

## EDUCATION



- Ph.D. in Computer Science**, UNIVERSITY OF CALIFORNIA, SAN DIEGO SEPTEMBER 2008  
Advisors: Henrik Wann Jensen & Matthias Zwicker  
Dissertation: *Efficient Monte Carlo Methods for Light Transport in Scattering Media*
- M.S. in Computer Science**, UNIVERSITY OF CALIFORNIA, SAN DIEGO MARCH 2006  
Advisor: Henrik Wann Jensen
- B.S in Computer Science**, UNIVERSITY OF ILLINOIS, URBANA–CHAMPAIGN MAY 2003  
Advisors: John C. Hart & Michael Garland  
Highest Honors, Senior Thesis: *Interactive Global Illumination for Improved Lighting Design Workflow*

## RESEARCH INTERESTS



My research is concerned with deriving *theoretical models* and developing *computational algorithms* for efficiently capturing, simulating, manipulating, and physically realizing complex visual appearance. In effect, I strive to understand why things look the way they do, how we can simulate their interaction with light efficiently, how we can intuitively author or edit that appearance, and how we can create physical objects with control over their appearance. My publications explore practical applications in several overlapping areas in computer graphics including: participating media rendering, appearance editing & stylization, complex illumination and materials, global illumination, Monte Carlo methods and efficient sampling, high-dynamic range imaging; and computational materials and displays.

## CURRENT POSITION



**Assistant Professor at DARTMOUTH COLLEGE** JULY 2015 – PRESENT  
*Visual Computing Lab, Department of Computer Science*

## EMPLOYMENT HISTORY



- Senior Research Scientist at DISNEY RESEARCH ZÜRICH** JANUARY 2014 – JUNE 2015  
Head of Rendering Group, *The Walt Disney Company (Switzerland) GmbH*
- Adjunct Lecturer at ETH ZÜRICH** AUGUST 2009 – JUNE 2015  
*Department of Computer Science*
- Research Scientist at DISNEY RESEARCH ZÜRICH** SEPTEMBER 2010 – DECEMBER 2013  
Head of Rendering Group, *The Walt Disney Company (Switzerland) GmbH*
- Post-Doctoral Researcher at DISNEY RESEARCH ZÜRICH** MARCH 2009 – SEPTEMBER 2010  
*Walt Disney Studios (Switzerland) Ltd.* Host: Markus Gross.
- Post-Doctoral Researcher at UC SAN DIEGO** OCTOBER 2008 – FEBRUARY 2009  
*Department of Computer Science & Engineering.* Host: Henrik Wann Jensen.
- Research Intern at ADOBE SOFTWARE SYSTEMS** SUMMER 2008  
*Advanced Technology Labs.* Host: Nathan Carr.
- Graduate Student Researcher at UC SAN DIEGO** JANUARY 2004 – SEPTEMBER 2008  
*Department of Computer Science & Engineering.* Hosts: Henrik Wann Jensen & Matthias Zwicker.
- Research Intern at INDUSTRIAL LIGHT & MAGIC** SUMMERS OF 2003, 2005, 2006  
*R&D Group.* Host: Florian Kainz.
- Student Researcher at UNIVERSITY OF ILLINOIS, URBANA–CHAMPAIGN** JUNE 2001 – JUNE 2003  
*Department of Computer Science.* Host: John C. Hart.

## HONORS & AWARDS



### Eurographics Young Researcher Award

2013

From the Eurographics website: “*The Young Researcher Award is given each year to two young researchers in the field who have already made a significant contribution. The intent of this award is to recognize people early on in their career who have already made a notable contribution and are likely to make more.*” See <https://www.eg.org/index.php/awards/young-researcher-award/59-awards/young-researcher-award-recipient/321-eurographics-young-researcher-award-2013>.

### Academy Award for Technical Achievement

JANUARY 2007

Awarded to Florian Kainz in recognition of the OpenEXR project. I worked on the project for two summers and implemented tiered and tiled image support mentioned in the award: “*Widely adopted, OpenEXR is engineered to meet the requirements of the visual effects industry by providing for lossless and lossy compression of tiered and tiled images.*”

### UCSD CSE 168 Rendering Competition – Grand Prize

SPRING 2004

Won a trip to SIGGRAPH 2004 for rendering a realistic scene of a cluttered desk using a personally-written renderer for CSE 168. See <http://graphics.ucsd.edu/courses/rendering/2004>

### CRA Outstanding Undergraduate Award – Honorable Mention

2003

### UIUC Dean’s List, every semester

FALL 1999 – SPRING 2003

## MOVIE CREDITS



<i>Big Hero 6</i> - “Senior Research Scientist (Disney Research)”	2014
<i>Planes: Fire &amp; Rescue</i> - “Research Scientist (Disney Research)”	2014
<i>Frozen</i> - “Research Scientist (Disney Research)”	2013
<i>Tangled</i> - “Research Scientist (Research)”	2010

## COMMERCIAL & OPEN-SOURCE SOFTWARE



### OpenEXR (<http://www.openexr.org>)

I designed and implemented tiling and multi-resolution support as well as thread-safety and multi-threading in the OpenEXR high-dynamic range image format and library while working at Industrial Light & Magic. The work was paid for in part by a grant from The Academy of Motion Picture Arts and Sciences. Implemented features were first used in *Star Wars Episode III: Revenge of the Sith*, and have since been adopted by all major renderers (Pixar’s RenderMan, NVIDIA’s Mental Ray, Arnold, etc.) and commercial image editing packages (Adobe Photoshop, Creative Suite, etc.). OpenEXR is now the de-facto standard image file format for professional film and special effects production, having been used in dozens of feature films.

### RenderMan (<http://renderman.pixar.com/>)

Several of my published methods have been incorporated directly into Pixar’s RenderMan software, including: hierarchical sample warping<sup>[49]</sup> for importance sampling environment maps, photon beams<sup>[40]</sup>, residual ratio tracking<sup>[21]</sup> and unified points, beams & paths<sup>[22]</sup> for participating media, and photon beam diffusion<sup>[27]</sup> for subsurface scattering.

## SUPERVISION



### Post-Docs

○ Gurprit Singh	2015–2017
○ Fabrice Rousselle	2014–2015
○ Jan Novák	2014–2015
○ Ralf Habel	2012–2014
○ Derek Nowrouzezahrai	2010–2011

### Ph.D. Students

○ Benedikt Bitterli	2016–PRESENT
○ Srinath Ravichandran	2015–PRESENT
○ Yuan Tian	2015–2016
○ Romain Prévost	2013–2016
○ Marios Papas	2011–2016
○ Christian Regg	2010–2011

### Interns

○ Adrian Blumer	FALL 2014
○ David Koerner	FALL 2014
○ Hugo Loi	SUMMER 2014
○ Oliver Klehm	SUMMER 2014
○ Rafael Hostettler	SUMMER 2014
○ Simon Kallweit	SUMMER 2014
○ Benedikt Bitterli	2014
○ Shuoran Yang	2014

