
- Gift from Intel Corporation [PI], \$15,000 + \$25,000 equipment, Dec 2009 – present.
- Gift from Adobe [PI], \$25,000, Mar 2010 – present.
- Gift from NVIDIA [PI], \$10,000 + equipment, Mar 2010 – present.
- “Theory and Algorithms for High Quality Real-Time Rendering and Lighting/Material Design in Computer Graphics” [PI] with H. Jensen (UCSD), NSF CPA \$320,000 Sep 1, 2007 - Aug 31, 2010.
- “Mathematical Models of Illumination and Reflectance for Image Understanding and Machine Vision” [PI], ONR Young Investigator Program \$350,000 + \$30,000 matching funds Jun 1, 2007 - May 31, 2010.
- Gift from Adobe Research [PI], \$68,000 Oct 1, 2007 – present.
- “Fast and Accurate Volumetric Rendering of Scattering Phenomena in Computer Graphics” [co-PI] with S. Nayar, S. Narasimhan (CMU, PI), NSF CPA \$400,000 Mar 1, 2006 - Feb 28, 2010.
- “Sloan Fellowship in Computer Science”, Alfred P. Sloan Foundation \$45,000 Sep 1, 2005 - Aug 31, 2009.
- “CAREER: Mathematical and Computational Fundamentals of Visual Appearance for Computer Graphics” [PI], NSF CCF Graphics and Visualization \$425,000 + \$45,000 matching funds Feb 1, 2005 - Jan 31, 2011.
- “Restore the Trustworthiness of Digital Photographs: Blind Detection of Digital Photograph Tampering” [co-PI] with S. Chang [PI], NSF Cyber Trust program, \$740,000 Sep 1, 2004 - Aug 31, 2008.
- “Real-Time Rendering and Interaction with Complex Illumination and Materials” [PI], Intel Corporation AIM Program, \$75,000 + \$15,000 equipment, Dec 1, 2003 – Aug 2009.
- “Real-Time Visualization and Rendering of Complex Scenes” [PI] with H. Jensen (UCSD), NSF program on Numeric, Symbolic and Geometric Computation CCF \$434,734 Dec 15, 2003 - Nov 30, 2007.
- “An Electronic Field Guide: Plant Exploration and Discovery in the 21st Century” [co-PI] with P. Belhumeur [PI], S. Feiner, D. Jacobs (UMD), J. Kress (Smithsonian), NSF ITR \$2,224,000 Sep 1, 2003 - Aug 31, 2010.

STUDENT COLLABORATORS AND ADVISEES

Postdocs: Milos Hasan, Dikpal Reddy

Current PhD (co-)advisees

- Jiamin Bai [ASTAR Fellow] (since Jan 2010)
- Michael Tao [NSF Fellow] (since Sep 2010)
- Sean Arietta (with Maneesh Agrawala, since Sep 2011)
- Soham Mehta Uday (since Sep 2011)

Alumni

- *Postdoc:* Huamin Wang [now Assistant Professor at Ohio State] (Oct 2009-May 2011), Manmohan Chandraker [now at NEC Labs] (Sep 2009-May 2011), Adrien Bousseau [Eurographics 2011 PhD Award, now at INRIA Sophia-Antipolis] (Nov 2009-Oct 2010), Craig Donner [now at Leolux] (Oct 2007-Aug 2009), Simon Premoze [was at ILM] (Oct 2003-Mar 2005)
- *PhD students:* Aner Ben-Artzi [now at Sony] (since Jan 2003: PhD deposit May, 2007)
Bo Sun [Presidential Fellow] (since Jan 2004 : PhD deposit Aug, 2008)
Dhruv Mahajan [now at Yahoo Research, Bangalore] (since Jan 2006 : PhD deposit Aug, 2009)
Ryan Overbeck [now at PDI/Dreamworks] (since Sep 2006 : PhD deposit Aug, 2009)
Jinwei Gu [now Assistant Professor at RIT] (since Sep 2005 : PhD deposit *with distinction* May, 2010)
Charles Han (since Jan 2006 : PhD deposit Jun 2011)
Kevin Egan (since Sep 2006 : defence Jun 2011)
- *PhD (co-)advisee:* Jason Lawrence [now faculty at Univ. Virginia, NSF CAREER Award 2008] (at Princeton, advisor Szymon Rusinkiewicz, since Jun 2003: PhD completed Jun 2006)
- *PhD student collaborators:* Ren Ng [Microsoft Fellow, 2006 ACM doctoral dissertation award] (Stanford, advisor Pat Hanrahan, May 2002-Jan 2004), Sameer Agarwal (UCSD, advisor Serge Belongie, Jan 2003), Srinivasa Narasimhan [now faculty at CMU] (advisor Shree Nayar, Jan 2003-Jan 2006), Todd Zickler [now faculty at Harvard] (Yale, advisor Peter Belhumeur, Nov 2002-Feb 2005), Ira Kemelmacher Shlizerman (Weizmann Institute, advisor Ronen Basri, Jun-Aug 2006), Diego Nehab [now faculty at IMPA] (Princeton, advisor Szymon Rusinkiewicz, Jun 2003-Jun 2007), Oliver Cossairt [NSF Fellow] (advisor Shree Nayar, Aug 2007-Jan 2008), Florian Hecht (advisor O'Brien, 2009 -)
- *MS:* Sebastian Enrique [now at Electronic Arts] (Sep 2003-Jun 2005), Kalyan Sunkavalli [now PhD at Harvard] (Sep 2004-Jul 2006), Dhruv Mahajan [MS thesis, then PhD] (Sep 2004-Dec 2005), Ryan Overbeck [MS thesis, then PhD] (Sep 2004-Dec 2005), Chien-I Tu [now PhD at Texas A&M] (Jun-Sep 2005), Nandan Dixit [now at Google] (Sep 2005-Dec 2006), Yu-Ting Tseng [now at Google] (Sep 2007-Dec 2008), Eric Risser [now PhD at Trinity, Dublin] (Sep 2007-Dec 2008), Fu-Chung Huang (Jan-Dec 2009)
- *BS:* Makiko Yasui [Theodore Bashkow award] (SEAS 2004), Zeyar Htet (SEAS 2005), Ray Ming-Yeh [Computer Science Scholarship award] (SEAS 2005), Matthew Schulkind (SEAS 2006), Tianyu Liu (BS 2010), Michael Tao (BS 2010)

