Samuel William Hasinoff

Curriculum Vitæ

Contact Information

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Degrees

9/2008	Ph.D.	Computer Science	University of Toronto
10/2002	M.Sc.	Computer Science	University of Toronto
5/2000	B.Sc.	Computer Science	University of British Columbia

Research Areas

Computer vision and computer graphics, with a focus on computational photography.

Work Experience

Aug 2011–present	Software Engineer (level 5/Senior Software Engineer) Google, Mountain View, CA
Nov 2010–Jul 2011	Research Assistant Professor Toyota Technical Institute at Chicago
2008–2010	Postdoctoral Fellow Massachusetts Institute of Technology, Computer Science and AI Laboratory
Jul-Aug 2010	Visiting Scientist (hosted by Prof. Anat Levin) Weizmann Institute of Science, Rehovot, Israel
2002–2008	Ph.D. Student Researcher University of Toronto, Department of Computer Science
Fall 2004	Research Intern (computational photography) Microsoft Research Asia, Visual Computing Group, Beijing, China
Summer 2003	Research Intern (computer vision) Microsoft Research, Interactive Visual Computing Group, Redmond, WA
2000–2002	Master's Student Researcher University of Toronto, Department of Computer Science
1999–2000	Research Assistant (computer graphics) University of British Columbia, Laboratory for Computational Intelligence
Summer 1998	Research Assistant (computational chemistry) University of Manitoba, Department of Chemistry, Winnipeg, Canada

Honors

2008	**Alain Fournier Ph.D. Thesis Award**, top Canadian dissertation in computer graphics
2008–2010	**NSERC Postdoctoral Fellowship**, Natural Sciences and Engineering Research Council of Canada
2006	**Honorable Mention, Longuet-Higgins Best Paper Award**, 9th European Conference on Computer Vision
2004–2006	**NSERC Canada Graduate Scholarship, Doctoral**, top scholarship tier
2009	Outstanding Reviewer Award, 12th IEEE International Conference on Computer Vision
2003–2004	Ontario Graduate Scholarship in Science and Technology
2000–2002	NSERC Postgraduate Scholarship A
1999	NSERC Undergraduate Student Research Award
1999	J. Fred Muir Memorial Scholarship in Science, University of British Columbia
1998	Charles and Jane Banks Scholarship, University of British Columbia
1996–2000	Hugh M. Brock National Entrance Scholarship, University of British Columbia
1996	Governor General's Bronze (High School) Medal

Research Funding

- **Principal Investigator**
  "Understanding and Improving Exposure Fusion," Adobe Systems donation (2010)

Professional Activities

- **Conference Program Committee Member**
  IEEE International Conference on Computational Photography (2012);
  IEEE Conference on Computer Vision and Pattern Recognition (2009, 2010, 2011, 2012)
  IEEE International Conference on Computer Vision (2009, 2011);
  European Conference on Computer Vision (2010);
  IEEE International Workshop on Projector-Camera Systems (2012)

- **Journal Reviewer**
  IEEE Transactions on Pattern Analysis and Machine Intelligence; IEEE Transactions on Visualization and Computer Graphics; IEEE Transactions on Image Processing; IEEE Transactions on Circuits and Systems for Video Technology; Image and Vision Computing; ACM Transactions on Graphics (SIGGRAPH, SIGGRAPH Asia); Computer Graphics Forum (Eurographics); Journal of the Optical Society of America A

- **Conference Reviewer**
  IEEE International Conference on Computer Vision; European Conference on Computer Vision; IEEE Conference on Computer Vision and Pattern Recognition; Graphics Interface

Ph.D. Dissertation

Variable-Aperture Photography, Department of Computer Science, University of Toronto, September 2008. Advisor: Prof. Kiriakos N. Kutulakos.
Alain Fournier Ph.D. Thesis Award

M.Sc. Thesis

Three-Dimensional Reconstruction of Fire from Images, Department of Computer Science, University of Toronto, October 2002. Advisor: Prof. Kiriakos N. Kutulakos.

Scholarly and Professional Work

A. Journal Publications

[1] S. Paris, **S. W. Hasinoff**, and J. Kautz, "Local Laplacian Filters: Edge-aware Image Processing with a Laplacian Pyramid," *ACM Transactions on Graphics (Proc. SIGGRAPH), 30(4)*, pp. 1–11, Vancouver, Canada, August 2011.
Acceptance rate: 19% (82 out of 432 submissions)

[2] **S. W. Hasinoff** and K. N. Kutulakos, "Light-Efficient Photography," *IEEE Trans. Pattern Analysis and Machine Intelligence*, 33(11), pp. 2203-2214, November 2011.