○ Károly Zsolnai	SUMMER 2013
○ Johannes Meng	SUMMERS 2012, 2013
○ Iliyan Georgiev	SUMMER 2012
○ Jan Novák	SUMMERS 2011, 2012
○ Wenzel Jakob	2010 – 2011
○ Robert Thomas	SUMMER 2010
○ Marios Papas	SUMMER 2010
○ Jared M. Johnson	SUMMER 2010
○ Derek Nowourzezahrai	SUMMER 2009

## Masters Theses

- Xi Deng: *Ongoing* 2017–PRESENT
- Shaojie Jiao: *Ongoing* 2017–PRESENT
- Thomas Müller: *Modeling and Rendering Heterogeneous Granular Materials* 2015–2016
- Benedikt Bitterli: *Informed Choices in Primary Sample Space* 2015
- Adrian Blumer: *Modular Radiance Transfer for Trees* 2013–2014
- Romain Prévost: *A Multi-Layering Framework for Raytraced Diffusion Curves* 2012–2013
- Jorge Schwarzhaupt: *Occlusion-Aware Hessians for Error Control in Irradiance Caching* 2011–2012
- Marina Späni: *Rendering Dynamic Objects in Dynamic Environments* 2011–2012
- Thomas Houit: *The Magic Lens: Refractive Steganography* 2011–2012
- Thomas Siegrist: *Stereoscopic Perception of Material Reflectance* 2011–2012
- Michael Morandi: *Directional Occlusion Volumes* 2011–2012
- Philipp Keller: *Manufacturing Layered Attenuators for Multiple Prescribed Shadow Images* 2011
- Silvan Tschoop: *Facial Performance Appearance Capture and Rendering* 2011
- Stefan Geiger: *An Immersive 3D Augmented Reality Lens* 2010–2011
- Benjamin Müller: *Analytic Lighting in the Presence of Participating Media* 2010–2011
- Pascal Goffin: *Fast Ray Tracing of Line Primitives* 2009–2010

## Bachelor/Semester Student Projects

- Jonathan Huang: *A HoloLens Application to Aid People who are Visually Impaired in Navigation Tasks* 2016–2017
- Simon Kallweit: *Photon Beam Methods in Rendering* 2013
- Benedikt Bitterli: *BSSRDF Explorer: A Rendering Framework for the BSSRDF* 2012–2013
- Jakob Progsch: *BRDF Fitting using Nonlinear Optimization Methods* 2012–2013
- Sebastien Millius: *Fabrication Method Analysis for Goal-Based Caustics Surfaces* 2011
- Adrian Blumer: *Visibility Silhouette Level-of-Detail* 2011

## Ph.D. Dissertation Committees

- Iliyan Georgiev (Saarland University): *Path Sampling Techniques for Efficient Light Transport Simulation* JUNE 2015
- Jan Novák (KIT): *Efficient Many-Light Rendering of Scenes with Participating Media* MAY 2014
- Laurent Belcour (Université de Grenoble): *A Frequency Analysis of Light Transport* OCTOBER 2012
- Adolfo Muñoz (Universidad de Zaragoza): *Light Transport in Participating Media* APRIL 2010

## Ph.D. Habilitation Committees

- Cyril Soler (Université de Grenoble): *Models and Analyses for Image Synthesis* JUNE 2014

## TEACHING



### Department of Computer Science, DARTMOUTH COLLEGE

- COSC 77/177: Computer Graphics FALL 2017, 2016
- COSC 89/189: Computational Aspects of Digital Photography WINTER 2018, FALL 2015
- COSC 87/187: Rendering Algorithms SPRING 2018, 2017, 2016

### Department of Computer Science, ETH ZÜRICH, SWITZERLAND

- 252-5705-00G: Image Synthesis (2015: with Wenzel Jakob) SPRING 2012, 2013, 2014, 2015
- 252-0543-01L: Computer Graphics (with Alex Hornung & Ilya Baran) FALL 2010
- 251-0543-01L: Computer Graphics (with Alex Hornung) FALL 2009

### Department of Computer Science and Engineering, UC SAN DIEGO

- CSE 168: Rendering Algorithms (teaching assistant, guest lecturer) SPRING 2005, 2006, 2007, 2008
- CSE 169: Computer Animation (teaching assistant) WINTER 2006
- CSE 167: Introduction to Computer Graphics (teaching assistant) FALL 2005

## PUBLICATIONS



Below you can find a list of my academic publications and patents (separated by type and sorted by year), along with links to accompanying project pages, PDF downloads, and approximate citation counts scraped from my Google Scholar profile.

## Edited Issues & Volumes














- [1] W. Jarosz and P. Peers, eds. *Proceedings of the Eurographics Symposium on Rendering 2014*. Vol. 33. Computer Graphics Forum 4. June 2014.
- [2] D. Gutierrez and W. Jarosz, eds. *Scattering: Acquisition, Modeling, and Rendering*. Vol. 33. IEEE Computer Graphics and Applications 3. Los Alamitos, CA, USA: IEEE Computer Society, 2013. DOI: 10.1109/MCG.2013.46.