PROFESSIONAL SERVICE

Co-Chair, Eurographics Symposium on Rendering, 2011

Associate Editor, ACM Transactions on Graphics, 2006 -

Associate Editor, IEEE Transactions on Pattern Analysis and Machine Intelligence, 2009 -

NSF Panelist and Reviewer, 2005 -

Proposal Reviewer for Austrian Science Foundation, 2005, 2006, 2010

Program Committee and Papers Sort, SIGGRAPH ASIA conference, 2009, 2010

Program Committee, SIGGRAPH conference, 2006, 2007

Program Committee, EGSR (Eurographics Symposium on Rendering), 2005, 2006, 2007, 2009

Program Committee, CVPR (IEEE Conference on Computer Vision and Pattern Recognition), 2003, 2007, 2010

Program Committee, ICCV (International Conference on Computer Vision), 2003, 2009

Program Committee, ECCV (European Conference on Computer Vision), 2004, 2006

Program Committee, ACCV (Asian Conference on Computer Vision), 2006

Reviewer for SIGGRAPH, Eurographics, Eurographics Symposium on Rendering, IEEE Computer Graphics and Applications, IEEE TVCG, IEEE PAMI, Computer Vision and Image Understanding, ...

Ravi Ramamoorthi (7/8)
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Jun 30, 2011

DEPARTMENTAL AND UNIVERSITY SERVICE

- *PhD Admissions and graduate advising (Berkeley)*: CS PhD admissions committee, 2009–. Responsible for shortlisting and admissions for 100+ graphics applicants, and related computer vision applicants. Discussions with committee on logistics, and with faculty regarding funding and admissions decisions. Active participation in graduate admissions meeting, visit day and recruiting. Also active in graduate advising committee.
- *Regents and Chancellors Interviews (UC Berkeley)*: Interviewed and recommended prospective students for UC Berkeley Regents and Chancellors fellowships (this counts as university senate service for 2010-2011).
- *PhD Admissions (Columbia)*: Served on PhD admissions committee 2002–2008. Participated actively on discussions to improve process, leading to new departmental fellowships for “general pool admits” chosen early by committee. Responsible for discussions and selection of Presidential and Departmental Fellowships (and before current electronic system, screening and sorting all applications). Responsible for the full schedule of faculty and student meetings for the 2006 PhD visit day.
- *Distinguished Lecture Series (Columbia)*: Organized Distinguished and Departmental Lecture series, 2006–2007.
- *Faculty Recruiting (Columbia)*: Responsible (2002–2004) for screening/interviewing applicants and active recruiting, especially in computer graphics. Continuing service on recruiting committee for 2006 search.
- *Nominations Committee (Columbia)*: Served on nominations committee (2004–2008) to select departmental nominees for competitive awards, like IBM and Microsoft fellowships.
- *Talks (Columbia)*: Gave talks and participated in 25th anniversary celebrations, PhD admit day, and visit of chair of trustees (and helped with some organization).
- *Advising (Berkeley and Columbia)*: Academic advising of undergraduate and MS students.