[3] A. Levin, **S. W. Hasinoff**, P. Green, F. Durand, and W. T. Freeman, "4D Frequency Analysis of Computational Cameras for Depth of Field Extension," *ACM Transactions on Graphics (Proc. SIGGRAPH), 28(3)*, pp. 1–14, New Orleans, LA, August 2009.
Acceptance rate: 18% (78 out of 439 submissions)

[4] **S. W. Hasinoff** and K. N. Kutulakos, "Confocal Stereo," *International Journal of Computer Vision*, 81(1), pp. 82–104, January 2009. Special Issue on Best Papers from ECCV 2006.

[5] **S. W. Hasinoff** and K. N. Kutulakos, "Photo-Consistent Reconstruction of Semitransparent Scenes by Density-Sheet Decomposition," *IEEE Trans. Pattern Analysis and Machine Intelligence*, 29(5), pp. 870–885, May 2007.

[6] **S. W. Hasinoff**, S. B. Kang, and R. Szeliski, "Boundary Matting for View Synthesis," *Computer Vision and Image Understanding*, 103(1), pp. 22–32, July 2006.

B. Refereed Conference Publications

[7] Y. Shih, A. Davis, **S. W. Hasinoff**, F. Durand, and W. T. Freeman, "Laser Speckle Photography for Surface Tampering Detection," in *Proc. 25th IEEE Conference on Computer Vision and Pattern Recognition*, pp. 33–40, Providence, RI, 2012. *Poster.*
Acceptance rate: 24% (465 out of 1933 submissions)

[8] **S. W. Hasinoff**, A. Levin, P. R. Goode, and W. T. Freeman, "Diffuse Reflection Imaging with Astronomical Applications," in *Proc. 13th IEEE International Conference on Computer Vision,* pp. 185–192, Barcelona, Spain, 2011. *Poster.*
Acceptance rate: 24% (340 out of 1433 submissions)

[9] **S. W. Hasinoff**, F. Durand, and W. T. Freeman, "Noise-Optimal Capture for High Dynamic Range Photography," in *Proc. 23rd IEEE Conference on Computer Vision and Pattern Recognition*, pp. 553–560, San Francisco, CA, 2010. *Poster.*
Acceptance rate: 27% (462 out of 1724 submissions)

[10] **S. W. Hasinoff**, M. Jóźwiak, F. Durand, and W. T. Freeman, "Search-and-Replace Editing for Personal Photo Collections," in *Proc. 2nd IEEE International Conference on Computational Photography*, pp. 1–8, Cambridge, MA, 2010. *Oral.*
Acceptance rate: 42% (13 orals out of 31 submissions)

[11] **S. W. Hasinoff**, K. N. Kutulakos, F. Durand, and W. T. Freeman, "Time-Constrained Photography," in *Proc. 12th IEEE International Conference on Computer Vision,* pp. 333–340, Kyoto, Japan, 2009. *Oral.*
Acceptance rate: 3.6% (48 orals out of 1327 submissions)

[12] **S. W. Hasinoff** and K. N. Kutulakos, "Light-Efficient Photography," in *Proc. 10th European Conference on Computer Vision,* pp. 45–49, Marseille, France, 2008. *Oral.*
Acceptance rate: 4.6% (40 orals out of 871 submissions)

[13] **S. W. Hasinoff** and K. N. Kutulakos, "A Layer-Based Restoration Framework for Variable-Aperture Photography," in *Proc. 11th IEEE International Conference on Computer Vision*, pp. 1–8, Rio de Janeiro, Brazil, 2007. *Poster.*
Acceptance rate: 24% (280 out of 1190 submissions)

[14] **S. W. Hasinoff** and K. N. Kutulakos, "Confocal Stereo," in *Proc. 9th European Conference on Computer Vision*, pp. 620–634, Graz, Austria, 2006. *Oral.*
Honorable Mention, Longuet-Higgins Best Paper Award
Acceptance rate: 4.9% (40 orals out of 811 submissions)

[15] **S. W. Hasinoff** and K. N. Kutulakos, "Photo-Consistent 3D Fire by Flame-Sheet Decomposition," in *Proc. 9th IEEE International Conference on Computer Vision*, pp. 1184–1191, Nice, France, 2003. *Oral.*
Acceptance rate: 4.4% (43 orals out of 966 submissions)

C. Invited Conference Publications

[16] K. N. Kutulakos and **S. W. Hasinoff**, "Focal Stack Photography: High-Performance Photography with a Conventional Camera," *Proc. 11th IAPR Conference on Machine Vision Applications*, pp. 332–337, Tokyo, Japan, 2009.