## Peer-Reviewed Journal Articles

- [3] B. Bitterli, W. Jarosz. “Beyond Points and Beams: Higher-Dimensional Photon Samples for Volumetric Light Transport”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH)* 36.4 (July 2017). DOI: 10.1145/3072959.3073698.  
🌐 webpage 📄 pdf
- [4] G. Singh, W. Jarosz. “Convergence Analysis for Anisotropic Monte Carlo Sampling Spectra”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH)* 36.4 (July 2017). DOI: 10.1145/3072959.3073656.  
🌐 webpage 📄 pdf 📄 citations: 1
- [5] G. Singh, B. Miller, W. Jarosz. “Variance and Convergence Analysis of Monte Carlo Line and Segment Sampling”. In: *Computer Graphics Forum (Proceedings of EGSR)* 36.4 (June 2017). DOI: 10.1111/cgf.13226.  
🌐 webpage 📄 pdf
- [6] T. Müller, M. Papas, M. Gross, W. Jarosz, J. Novák. “Efficient Rendering of Heterogeneous Polydisperse Granular Media”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia)* 35.6 (Dec. 2016), 168:1–168:14. DOI: 10.1145/2980179.2982429.  
🌐 webpage 📄 pdf 📄 citations: 4
- [7] F. Rousselle, W. Jarosz, J. Novák. “Image-space Control Variates for Rendering”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia)* 35.6 (Dec. 2016), 169:1–169:12. DOI: 10.1145/2980179.2982443.  
🌐 webpage 📄 pdf
- [8] A. Blumer, J. Novák, R. Habel, D. Nowrouzezahrai, W. Jarosz. “Reduced Aggregate Scattering Operators for Path Tracing”. In: *Computer Graphics Forum (Proceedings of Pacific Graphics)* 35.7 (Oct. 2016), pp. 461–473. DOI: 10.1111/cgf.13043.  
🌐 webpage 📄 pdf
- [9] P. H. Christensen, W. Jarosz. “The Path to Path-Traced Movies”. In: *Foundations and Trends in Computer Graphics and Vision* 10.2 (Oct. 2016), pp. 103–175. ISSN: 1572-2740. DOI: 10.1561/06000000073.  
🌐 webpage 📄 pdf 📄 citations: 1
- [10] B. Bitterli, F. Rousselle, B. Moon, J. A. Iglesias-Gutián, D. Adler, K. Mitchell, W. Jarosz, J. Novák. “Nonlinearly Weighted First-order Regression for Denoising Monte Carlo Renderings”. In: *Computer Graphics Forum (Proceedings of EGSR)* 35.4 (June 2016), pp. 107–117. DOI: 10.1111/cgf.12954.  
🌐 webpage 📄 pdf 📄 citations: 10
- [11] R. Prévost, A. Jacobson, W. Jarosz, O. Sorkine-Hornung. “Large-Scale Painting of Photographs by Interactive Optimization”. In: *Computers & Graphics* 55 (Apr. 2016), pp. 108–117. DOI: 10.1016/j.cag.2015.11.001.  
🌐 webpage 📄 pdf 📄 citations: 5
- [12] T.-W. Schmidt, F. Pellacini, D. Nowrouzezahrai, W. Jarosz, C. Dachsbacher. “State of the Art in Artistic Editing of Appearance, Lighting, and Material”. In: *Computer Graphics Forum* 35.1 (Feb. 2016), pp. 216–233. DOI: 10.1111/cgf.12721.  
🌐 webpage 📄 pdf 📄 citations: 12
- [13] R. Hostettler, R. Habel, M. Gross, W. Jarosz. “Dispersion-based Color Projection using Masked Prisms”. In: *Computer Graphics Forum (Proceedings of Pacific Graphics)* 34.7 (Oct. 2015). DOI: 10.1111/cgf.12771.  
🌐 webpage 📄 pdf 📄 citations: 2
- [14] J. Meng, M. Papas, R. Habel, C. Dachsbacher, S. Marschner, M. Gross, W. Jarosz. “Multi-Scale Modeling and Rendering of Granular Materials”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH)* 34.4 (July 2015). DOI: 10.1145/2766949.  
🌐 webpage 📄 pdf 📄 citations: 11
- [15] B. Bitterli, J. Novák, W. Jarosz. “Portal-Masked Environment Map Sampling”. In: *Computer Graphics Forum (Proceedings of EGSR)* 34.4 (June 2015). DOI: 10.1111/cgf.12674.  
🌐 webpage 📄 pdf 📄 citations: 2










- [16] H. Zimmer, F. Rousselle, W. Jakob, O. Wang, D. Adler, **W. Jarosz**, O. Sorkine-Hornung, A. Sorkine-Hornung. “Path-space Motion Estimation and Decomposition for Robust Animation Filtering”. In: *Computer Graphics Forum (Proceedings of EGSR)* 34.4 (June 2015). DOI: 10.1111/cgf.12685.  
 webpage  pdf  citations: 12
- [17] O. Klehm, F. Rousselle, M. Papas, D. Bradley, C. Hery, B. Bickel, **W. Jarosz**, T. Beeler. “Recent Advances in Facial Appearance Capture”. In: *Computer Graphics Forum (Proceedings of Eurographics)* 34.2 (May 2015), pp. 709–733. DOI: 10.1111/cgf.12594.  
 webpage  pdf  citations: 10
- [18] M. Zwicker, **W. Jarosz**, J. Lehtinen, B. Moon, R. Ramamoorthi, F. Rousselle, P. Sen, C. Soler, S.-E. Yoon. “Recent Advances in Adaptive Sampling and Reconstruction for Monte Carlo Rendering”. In: *Computer Graphics Forum (Proceedings of Eurographics)* 34.2 (May 2015), pp. 667–681. DOI: 10.1111/cgf.12592.  
 webpage  pdf  citations: 27
- [19] R. Prévost, **W. Jarosz**, O. Sorkine-Hornung. “A Vectorial Framework for Ray Traced Diffusion Curves”. In: *Computer Graphics Forum* 34.1 (Feb. 2015), pp. 253–264. ISSN: 1467-8659. DOI: 10.1111/cgf.12510.  
 webpage  pdf  citations: 3
- [20] A. Jarabo, J. Marco, A. Munoz, R. Buisan, **W. Jarosz**, D. Gutierrez. “A Framework for Transient Rendering”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia)* 33.6 (Nov. 2014). DOI: 10.1145/2661229.2661251.  
 webpage  pdf  citations: 24
- [21] J. Novák, A. Selle, **W. Jarosz**. “Residual Ratio Tracking for Estimating Attenuation in Participating Media”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia)* 33.6 (Nov. 2014). DOI: 10.1145/2661229.2661292.  
 webpage  pdf  citations: 16
- [22] J. Křivánek, I. Georgiev, T. Hachisuka, P. Vévoda, M. Šik, D. Nowrouzezahrai, **W. Jarosz**. “Unifying Points, Beams, and Paths in Volumetric Light Transport Simulation”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH)* 33.4 (July 2014). DOI: 10.1145/2601097.2601219.  
 webpage  pdf  citations: 27
- [23] K. Subr, D. Nowrouzezahrai, **W. Jarosz**, J. Kautz, K. Mitchell. “Error analysis of estimators that use combinations of stochastic sampling strategies for direct illumination”. In: *Computer Graphics Forum (Proceedings of EGSR)* 33.4 (June 2014), pp. 93–102. DOI: 10.1111/cgf.12416.  
 webpage  pdf  citations: 8
- [24] D. Nowrouzezahrai, I. Baran, K. Mitchell, **W. Jarosz**. “Visibility Silhouettes for Semi-Analytic Spherical Integration”. In: *Computer Graphics Forum* 33.1 (Feb. 2014), pp. 105–117. DOI: 10.1111/cgf.12257.  
 webpage  pdf  citations: 7
- [25] I. Georgiev, J. Křivánek, T. Hachisuka, D. Nowrouzezahrai, **W. Jarosz**. “Joint Importance Sampling of Low-Order Volumetric Scattering”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia)* 32.6 (Nov. 2013). DOI: 10.1145/2508363.2508411.  
 webpage  pdf  citations: 23
- [26] M. Papas, C. Regg, **W. Jarosz**, B. Bickel, P. Jackson, W. Matusik, S. Marschner, M. Gross. “Fabricating Translucent Materials using Continuous Pigment Mixtures”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH)* 32.4 (July 2013). DOI: 10.1145/2461912.2461974.  
 webpage  pdf  citations: 17
- [27] R. Habel, P. H. Christensen, **W. Jarosz**. “Photon Beam Diffusion: A Hybrid Monte Carlo Method for Subsurface Scattering”. In: *Computer Graphics Forum (Proceedings of EGSR)* 32.4 (June 2013). DOI: 10.1111/cgf.12148.  
 webpage  pdf  citations: 34
- [28] M. Papas, T. Houit, D. Nowrouzezahrai, M. Gross, **W. Jarosz**. “The Magic Lens: Refractive Steganography”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia)* 31.6 (Nov. 2012). DOI: 10.1145/2366145.2366205.  
 webpage  pdf  citations: 29
- [29] J. Schwarzhaupt, H. W. Jensen, **W. Jarosz**. “Practical Hessian-Based Error Control for Irradiance Caching”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia)* 31.6 (Nov. 2012). DOI: 10.1145/2366145.2366212.  
 webpage  pdf  citations: 15

