

# Jason Lawrence

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## Education

Ph.D. in Computer Science, Princeton University (September 2006).

Thesis: Acquisition and Representation of Material Appearance for Rendering and Editing

M.S. in Computer Science, Princeton University (May 2003).

B.S. in Electrical and Computer Engineering, Carnegie Mellon University (May 2001).

## Employment

Assistant Professor, Department of Computer Science, University of Virginia, (July 2006 - present).

## Publications

### Archival Journals<sup>1</sup>

1. Sean Arietta, Jason Lawrence  
“Early Experiences in Building and Using a Database of One Trillion Natural Image Patches,”  
*IEEE Computer Graphics & Applications*, 2010 (to appear).
2. Jason Lawrence, Sean Arietta, Michael Kazhdan, Daniel Lepage, Colleen O’Hagan,  
“A User-Assisted Approach to Visualizing Multidimensional Images,”  
*IEEE Transactions on Visualization and Computer Graphics*, 2010 (to appear).
3. Pitchaya Sitthi-amorn, Fabiano Romeiro, Todd Zickler, Jason Lawrence,  
“Interactive Editing of Lighting and Materials using a Bivariate BRDF Representation,”  
*Computer Graphics Forum (Proc. Eurographics Symposium on Rendering)*, 29(4), June 2010.
4. Michael Holroyd, Jason Lawrence, Todd Zickler,  
“A Coaxial Optical Scanner for Synchronous Acquisition of 3D Geometry and Surface Reflectance,”  
*ACM Transactions on Graphics (Proc. SIGGRAPH)*, 29(3), July 2010.
5. Tim Weyrich, Jason Lawrence, Hendrik P. A. Lensch, Szymon Rusinkiewicz, Todd Zickler,  
“Principles of Appearance Acquisition and Representation,”  
*Foundations and Trends in Computer Graphics and Vision*, 4(2), 2008 (appeared in 2009).
6. Lei Yang, Diego Nehab, Pitchaya Sitthi-amorn, Jason Lawrence, Hugues Hoppe,  
“Amortized Supersampling,”  
*ACM Transactions on Graphics (Proc. SIGGRAPH Asia)*, 28(5), December 2009.

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<sup>1</sup>The ACM SIGGRAPH and SIGGRAPH Asia conferences are the leading venues for publishing research in computer graphics, with acceptance rates ranging from 15%-20%. Since 2002, the SIGGRAPH proceedings have also been published as a special issue of the ACM Transactions on Graphics (TOG), the leading journal in graphics. The Eurographics Symposium on Rendering (EGSR) is the leading venue for rendering research (second only to the SIGGRAPH conferences), and has a competitive acceptance rate of 25%-35%. 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.

7. Boris Ajdin, Jinwei Gu, Szymon Rusinkiewicz, Wojciech Matusik, Jason Lawrence, Fabio Pellacini,  
 “Printing Spatially-Varying Reflectance,”  
*ACM Transactions on Graphics (Proc. SIGGRAPH Asia)*, 28(5), December 2009.
8. Craig Donner, Jason Lawrence, Ravi Ramamoorthi, Toshiya Hachisuka, Henrik Wann Jensen, Shree Nayar,  
 “An Empirical BSSRDF Model,”  
*ACM Transactions on Graphics (Proc. SIGGRAPH)*, 28(3), August 2009.
9. Michael Holroyd, Jason Lawrence, Todd Zickler, Greg Humphreys,  
 “A Photometric Approach for Estimating Normals and Tangents,”  
*ACM Transactions on Graphics (Proc. SIGGRAPH Asia)*, 27(5), December 2008.
10. Pitchaya Sitthi-amorn, Jason Lawrence, Lei Yang, Pedro V. Sander, Diego Nehab, Jiahe Xi,  
 “Automated Reprojection-Based Pixel Shader Optimization,”  
*ACM Transactions on Graphics (Proc. SIGGRAPH Asia)*, 27(5), December 2008.
11. Lei Yang, Pedro V. Sander, Jason Lawrence,  
 “Geometry-Aware Framebuffer Level of Detail,”  
*Computer Graphics Forum (Proc. Eurographics Symposium on Rendering)*, 27(4), June 2008.
12. Fabio Pellacini and Jason Lawrence,  
 “AppWand: Editing Measured Materials using Appearance-Driven Optimization,”  
*ACM Transactions on Graphics (Proc. SIGGRAPH)*, 26(3), July 2007.
13. Jason Lawrence, Aner Ben-Artzi, Christopher DeCoro, Wojciech Matusik, Hanspeter Pfister, Ravi Ramamoorthi, Szymon Rusinkiewicz,  
 “Inverse Shade Trees for Non-Parametric Material Representation and Editing,”  
*ACM Transactions on Graphics (Proc. SIGGRAPH)*, 25(3), July 2006.
14. Pieter Peers, Karl vom Berge, Wojciech Matusik, Ravi Ramamoorthi, Jason Lawrence, Szymon Rusinkiewicz, Phil Dutré,  
 “A Compact Factored Representation of Heterogeneous Subsurface Scattering,”  
*ACM Transactions on Graphics (Proc. SIGGRAPH)*, 25(3), July 2006.
15. Jason Lawrence and Thomas Funkhouser,  
 “A Painting Interface for Interactive Surface Deformations,”  
*Graphical Models*, 66(6), November 2004.
16. Jason Lawrence, Szymon Rusinkiewicz, Ravi Ramamoorthi,  
 “Efficient BRDF Importance Sampling Using a Factored Representation,”  
*ACM Transactions on Graphics (Proc. SIGGRAPH)*, 23(3), August 2004.
17. Kallay Michael and Jason Lawrence,  
 “Improving the Two-Pass Resampling Algorithm,”  
*Journal of Graphics Tools*, 8(2), January 2003.