D. Refereed Workshop Publications

[17] **S. W. Hasinoff**, S. B. Kang, and R. Szeliski, "Boundary Matting for View Synthesis," in *Proc. Second IEEE Workshop on Image and Video Registration (with CVPR)*, 8 pp., Washington, DC, 2004. *Oral.*
Acceptance rate: 50% (13 out of 26 submissions)

E. Encyclopedia Contributions

[18] **S. W. Hasinoff**, "Photon, Poisson noise," in *Encyclopedia of Computer Vision*, K. Ikeuchi and R. Kawakami, eds. Springer Science+Business Media. *To appear.*

[19] **S. W. Hasinoff**, "Saturation (imaging)," in *Encyclopedia of Computer Vision*, K. Ikeuchi and R. Kawakami, eds. Springer Science+Business Media. *To appear.*

F. Technical Reports

[20] M. Aubry, S. Paris, **S. W. Hasinoff**, and J. Kautz, "Fast and Robust Pyramid-based Image Processing," Technical Report, MIT CSAIL TR 2011-049, 2011.

[21] A. Levin, **S. W. Hasinoff**, P. Green, F. Durand, and W. T. Freeman, "4D Frequency Analysis of Computational Cameras for Depth of Field Extension," Technical Report, MIT CSAIL TR 2009-019, 2009. *Extended version of SIGGRAPH paper.*

[22] **S. W. Hasinoff** and K. N. Kutulakos, "Multiple-Aperture Photography for High Dynamic Range and Post-Capture Refocusing," Technical Report, University of Toronto, Department of Computer Science, 2009.

[23] **S. W. Hasinoff**, "Solving Substitution Ciphers," Technical Report, University of Toronto, Department of Computer Science, 2003.

[24] **S. W. Hasinoff**, "Reinforcement Learning for Problems with Hidden State," Technical Report, University of Toronto, Department of Computer Science, 2002.

G. In Submission

[25] M. Aubry, S. Paris, J. Kautz, **S. W. Hasinoff**, and F. Durand, Fast and Robust Pyramid-based Image Processing, submitted to *ACM Transactions on Graphics*, 2012.

Conference Talks, Single-track

- **"Local Laplacian Filters: Edge-aware Image Processing with a Laplacian Pyramid"** (co-presenter), ACM SIGGRAPH, Vancouver, Canada (Aug 10, 2011)
- **"Search-and-Replace Editing for Personal Photo Collections,"** 2nd IEEE International Conference on Computational Photography, Cambridge, MA (Mar 30, 2010)
- **"Time-Constrained Photography,"** 12th IEEE International Conference on Computer Vision, Kyoto, Japan (Oct 2, 2009)
- **"4D Frequency Analysis of Computational Cameras for Depth of Field Extension"** (co-presenter), ACM SIGGRAPH, New Orleans, LA (Aug 7, 2009)
- **"Light-Efficient Photography,"** 10th European Conference on Computer Vision, Marseille, France (Oct 16, 2008)
- **"Confocal Stereo,"** 9th European Conference on Computer Vision, Graz, Austria (May 8, 2006)
- **"Photo-Consistent 3D Fire by Flame-Sheet Decomposition,"** 9th IEEE International Conference on Computer Vision, Nice, France (Oct 15, 2003)

Invited Talks

- **"Local Laplacian Filters: Edge-aware Image Processing with a Laplacian Pyramid"**
  Stanford University, Computer Graphics Group (Oct 4, 2011)
  Midwest Workshop in Computer Vision, Ann Arbor, MI (May 5, 2011)

- **"Tradeoffs in Photography and Advances in Image Editing"**
  Toyota Technical Institute at Chicago (Apr 22, 2011)

- **"Rich Photography on a Budget"**
  NVIDIA Research, Santa Clara, CA (May 23, 2011)
  Université de Montréal, Dept. of Computer Science and Operations Research (Jan 21, 2011)
  McGill University, Centre for Intelligent Machines (Jan 20, 2011)
  Weizmann Institute of Science, Dept. of Computer Science and Applied Math (Aug 12, 2010)
  Technion—Israel Institute of Technology, Dept. of Electrical Engineering (Aug 4, 2010)
  Hebrew University of Jerusalem, Computational Photography and Graphics group (Jul 27, 2010)
  INRIA Grenoble—Rhône-Alpes, ARTIS and LEAR groups (May 27, 2010)
  INRIA Paris—Rocquencourt, WILLOW group (May 26, 2010)
  Rochester Institute of Technology, Center for Imaging Science (Apr 19, 2010)
  Toyota Technical Institute at Chicago (Apr 15, 2010)
  University of Rochester, Dept. of Computer Science (Apr 1, 2010)
  University of Kentucky, Dept. of Computer Science (Mar 25, 2010)
  Stevens Institute of Technology, Dept. of Computer Science (Mar 22, 2010)
  Tufts University, Dept. of Computer Science (Mar 18, 2010)
  Boston University, Dept. of Electrical and Computer Engineering (Mar 15, 2010)
  University of Chicago, Dept. of Computer Science (Mar 10, 2010)
  University of Houston, Dept. of Computer Science (Mar 8, 2010)
  Harvard University, Graphics, Vision & Interaction Labs (Mar 4, 2010)
  Massachusetts Institute of Technology, Computer Vision Group (Mar 2, 2010)