- [30] W. Jarosz, V. Schönefeld, L. Kobbelt, H. W. Jensen. “Theory, Analysis and Applications of 2D Global Illumination”. In: *ACM Transactions on Graphics (Presented at SIGGRAPH)* 31.5 (Sept. 2012), 125:1–125:21. DOI: 10.1145/2231816.2231823.    citations: 15
- [31] J. Novák, D. Nowrouzezahrai, C. Dachsbacher, W. Jarosz. “Virtual Ray Lights for Rendering Scenes with Participating Media”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH)* 31.4 (July 2012). DOI: 10.1145/2185520.2185556.    citations: 52
- [32] J. Novák, D. Nowrouzezahrai, C. Dachsbacher, W. Jarosz. “Progressive Virtual Beam Lights”. In: *Computer Graphics Forum (Proceedings of EGSR)* 31.4 (June 2012). DOI: 10.1111/j.1467-8659.2012.03136.x.    citations: 28
- [33] I. Baran, P. Keller, D. Bradley, S. Coros, W. Jarosz, D. Nowrouzezahrai, M. Gross. “Manufacturing Layered Attenuators for Multiple Prescribed Shadow Images”. In: *Computer Graphics Forum (Proceedings of Eurographics)* 31.2 (May 2012), pp. 603–610. ISSN: 0167-7055. DOI: 10.1111/j.1467-8659.2012.03039.x.    citations: 17
- [34] I. Sadeghi, A. Munoz, P. Laven, W. Jarosz, F. Seron, D. Gutierrez, H. W. Jensen. “Physically-based Simulation of Rainbows”. In: *ACM Transactions on Graphics (Presented at SIGGRAPH)* 31.1 (Feb. 2012), 3:1–3:12. DOI: 10.1145/2077341.2077344.    citations: 40
- [35] W. Jarosz, D. Nowrouzezahrai, R. Thomas, P.-P. Sloan, M. Zwicker. “Progressive Photon Beams”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia)* 30.6 (Dec. 2011). DOI: 10.1145/2070781.2024215.    citations: 45
- [36] B. J. Loos, L. Antani, K. Mitchell, D. Nowrouzezahrai, W. Jarosz, P.-P. Sloan. “Modular Radiance Transfer”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia)* 30.6 (Dec. 2011). DOI: 10.1145/2070781.2024212.    citations: 24
- [37] D. Nowrouzezahrai, J. Johnson, A. Selle, D. Lacewell, M. Kaschalk, W. Jarosz. “A Programmable System for Artistic Volumetric Lighting”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH)* 30.4 (Aug. 2011), 29:1–29:8. ISSN: 0730-0301. DOI: 10.1145/2010324.1964924.    citations: 25
- [38] W. Jakob, C. Regg, W. Jarosz. “Progressive Expectation–Maximization for Hierarchical Volumetric Photon Mapping”. In: *Computer Graphics Forum (Proceedings of EGSR)* 30.4 (June 2011). DOI: 10.1111/j.1467-8659.2011.01988.x.    citations: 18
- [39] M. Papas, W. Jarosz, W. Jakob, S. Rusinkiewicz, W. Matusik, T. Weyrich. “Goal-based Caustics”. In: *Computer Graphics Forum (Proceedings of Eurographics)* 30.2 (June 2011), pp. 503–511. DOI: 10.1111/j.1467-8659.2011.01876.x.    citations: 61
- [40] W. Jarosz, D. Nowrouzezahrai, I. Sadeghi, H. W. Jensen. “A Comprehensive Theory of Volumetric Radiance Estimation Using Photon Points and Beams”. In: *ACM Transactions on Graphics (Presented at SIGGRAPH)* 30.1 (Jan. 2011), 5:1–5:19. DOI: 10.1145/1899404.1899409.    citations: 78
- [41] T. Hachisuka, W. Jarosz, H. W. Jensen. “A Progressive Error Estimation Framework for Photon Density Estimation”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia)* 29.6 (Dec. 2010), 144:1–144:12. ISSN: 0730-0301. DOI: 10.1145/1882261.1866170.    citations: 145
- [42] W. Jarosz, N. A. Carr, H. W. Jensen. “Importance Sampling Spherical Harmonics”. In: *Computer Graphics Forum (Proceedings of Eurographics)* 28.2 (Apr. 2009), pp. 577–586. DOI: 10.1111/j.1467-8659.2009.01398.x.    citations: 30
- [43] T. Hachisuka, W. Jarosz, R. P. Weistroffer, K. Dale, G. Humphreys, M. Zwicker, H. W. Jensen. “Multidimensional Adaptive Sampling and Reconstruction for Ray Tracing”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH)* 27.3 (Aug. 2008), 33:1–33:10. DOI: 10.1145/1360612.1360632.    citations: 134
- [44] S. Paris, W. Chang, O. I. Kozhushnyan, W. Jarosz, W. Matusik, M. Zwicker, F. Durand. “Hair Photobooth: Geometric and Photometric Acquisition of Real Hairstyles”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH)* 27.3 (Aug. 2008), 30:1–30:9. DOI: 10.1145/1360612.1360629.    citations: 83






- [45] W. Jarosz, M. Zwicker, J. Schulze. “EvalWare: Virtual Reality and Visualization Resources [Best of the Web]”. In: *Signal Processing Magazine, IEEE* 25.4 (July 2008), pp. 123–127. ISSN: 1053-5888. DOI: 10.1109/MSP.2008.923512.  
 citations: 2
- [46] W. Jarosz, M. Zwicker, H. W. Jensen. “Irradiance Gradients in the Presence of Participating Media and Occlusions”. In: *Computer Graphics Forum (Proceedings of EGSR)* 27.4 (June 2008), pp. 1087–1096. DOI: 10.1111/j.1467-8659.2008.01246.x.  
 webpage  pdf  citations: 14
- [47] W. Jarosz, M. Zwicker, H. W. Jensen. “The Beam Radiance Estimate for Volumetric Photon Mapping”. In: *Computer Graphics Forum (Proceedings of Eurographics)* 27.2 (Apr. 2008), pp. 557–566. DOI: 10.1111/j.1467-8659.2008.01153.x.  
 webpage  pdf  citations: 96
- [48] W. Jarosz, C. Donner, M. Zwicker, H. W. Jensen. “Radiance Caching for Participating Media”. In: *ACM Transactions on Graphics (Presented at SIGGRAPH)* 27.1 (Mar. 2008), 7:1–7:11. ISSN: 0730-0301. DOI: 10.1145/1330511.1330518.  
 webpage  pdf  citations: 51
- [49] P. Clarberg, W. Jarosz, T. Akenine-Möller, H. W. Jensen. “Wavelet Importance Sampling: Efficiently Evaluating Products of Complex Functions”. In: *ACM Transactions on Graphics (Proceedings of SIGGRAPH)* 24.3 (Aug. 2005), pp. 1166–1175. DOI: 10.1145/1073204.1073328.  
 webpage  pdf  citations: 142