#### **Refereed International Conferences**

18. Pitchaya Sitthi-amorn, Lei Yang, Pedro V. Sander, Diego Nehab, Jason Lawrence,  
 “An Improved Shading Cache for Modern GPUs,”  
*Graphics Hardware*, Sarajevo, Bosnia, June 2008.
19. Diego Nehab, Pedro V. Sander, Jason Lawrence, Natalya Tatarchuk, John R. Isidoro,  
 “Accelerating Real-Time Shading with Reverse Reprojection Caching,”  
*Graphics Hardware*, San Diego, CA, August 2007.

20. Pete Weistroffer, Kristen R. Walcott, Greg Humphreys, Jason Lawrence,  
“Efficient Basis Decomposition for Scattered Reflectance Data,”  
*Eurographics Symposium on Rendering*, Grenoble, France, June 2007.
21. Jason Lawrence, Szymon Rusinkiewicz, Ravi Ramamoorthi,  
“Numerical Cumulative Distribution Functions for Efficient Importance Sampling,”  
*Eurographics Symposium on Rendering*, Konstanz, Germany, July 2005.
22. Trần-Quân Luong, Ankush Seth, Allison Klein, Jason Lawrence,  
“Isoluminant Color Picking for Non-Photorealistic Rendering,”  
*Graphics Interface*, Victoria, British Columbia, June 2005.
23. Jason Lawrence and Thomas Funkhouser,  
“A Painting Interface for Interactive Surface Deformations,”  
*Pacific Graphics*, Alberta, Canada, October 2003.

#### **Other Publications**

24. Tim Weyrich, Jason Lawrence, Hendrik P.A. Lensch, Szymon Rusinkiewicz, Todd Zickler,  
“Principles of Appearance Acquisition and Representation,”  
Short Course ICCV 2007, Rio de Janeiro, Brazil, October 2007.
25. Jason Lawrence,  
“Acquisition and Representation of Material Appearance for Editing and Rendering,”  
Ph.D. Thesis, Princeton University, September 2006.

## **Honors and Awards**

- NVIDIA Professor Partner Award (2008).
- National Science Foundation CAREER Award (2008).
- National Defense Science and Engineering Graduate Fellowship (2001 - 2004).
- Departmental Fellowship Award, Princeton University (2001).
- Graduated first in class, Carnegie Institute of Technology (2001).

## **Professional Activities**

#### **Conference Committees**

- Program Committee, SIGGRAPH (2011).
- Papers Co-Chair, Eurographics Symposium on Rendering (2010).
- Program Committee, EUROGRAPHICS (2010).
- Program Committee, Symposium on Interactive 3D Graphics and Games (2009).
- Program Committee, SIGGRAPH (2009).
- Program Committee, Eurographics Symposium on Rendering (2009).
- Program Committee, SIGGRAPH (2008).
- Program Committee, Eurographics Symposium on Rendering (2008).
- Program Committee, Eurographics Symposium on Rendering (2007).
- Program Committee, Pacific Graphics Conference (2006).
- Posters Chair, Symposium on Interactive 3D Graphics (2005).

### **Conference Panels and Courses**

Co-organizer and instructor, “Spatially-Varying BRDF Models,” Tutorial: Principles of Appearance Acquisition and Representation, *Proc. SIGGRAPH*, 2008.

Co-organizer and instructor, “Spatially-Varying BRDF Models,” Tutorial: Principles of Appearance Acquisition and Representation, *International Conference on Computer Vision (ICCV)*, 2007.

### **Conference Session Chairs**

“Rendering & Visibility”, *ACM SIGGRAPH 2009*.

