

Curriculum Vitae of Aravind Krishnaswamy

Contact Information

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Education

- Master of Mathematics (MMath), Computer Science
University of Waterloo
Waterloo, Ontario, Canada.
Studies part-time while employed full-time.
Thesis: “*BioSpec: A Biophysically-based Spectral Model for Light Interaction with Human Skin.*”
- Bachelor of Mathematics (BMath), Honours Computer Science with Co-op
University of Waterloo
Waterloo, Ontario, Canada.

Summary of Research Interests

- Photo realistic rendering,
- Robust, physically-based, and efficient material specification systems,
- Practical and physically correct global illumination,
- Biologically and physically-based rendering of organic materials,
- Simulation of natural phenomenon,
- Parallel computing,
- Computational imaging/photography.

Professional Experience

- Senior Computer Scientist
Adobe Systems Incorporated (Visual Computing Lab), *April 2007 to present*.
Engaged in academic level research in areas related to rendering, parallel computing and computational imaging. Helped develop and integrate the technology behind the Mixer Brush and Bristle Tips in Photoshop CS5. Co-developed and shipped the real time and final quality ray tracer in Photoshop CS4 and CS5.
- Computer Scientist - GPU
Adobe Systems Incorporated (Photoshop), *October 2005 to April 2007*.
As a 'GPU and Performance Guru' on the Photoshop team, my primary role was to drive the adoption of GPUs into Photoshop as well as to be resident expert on GPU programming.
- Lead Software Architect
Inscriber Technology Corporation, *January 2001 to October 2005*.
Organization and co-ordination of the development of broadcast products. Technical consulting and research for core technologies.
- Software Developer (full-time intern)
Inscriber Technology Corporation, *January 1999 to December 2000*.
Researched and developed algorithms for integrating 3D mesh technology into broadcast and post production software.

Research

My Master's research has addressed the simulation the interaction of light with human skin by the introduction of the BioSpec model. The BioSpec model is biophysically based, hence it is predictive and it is a full spectral model. The BioSpec model is one of the few models which addresses the spatial distribution of light (BRDF) as well as the spectral distribution of light.

I have also researched improving the way in which virtual measurement devices such as virtual goniophotometers are used.

Membership

- *ACM SIGGRAPH*,
- *Eurographics*,
- *National Association of Photoshop Professionals (NAPP)*.

Selected Professional Activities

- Open Source Projects
 - Project Manager and Principal Researcher
Realistic Image Synthesis Engine, September 2001 to May 2006.
R.I.S.E. is a state of the art software for the simulation and rendering of natural phenomena. Its flexible ray tracing and Monte Carlo core make it ideal for rendering organic and inorganic materials. It has been used by several researchers around the world in variety of fields such as fractal visualization, remote sensing simulation and illumination engineering.

- Conference Courses and Tutorials
 - Baranoski, G.V.G.; Krishnaswamy, A.; “Light Interaction With Human Skin: From Believable Images to Predictable Models”, SIGGRAPH Asia 2008.
 - Baranoski, G.V.G.; Krishnaswamy, A.; “Light Interaction with Human Skin”, Afrigraph 2007.
 - Baranoski, G.V.G.; Krishnaswamy, A.; “Simulation of Light Interaction with Human Skin”, Eurographics 2005.
 - Baranoski, G.V.G.; Krishnaswamy, A.; “An Introduction to Light Interaction with Human Skin”, SIBGRAPI 2004.

- Reviewer
 - Eurographics
 - IEEE Symposium on Interactive Ray Tracing
 - Computers & Graphics
 - Computers & Graphics - special issue on Natural Phenomena Simulation
 - International Journal of Image and Graphics
 - SIBGRAPI - Brazilian Symposium on Computer Graphics and Image Processing
 - Computer Animation and Social Agents 2005

Publications

• Books

- Baranoski, G.V.G.; Krishnaswamy, A.; Light and Skin Interactions: Simulations for Computer Graphics Applications. Elsevier, 2010.
- Gee, Z.; Falco, F; 3D in Photoshop: The Ultimate Guide for Creative Professionals. Focal Press, 2010. Contributing author.

• Journal Articles

- Baranoski, G.V.G.; Krishnaswamy, A.; Kimmel, B; Increasing the predictability of tissue subsurface scattering simulations. *The Visual Computer*. Volume 21, Number 4, pp. 265-278.
- Krishnaswamy, A.; Baranoski, G.V.G.; A Biophysically-Based Spectral Model of Light Interaction with Human Skin. *Computer Graphics Forum*. Volume 23, Number 4, pp. 331-340. Best Student Paper Award (2nd Prize) of Eurographics 2004, Grenoble France.
- Baranoski, G.V.G.; Krishnaswamy, A.; Kimmel, B; An investigation on the use of data driven scattering profiles in Monte Carlo simulations of ultraviolet light propagation in skin tissues. *Physics in Medicine & Biology*. Volume 49, Number 20, pp. 4799-4809.
- Baranoski, G.V.G.; Krishnaswamy, A.; An Introduction to Light interaction with Human Skin. *Revista de Informatica Teorica e Aplicada*. Volume 11, Number 1, 2004, pp. 33-62.
- Krishnaswamy, A.; Baranoski, G.V.G.; Rokne, J.; Improving the Reliability/Cost Ratio of Goniophotometric Comparisons. *Journal of Graphics Tools*. Volume 9, Number 3. pp. 1-20.

• Referred Conference Publications

- Krishnaswamy, A.; Baranoski, G.V.G.; Combining a Shared-Memory High Performance Computer and a Heterogeneous Cluster for the Simulation of Light Interaction with Human Skin. *Proceedings of SBAC-PAD 2004; 16th Symposium on Computer Architecture and High Performance Computing*. Foz do Iguacu, Brazil, October 27-29, 2004. pp. 166-171.

• Technical Reports

- Krishnaswamy, A.; Baranoski, G.V.G.; “A Study on Skin Optics”. Technical Report CS-2004-01. School of Computer Science, University of Waterloo. Canada, January, 2004.
- Baranoski, G.V.G., Krishnaswamy, A., Kimmel, B. “Revisiting the Foundations of Subsurface Scattering”. Technical Report CS-2003-45. School of Computer Science, University of Waterloo. Canada, December, 2003.

- Krishnaswamy,A., Baranoski,G.V.G., Rokne,J. “Virtual Goniophotometric Measurements Protocol”. Technical Report CS-2002-21. School of Computer Science, University of Waterloo. Canada, July, 2002.

- **Patents**

Numerous patents pending.