### Peer-Reviewed Conference Papers








- [50] M. Mara, M. McGuire, B. Bitterli, W. Jarosz. “An Efficient Denoising Algorithm for Global Illumination”. In: *Proceedings of High Performance Graphics*. Los Angeles, California, USA: ACM, July 2017. ISBN: 978-1-4503-5101-0. DOI: 10.1145/3105762.3105774.  
 webpage  pdf
- [51] T. Hachisuka, I. Georgiev, W. Jarosz, J. Křivánek, D. Nowrouzezahrai. “Extended Path Integral Formulation for Volumetric Transport”. In: *Proceedings of EGSR (Experimental Ideas & Implementations)*. The Eurographics Association, June 2017. DOI: 10.2312/sre.20171195.  
 webpage  pdf
- [52] J. Marco, W. Jarosz, D. Gutierrez, A. Jarabo. “Transient Photon Beams”. In: *Spanish Computer Graphics Conference (CEIG)*. The Eurographics Association, June 2017. ISBN: 978-3-03868-046-8. DOI: 10.2312/ceig.20171216.  
 webpage  pdf
- [53] R. Prévost, M. Bäcker, W. Jarosz, O. Sorkine-Hornung. “Balancing 3D Models with Movable Masses”. In: *Proceedings of the Vision, Modeling and Visualization Workshop (VMV)*. Eurographics Association, Oct. 2016. DOI: 10.2312/vmv.20161337.  
 webpage  pdf  citations: 2
- [54] D. Koerner, J. Novák, P. Kutz, R. Habel, W. Jarosz. “Subdivision Next-Event Estimation for Path-Traced Subsurface Scattering”. In: *Proceedings of EGSR (Experimental Ideas & Implementations)*. The Eurographics Association, June 2016. DOI: 10.2312/sre.20161214.  
 webpage  pdf  citations: 1
- [55] A. Chapiro, C. O’Sullivan, W. Jarosz, M. Gross, A. Smolic. “Stereo from Shading”. In: *Proceedings of EGSR (Experimental Ideas & Implementations)*. June 2015. DOI: 10.2312/sre.20151173.  
 webpage  pdf  citations: 1
- [56] T.-W. Schmidt, F. Pellacini, D. Nowrouzezahrai, W. Jarosz, C. Dachsbacher. “State of the Art in Artistic Editing of Appearance, Lighting, and Material”. In: *Eurographics 2014 - State of the Art Reports*. Strasbourg, France: Eurographics Association, Apr. 2014. DOI: 10.2312/egst.20141041.  
 webpage  pdf  citations: 12
- [57] B. J. Loos, D. Nowrouzezahrai, W. Jarosz, P.-P. Sloan. “Delta Radiance Transfer”. In: *Proceedings of ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games*. Costa Mesa, CA: ACM, 2012. DOI: 10.1145/2159616.2159648.  
 webpage  pdf  citations: 5
- [58] J. Chen, I. Baran, F. Durand, W. Jarosz. “Real-Time Volumetric Shadows using 1D Min-Max Mipmaps”. In: *Proceedings of ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games*. I3D 2011. New York, NY, USA: ACM, 2011. DOI: 10.1145/1944745.1944752.  
 webpage  pdf  citations: 37

- [59] D. Nowrouzezahrai, S. Geiger, K. Mitchell, R. Sumner, **W. Jarosz**, M. Gross. “Light Factorization for Mixed-Frequency Shadows in Augmented Reality”. In: *10th IEEE International Symposium on Mixed and Augmented Reality (Proceedings of ISMAR 2011)*. Oct. 2011. DOI: 10.1109/ISMAR.2011.6092384.  
 webpage  pdf  citations: 29
- [60] J. Baar, S. Poulakos, **W. Jarosz**, D. Nowrouzezahrai, R. Tamstorf, M. Gross. “Perceptually-Based Compensation of Light Pollution in Display Systems”. In: *Proceedings of the 2011 ACM Symposium on Applied Perception in Graphics and Visualization*. New York, NY, USA: ACM, Aug. 2011. DOI: 10.1145/2077451.2077460.  
 webpage  pdf  citations: 5
- [61] J. C. Hart, E. Bachta, **W. Jarosz**, T. Fleury. “Using Particles to Sample and Control More Complex Implicit Surfaces”. In: *SMI '02: Proceedings of the Shape Modeling International 2002 (SMI'02)*. Washington, DC, USA: IEEE Computer Society, 2002, p. 129. DOI: 10.1109/SMI.2002.1003537.  
 webpage  pdf  citations: 46

### Refereed Sketches & Abstracts

- [62] J. M. Johnson, D. Lacewell, A. Selle, **W. Jarosz**. “Gaussian Quadrature for Photon Beams in Tangled”. In: *ACM SIGGRAPH 2011 Talks*. SIGGRAPH 2011. Vancouver, Canada: ACM, Aug. 2011. DOI: 10.1145/2037826.2037898.  
 citations: 2
- [63] B. J. Loos, L. Antani, K. Mitchell, D. Nowrouzezahrai, **W. Jarosz**, P.-P. Sloan. “Runtime Implementation of Modular Radiance Transfer”. In: *ACM SIGGRAPH 2011 Talks*. SIGGRAPH 2011. Vancouver, Canada: ACM, Aug. 2011. DOI: 10.1145/2037826.2037905.  
 webpage  pdf
- [64] T. Hachisuka, **W. Jarosz**, H. W. Jensen. “An Error Estimation Framework for Photon Density Estimation”. In: *ACM SIGGRAPH 2010 Talks*. SIGGRAPH 2010. Los Angeles, California: ACM, 2010, 3:1–3:1. DOI: 10.1145/1837026.1837030.  
 citations: 1
- [65] **W. Jarosz**, C. Donner, M. Zwicker, H. W. Jensen. “Radiance caching for Participating Media”. In: *ACM SIGGRAPH 2007 Sketches*. SIGGRAPH 2007. San Diego, California: ACM, 2007. DOI: 10.1145/1278780.1278848.  
 citations: 51

### Refereed Courses/Classes

- [66] K. Subr, G. Singh, **W. Jarosz**. “Fourier Analysis of Numerical Integration in Monte Carlo Rendering: Theory and Practice”. In: *ACM SIGGRAPH Courses*. Anaheim, California: ACM, July 2016. DOI: 10.1145/2897826.2927356.  
 webpage  pdf  citations: 2
- [67] T. Hachisuka, **W. Jarosz**, I. Georgiev, A. Kaplanyan, D. Nowrouzezahrai. “State of the Art in Photon Density Estimation”. In: *ACM SIGGRAPH Asia Courses*. Hong Kong, China: ACM, Nov. 2013. DOI: 10.1145/2542266.2542281.  
 citations: 4
- [68] T. Hachisuka, **W. Jarosz**, G. Bouchard, P. H. Christensen, J. R. Frisvad, W. Jakob, H. W. Jensen, M. Kaschalk, C. Knaus, A. Selle, B. Spencer. “State of the Art in Photon Density Estimation”. In: *ACM SIGGRAPH Courses*. Los Angeles, California: ACM, July 2012. DOI: 10.1145/2343483.2343489.  
 citations: 9
- [69] D. Gutierrez, H. W. Jensen, **W. Jarosz**, C. Donner. “Scattering”. In: *ACM SIGGRAPH Asia Courses*. Yokohama, Japan: ACM, Dec. 2009, 15:1–15:620. DOI: 10.1145/1665817.1665832.
- [70] D. Gutierrez, **W. Jarosz**, C. Donner, S. G. Narasimhan. “Scattering”. In: *ACM SIGGRAPH Courses*. New Orleans, Louisiana: ACM, Aug. 2009, 21:1–21:397. DOI: 10.1145/1667239.1667260.
- [71] D. Gutierrez, S. G. Narasimhan, H. W. Jensen, **W. Jarosz**. “Scattering”. In: *ACM SIGGRAPH Asia Courses*. Singapore: ACM, Dec. 2008, 57:1–57:12. DOI: 10.1145/1508044.1508101.  
 citations: 22
- [72] **W. Jarosz**, H. W. Jensen, C. Donner. “Advanced global illumination using photon mapping”. In: *ACM SIGGRAPH Courses*. Los Angeles, California: ACM, Aug. 2008, 2:1–2:112. DOI: 10.1145/1401132.1401136.  
 citations: 21