“Faces & Reflectance”, *ACM SIGGRAPH 2008*.

## **Academic Activities**

### **University Service**

Member, SEAS Open House committee (Fall 2010 - Present).

Member, ad-hoc self-study committee on graduate qualifying exam (Spring 2009 - Spring 2010).

Member, ad-hoc self-study committee on graduate program (Spring 2009 - Spring 2010).

Member, committee on graduate curriculum (Fall 2007 - Spring 2010).

Member, committee on undergraduate curriculum (Fall 2006 - Spring 2007).

### **University Teaching**

“Introduction to Programming,” CS1111 (Fall 2010).

“Introduction to Computer Graphics,” CS4810 (Spring 2010).

“Topics in Computer Vision,” CS651 (Spring 2009).

“Introduction to Computer Graphics,” CS415 (Fall 2008).

“Advanced Computer Graphics,” CS451 (Spring 2008).

“Computer Vision,” CS651 (Spring 2007, Fall 2007).

“Data-Driven Models in Computer Graphics,” CS851 (Fall 2006).

### **Graduate Student Advising**

Sean Arietta (3<sup>rd</sup> year Ph.D. student)

Daniel LePage (4<sup>th</sup> year Ph.D. student)

Pitchaya Sitthi-amorn (4<sup>th</sup> year Ph.D. student)

Michael Holroyd (5<sup>th</sup> year Ph.D. student)

Colleen O’Hagan (M.S., 2009)

Steven Baker (M.S., 2008)

### **Undergraduate Student Advising**

Senior thesis advisor, 14 students (Jen Dolson, Chris Forster, Dan Gantz, Lucas Gravitt, Phil Gurney, Jacob Harr, Patrick LeDuc, Aaron Liu, Nicholas Parisi, Andrew Psaltis, Wolfgang Richter, Chris Sweeney, John Will, Ted Yokoyama)

## Patents

1. Michael Holroyd, Jason Lawrence, and Todd Zickler,  
“Coaxial Optical Scanner for Synchronous Acquisition of 3D Geometry and Surface Reflectance and Related Method”, filed 2010.
2. Michael Kallay and Jason Lawrence,  
“Systems and Methods for Providing Improved Two Pass Resampling,” filed 2001, granted 2004.

## Grants

1. Co-principal investigator (with Stephen Marschner, Kavita Bala, Szymon Rusinkiewicz, Ravi Ramamoorthi, and Todd Zickler),  
“Beyond Flat Images: Acquiring, Processing and Fabricating Visually Rich Material Appearance,”  
NSF IIS-1011444, \$3,000,000 (2010 - 2015).
2. Principal investigator,  
“Image Super-Resolution Using Trillions of Examples,”  
NSF IIS-0844416, \$220,000 (2009 - 2011).
3. Principal investigator,  
“A Scanning Pipeline for the Synchronous Capture of Precise 3D Shape and Surface Appearance,”  
NSF CCF-0811493, \$450,000 (2008 - 2011).
4. Principal investigator,  
“Automated Resource Allocation for Interactive Rendering Algorithms”,  
NVIDIA Professor Partnership, \$25,000 (2008).
5. Principal investigator,  
“CAREER: The Inverse Shade Tree Framework for Material Acquisition, Analysis, and Design,”  
NSF CAREER Award, CCF-0747220, \$400,000 (2008 - 2013).

## Invited Lectures and Colloquia

- Colloquium, Yale University (2010).
- Invited lecture, New York University (2010).
- Colloquium, Johns Hopkins University (2009).
- Colloquium, University of Pennsylvania (2006).
- Colloquium, University of Virginia (2006).
- Colloquium, Lehigh University (2006).
- Invited lecture, MIT (2004).
- Invited lecture, Mitsubishi Electric Research Labs (2004).
- Invited lecture, Columbia University (2004).

## Press

- NSF Press Release 09-082 (April 23, 2009): “National Science Foundation Awards Millions to Fourteen Universities for Cloud Computing Research”

([http://www.nsf.gov/news/news\\_summ.jsp?cntn\\_id=114686&org=NSF&from=news](http://www.nsf.gov/news/news_summ.jsp?cntn_id=114686&org=NSF&from=news))

InformationWeek (April 23, 2009): “Universities Get \$5 Million To Tap IBM-Google Cloud”

([http://www.informationweek.com/news/services/hosted\\_apps/showArticle.jhtml?articleID=217100178&subSection=News](http://www.informationweek.com/news/services/hosted_apps/showArticle.jhtml?articleID=217100178&subSection=News))

UVA Today (April 1, 2008): “University of Virginia Computer Science Professors Receive National Science Foundation CAREER Awards”

(<http://www.virginia.edu/uvatoday/newsRelease.php?id=4880>)