## Technical Reports

- [73] G. Singh, W. Jarosz. *Monte Carlo Convergence Analysis for Anisotropic Sampling Power Spectra*. Tech. rep. TR2016-816. Hanover, NH: Dartmouth College, Computer Science, Aug. 2016.  
🌐 webpage 📄 pdf
- [74] R. Habel, P. H. Christensen, W. Jarosz. *Classical and Improved Diffusion Theory for Subsurface Scattering*. Tech. rep. Disney Research Zürich, June 2013.  
🌐 webpage 📄 pdf 📖 citations: 1
- [75] W. Jarosz, M. Zwicker, H. W. Jensen. *The Beam Radiance Estimate for Volumetric Photon Mapping*. Tech. rep. CS2008-0914. San Diego, CA: UC San Diego, Jan. 2008.  
📖 citations: 96

## Theses

- [76] W. Jarosz. “Efficient Monte Carlo Methods for Light Transport in Scattering Media”. PhD thesis. La Jolla, CA, USA: UC San Diego, Sept. 2008. ISBN: 978-0-549-72071-3.  
📖 citations: 26
- [77] W. Jarosz. “Interactive Global Illumination for Improved Lighting Design Workflow”. Bachelors thesis. University of Illinois, Urbana–Champaign, 2002.  
🌐 webpage 📄 pdf

## Patents

- [78] W. Jarosz, N. A. Carr. “Method and apparatus for converting spherical harmonics representations of functions into multi-resolution representations”. Patent 9703756 B2 (US). July 2017.
- [79] W. Jarosz, I. Georgiev, J. Krivanek, T. Hachisuka, D. Nowrouzezahrai. “Methods and systems of joint path importance sampling”. Patent 9665974 B2 (US). May 2017.
- [80] D. Nowrouzezahrai, I. Baran, K. Mitchell, W. Jarosz. “Visibility silhouettes for masked spherical integration”. Patent 9501862 B2 (US). Nov. 2016.
- [81] W. Jarosz, J. Meng, M. Papas, R. Habel, C. Dachsbacher, S. Marschner. “Bidirectional point distribution functions for rendering granular media”. Patent 9472016 B2 (US). Oct. 2016.
- [82] K. Subr, K. Mitchell, W. Jarosz, D. Nowrouzezahrai. “Combining sampling arrangements and distributions for stochastic integration in rendering”. Patent 20160275718 A1 (US). Sept. 2016.
- [83] R. Habel, W. Jarosz. “Photon beam diffusion”. Patent 9401043 B1 (US). July 2016.
- [84] D. Nowrouzezahrai, W. Jarosz, J. Johnson, J. D. Lacewell, A. Selle, M. Kaschalk. “Programmable system for artistic volumetric lighting”. Patent 9396580 B1 (US). July 2016.
- [85] J. Chen, I. Baran, F. Durand, W. Jarosz. “Rendering images with volumetric shadows using rectified height maps for independence in processing camera rays”. Patent 9280848 B1 (US). Mar. 2016.
- [86] J. Novak, W. Jarosz, A. Selle. “Residual ratio tracking for estimating attenuation in heterogeneous volumes”. Patent 20160061729 A1 (US). Mar. 2016.
- [87] M. Papas, W. Jarosz, W. A. Jakob, S. M. Rusinkiewicz, W. Matusik, T. A. Weyrich. “Reflective and refractive surfaces configured to project desired caustic pattern”. Patent 9188783 B1 (US). Nov. 2015.
- [88] W. Jakob, C. Regg, W. Jarosz. “Progressive expectation–maximization for hierarchical rendering of participating media”. Patent 9013484 B1 (US). Apr. 2015.
- [89] W. Jarosz, M. Papas, D. Nowrouzezahrai, T. Houit. “Refractive steganography lens and method for determining milling plan for same”. Patent 8964295 B2 (US). Apr. 2015.
- [90] M. Papas, C. Regg, S. Marschner, W. Jarosz, W. Matusik, P. J. Jackson, B. Bickel. “Method of fabricating translucent materials with desired appearance”. Patent 20140198204 A1 (US). July 2014.
- [91] H. Bowles, K. Mitchell, R. Sumner, W. Jarosz, M. Gross. “Iterative reprojection of images”. Patent 8624891 B2 (US). Jan. 2014.
- [92] W. Jarosz, D. Nowrouzezahrai, R. Thomas, P.-P. Sloan, M. Zwicker. “Image processing using iterative generation of intermediate images using photon beams of varying parameters”. Patent 8638331 B1 (US). Jan. 2014.

- [93] W. Jarosz, D. Nowrouzezahrai, S. Watson. "Compensation for self-scattering on concave screens". Patent 8611005 B2 (US). Dec. 2013.
- [94] S. C. Geiger, W. Jarosz, M. J. Lang, K. J. Mitchell, D. Nowrouzezahrai, R. W. Sumner, T. Williams. "Virtual lens - rendering for augmented reality". Patent 9164723 B1 (US). Jan. 2013.

## TALKS/INVITED LECTURES



- [95] "Mastering the Interaction of Light & Matter: From Real to Virtual, and Back Again." MIT CSAIL, Graphics Lunch. February 17, 2016.
- [96] "Mastering the Interaction of Light & Matter: From Real to Virtual, and Back Again." BBN/Raytheon Technologies, Invited Talk. February 23, 2016.
- [97] "Mastering the Interaction of Light & Matter: From Real to Virtual, and Back Again." Williams College, Computer Science Colloquium. October 30, 2015.
- [98] "High Dynamic Range Photography." Universidad de Zaragoza, Invited Talk. March 18, 2015.
- [99] "Mastering the Interaction of Light & Matter: From Real to Virtual, and Back Again." UC Berkeley. Visual Computing Lab, Invited Talk. August 27, 2014.
- [100] "Mastering the Interaction of Light & Matter: From Real to Virtual, and Back Again." Stanford University. Computer Science Seminar, Invited Talk. March 10, 2014.
- [101] "Mastering the Interaction of Light & Matter: From Real to Virtual, and Back Again." Dartmouth College, Computer Science Colloquium. February 20, 2014.
- [102] "The Perils of Evolutionary Rendering Research: Beyond the Point Sample." EGSR 2013, Invited Talk. June 21, 2013.
- [103] "The Perils of Evolutionary Rendering Research: Beyond the Point Sample." Journées du groupe de travail rendu, Keynote Talk. March 8, 2013.
- [104] "The Perils of Evolutionary Rendering Research: Beyond the Point Sample." TU Wien Graphics Konversatorium, Invited Talk. February 21, 2013.
- [105] "*Tangled*: Behind the Magic." Scientifica<sup>11</sup>: Zürcher Wissenschaftstage, Disney-Night. August 27, 2011.
- [106] "The Research Behind the Magic." UIUC. Computer Science - Distinguished Lecture Series. November, 29, 2010.
- [107] "Non-Photorealistic Rendering." UCSD. Invited lecture for CSE 168, June 5, 2008.
- [108] "Textures, Environment mapping, and Procedurals." UCSD. Invited lecture for CSE 168, May 6, 2008.
- [109] "Efficient Light Transport in Scattering Media." Walt Disney Animation Studios, Los Angeles, February 5, 2008.
- [110] "Efficient Light Transport in Scattering Media." UCSD. Invited lecture for CSE 272, December 5, 2007.
- [111] "Texturing." UCSD. Invited lecture for CSE 168, May 8, 2007.
- [112] "Global Illumination." UCSD. Invited lecture for CSE 168, May 3, 2006.
- [113] "OpenEXR: Towards Realtime Playback." SIGGRAPH 2005 OpenEXR Birds of a Feather.
- [114] "Non-Photorealistic Rendering." UCSD. Invited lecture for CSE 168, June 2, 2005.

## SERVICE & PROFESSIONAL ACTIVITIES



### Chairing & Editorial duties

- Associate editor, Journal of Computer Graphics Techniques (JCGT) 2015–PRESENT
- Associate editor, Computer Graphics Forum (Wiley) 2014–2017
- Papers co-chair, Eurographics Symposium on Rendering (EGSR) 2014

### Committees

- ACM SIGGRAPH Asia Technical Papers Committee 2017
- Eurographics Symposium on Rendering (EGSR) Papers Committee 2010–2012, 2016, 2017
- Eurographics (EG) Full Papers International Program Committee 2013, 2014, 2016
- ACM SIGGRAPH Technical Papers Committee 2012, 2013, 2015

- GRAPP International Program Committee 2015
- SIBGRAPI Technical Program Committee 2014
- ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (i3D) 2012–2014
- SIGGRAPH Asia Sketches Committee 2008, 2009

## Reviewer

- SIGGRAPH 2004–2017
- SIGGRAPH Asia 2008–2010, 2012–2014
- Transactions on Graphics 2009–2013
- Eurographics 2008–2016
- Eurographics Symposium on Rendering 2005, 2009–2012, 2015
- Computer Graphics Forum 2009–2011, 2013
- The Visual Computer 2007, 2010
- Interactive Ray Tracing 2007

## Other

- Student Volunteer, Symposium on Computer Animation 2007
- President, SIGGRAPH UIUC Student Chapter SUMMER 2001 – SPRING 2002

## PRESS & MEDIA COVERAGE



- “Every grain of sand: Method efficiently renders massive assemblies of granular materials.” *PhysOrg*. December 8, 2016. <https://phys.org/news/2016-12-grain-sand-method-efficiently-massive.html>
- “You Can Stop Worrying, Disney Figured Out How to Make Perfect CG Sugar.” *Gizmodo*. December 8, 2016. <http://gizmodo.com/you-can-stop-worrying-disney-figured-out-how-to-make-p-1789824492>
- “This simulation is so good it’s hard to believe it’s not real.” *Popular Mechanics*. December 8, 2016. <http://www.popularmechanics.com/technology/apps/a24213/disney-research-sugar-simulation/>
- “Disney Research Devises a Method of 3D Printing Models That Balance or Breakdance.” *3DPrint.com*. October 7, 2016. <https://3dprint.com/151798/disney-research-balancing/>
- “Scientists Develop Spray Cans That Know What to Paint.” *Wall Street Journal Video*. May 2, 2016. <http://www.wsj.com/video/scientists-develop-spray-cans-that-know-what-to-paint/3D6DC052-2F62-4FB0-9585-764123A298AB.html>
- “Spray Cans That Know What to Paint.” *The Wall Street Journal*. April 29, 2016. <https://www.wsj.com/articles/spray-cans-that-know-what-to-paint-1461938405>
- “Move over Banksy! Robotic spray can helps novices reproduce photos as giant ‘paint by numbers’ murals.” *Daily Mail*. April 8, 2016. <http://www.dailymail.co.uk/sciencetech/article-3529871/Move-Banksy-Robotic-spray-helps-novices-reproduce-photos-giant-paint-numbers-murals.html>
- “Smart spray paint copies color photos onto walls.” *gizmag*. April 8, 2016. <http://newatlas.com/smart-spray-paint-computer-aided-mural-dartmouth/42715/>
- “This ‘smart’ spray can will instantly turn you into a pro graffiti artist.” *TechRadar*. April 8, 2016. <http://www.techradar.com/news/world-of-tech/this-smart-spray-can-will-instantly-turn-you-into-a-pro-graffiti-artist-1318575>
- “Scientists Invent Robotic ‘Artist’ That Spray Paints Giant Murals.” *NeuroScienceNews*. April 7, 2016. <http://neurosciencenews.com/painting-robotic-artist-3995/>
- “Scientists invent robotic ‘artist’ that spray paints giant murals.” *PhysOrg*. April 7, 2016. <https://phys.org/news/2016-04-scientists-robotic-artist-giant-murals.html>
- “Think You Know Rainbows? Look Again.” *Scientific American*. February 26, 2016. <http://www.scientificamerican.com/article/think-you-know-rainbows-look-again-slide-show/>
- “New device improves full-color image projection.” *PhysOrg*. October 21, 2015. <http://phys.org/news/2015-10-device-full-color-image.html>
- “5 Crazy New Ideas Out Of Disney Research.” *FastCompany*. August 7, 2015. <http://www.fastcodesign.com/3049566/5-crazy-new-ideas-out-of-disney-research>
- “New method efficiently renders granular materials at multiple scales.” *PhysOrg*. August 5, 2015. <http://phys.org/news/2015-08-method-efficiently-granular-materials-multiple.html>
- “Disney’s new rendering technique could usher in a new era of animation.” *io9*. November 19, 2013. <http://io9.com/disneys-new-rendering-technique-could-usher-in-a-new-e-1467435361>
- “New algorithms improve animations featuring fog, smoke and underwater scenes.” *PhysOrg*. November 18, 2013. <http://phys.org/news/2013-11-algorithms-animations-featuring-fog-underwater.html>
- “The State of Rendering - Part 2.” *fxguide*. July 17, 2013. <http://www.fxguide.com/featured/the-state-of-rendering-part-2/>
- “3D-printed magic lens unscrambles hidden animations.” *New Scientist*. November 23, 2012. <http://www.newscientist.com/blogs/nstv/2012/11/3d-printed-magic-lens-unscrambles-secret-animations.html>
- “Local Scientists Unlock Mystery Of Elusive Twinned Rainbows.” *KPBS.org*. August 13, 2012. <http://www.kpbs.org/news/2012/aug/13/local-scientists-unlock-mystery-elusive-twin-rainb/>
- “Twinned Rainbows Formation Explained By New Research.” *HuffingtonPost.com*. August 10, 2012. [http://www.huffingtonpost.com/2012/08/10/twinned-rainbows-formation\\_n\\_1764331.html](http://www.huffingtonpost.com/2012/08/10/twinned-rainbows-formation_n_1764331.html)
- “How those strange, exotic twinned rainbows form.” *NBCNews.com*. August 8, 2012. <http://www.nbcnews.com/id/48578190/>
- “How Strange Twinned Rainbows Form.” *Live Science*. August 2012. <http://www.livescience.com/22218-how-twinned-rainbows-form.html>
- “Disney might be about to get a little more magic: CGI technology breakthrough will take the Mickey and make him sparkle.” *The Daily Mail*. August 8, 2012.

- <http://www.dailymail.co.uk/sciencetech/article-2185029>
- “Researchers Unlock Secret of the Rare ‘Twinned Rainbow.’” *Science Daily*. August 6, 2012.  
<http://www.sciencedaily.com/releases/2012/08/120806151415.htm>
  - “Researchers unlock secret of the rare ‘twinned rainbow.’” *PhysOrg*. August 6, 2012.  
<http://phys.org/news/2012-08-secret-rare-twinned-rainbow.html>
  - “New technique improves rendering of smoke, dust and participating media.” *PhysOrg*. August 6, 2012.  
<http://phys.org/news/2012-08-technique-media.html>
  - “Imagining how light behaves in 2D world gives researchers insights for faster 3D rendering.” *PhysOrg*. August 6, 2012.  
<http://phys.org/news/2012-08-d-world-insights-faster.html>
  - “Engraved plastic panel casts image in light and shade.” *New Scientist*. March 24, 2011.  
<http://www.newscientist.com/article/dn20280-engraved-plastic-panel-casts-image-in-light-and-shade.html>
  - “Unknown Mechanism For Rare Twinned Rainbows Discovered.” *RedOrbit*. August 7, 2012.  
<http://www.redorbit.com/news/science/1112671052/mechanism-twinned-rainbows-080712/>
  - “Hairstyles for games and movies.” *Emerging Technology Trends | ZDNet.com*. Aug. 16, 2008.  
<http://www.zdnet.com/blog/emergingtech/hairstyles-for-games-and-movies/1012>
  - “Hair Photobooth: Geometric and Photometric Acquisition of Real Hairstyles.” *The Composed Gentleman*. Aug. 14, 2008.
  - “Hollywood hair will be captured at last: details in SIGGRAPH 2008 paper.” *EurekaAlert*. Aug. 13, 2008.
  - “Hollywood Hair is Captured at Last.” *PhysOrg*. Aug. 13, 2008.  
<http://phys.org/news137859323.html>
  - “Hollywood Hair is Captured at Last: Details in SIGGRAPH 2008 Paper.” *Jacobs School News*. Aug. 13, 2008.
  - “A Better Fog And Smoke Machine From Computer Scientists.” *Science Daily*. Apr. 20, 2008.  
<http://www.sciencedaily.com/releases/2008/04/080415185011.htm>
  - “A better fog and smoke machine from computer scientists.” *Science Blog*. Apr. 16, 2008.  
<http://scienceblog.com/15928/>
  - “Light-in-Fog Computer Simulation Is Ultra Realistic and Cheap.” *io9*. Apr. 17, 2008.
  - “Innovative Computer Graphics Machine that Reduce the Computational Cost of Making Realistic Smoky and Foggy 3-D Images Using Ray Tracing Algorithms.” *4Engr.com*. Apr. 17, 2008.
  - “A better fog and smoke machine from researchers at UC San Diego.” *Science Centric*. Apr. 17, 2008.
  - “Scientists Use Ray-tracing Technology For Advanced Fog and Smoke Graphics Effects.” *CdrInfo.com*. Apr. 17, 2008.
  - “Computer Science Fog Machine Improves Computer Graphics.” *PhysOrg*. Apr. 16, 2008.
  - “A new way to improve computer graphics.” *Emerging Technology Trends | ZDNet.com*. Apr. 16, 2008.  
<http://www.zdnet.com/blog/emergingtech/a-new-way-to-improve-computer-graphics/894>
  - “Computer Science Fog Machine Improves Computer Graphics.” *ACM TechNews*. Apr. 16, 2008.
  - “A new way to improve computer graphics.” *Roland Piquepaille’s Technology Trends*. Apr. 16, 2008.
  - “Scientists turn to ray-tracing for advanced graphics effects.” *TG Daily*. Apr. 16, 2008.  
<http://www.tgdaily.com/trendwatch-features/36971-scientists-turn-to-ray-tracing-for-advanced-graphics-effects>
  - “Computer Science Fog Machine Improves Computer Graphics.” *HPC Wire*. Apr. 15, 2008.
  - “Computer Science Fog Machine Improves Computer Graphics.” *Jacobs School News*. Apr. 15, 2008.
  - “A better fog and smoke machine from computer scientists at UC San Diego.” *EurekaAlert*. Apr. 15, 2008.
  - “An Easier Way to Simulate a Foggy View.” *Photonics Spectra Magazine*. October, 2007.  
<http://photonics.com/Article.aspx?AID=30986>
  - “Determine the exact kind of milk spilled by computer graphics.” *4Engr.com*. Aug. 17, 2007.
  - “Render Smoke and Fog Without Being a Computation Hog.” *ACM TechNews*. Aug. 13, 2007.
  - “Seeing Your Smoke and Breathing It Too.” *DDJ’s Portal Blog*. Aug. 9, 2007.
  - “Render smoke and fog without being a computation hog.” *PhysOrg*. Aug. 9, 2007.  
<http://phys.org/news105887616.html>
  - “Render Smoke and Fog without being a Computation Hog.” *Jacobs School News*. Aug. 9, 2007.
  - Cover Image for 2005-2006 CSE Departmental Brochure.
  - “SIGGRAPH In San Diego: Graphics, Video And Rock.” *Jacobs School News*. Aug. 4, 2005.
  - “Calit2 Lights Up SIGGRAPH 2005.” *HPC Wire*. Aug. 4, 2005.
  - “Light Clouds, Camera Arrays and Speedier Rendering at SIGGRAPH 2005.” *UCSD News*. July 28, 2005.  
[http://www.jacobsschool.ucsd.edu/news/news\\_releases/release.sfe?id=412](http://www.jacobsschool.ucsd.edu/news/news_releases/release.sfe?id=412)
  - “California Institute researchers unveil computer graphics innovations at SIGGRAPH.” *EurekaAlert*. July 28, 2005
  - “Researchers Unveil Computer Graphics Innovations at SIGGRAPH.” *Red Orbit*. July 28, 2005.