- **"Noise-Optimal Capture for High Dynamic Range Photography"**
  Midwest Vision Workshop, Chicago, IL (Dec 13, 2010)

- **"Optimizing the Blur-Noise Tradeoff with Multiple-Photo Capture"**
  24th Conference on Neural Information Processing Systems, Workshop on Machine Learning meets Computational Photography, Whistler, BC, Canada (Dec 11, 2010)
  5th SIAM Conference on Imaging Science, Minisymposium on Recent Advances in Image and Video Deblurring, Chicago, IL (Apr 12, 2010)

- **"Focal Stacks and High ISO for Efficient Photography"**
  Elbit Systems Electro-optics (Elop), Rehovot, Israel (Jul 28, 2010)

- **"Fundamentals of Computational Photography: Sensors and Noise" (Tutorial)**
  2nd IEEE International Conference on Computational Photography, Cambridge, MA (Mar 29, 2010)

- **"Fragmented Lenses and High ISO for Efficient Photography"**
  University of Toronto, Computer Vision Group (Dec 4, 2009)

- **"Focal Stack Photography"**
  Massachusetts Institute of Technology, The Media Lab (Jun 3, 2009)
  Brown University, Computer Vision Group (May 1, 2009)

- **"Light-Efficient Photography"**
  Massachusetts Institute of Technology, Research Laboratory of Electronics (Feb 23, 2009)

- **"Variable-Aperture Photography"**
  Harvard University, Graphics, Vision & Interaction Labs (Oct 30, 2008)
  Carnegie Mellon University, Vision and Autonomous Systems Center (Feb 11, 2008)
  Massachusetts Institute of Technology, Computer Science and AI Laboratory (Dec 18, 2007)
  Mitsubishi Electric Research Labs, Cambridge, MA (Dec 17, 2007)
  Columbia University, Computer Vision Laboratory (Dec 14, 2007)
  Microsoft Research, Redmond, WA (Sep 21, 2007)
  University of Washington, Graphics and Imaging Laboratory (Sep 20, 2007)

Selected Press

- New Scientist (Oct 19, 2011), "Smarter cameras help you take slicker snaps"
- MIT news (Sep 30, 2009), "Stay focused"

Teaching Experience

- **Guest Lecturer, TTIC and University of Chicago**
  TTIC 31090: Signals, Systems, and Random Processes (Spring 2011)

- **Guest Lecturer, Massachusetts Institute of Technology**
  6.815/6.865: Advanced Computational Photography (Spring 2010)

- **Guest Lecturer, Brown University**
  CSCI1950-G: Computational Photography (Spring 2010)

- **Guest Lecturer, University of Toronto**
  CSC 320: Introduction to Visual Computing (Spring 2006)
  CSC 2530: Visual Modeling (Spring 2004, Spring 2006)

- **Teaching Assistant, University of Toronto**
  CSC 320: Introduction to Visual Computing (Fall 2002, Spring 2004, 2006, 2007, 2008)

CSC 418: Computer Graphics (Fall 2001, Spring 2002, Fall 2003)
CSC 336: Numerical Methods (Spring 2003)
CSC 270: Data Structures (Spring 2001)
CSC 324: Programming Languages (Fall 2000)

- **Lab Instructor, University of British Columbia**
  CPSC 216: Data Structures (Spring 1999)
  CPSC 152: Software Development (Fall 1998)

Supervision

- **PhD Students Supervised**
  - Xavier Snelgrove (co-supervised)
    University of Toronto, Computer Science, Aug 2011-present
    Thesis title: Efficient Spatially-Multiplexed Capture with Plenfocal Imaging
- **Masters Students Supervised**
  - David Chen (co-supervised)
    MIT Electrical Engineering and Computer Science, Jul-Nov 2010
    Thesis title: Mapping Distant Planets from Single-Pixel Observations
- **Undergraduate Students Supervised**
  - Livia Ilie (co-supervised)
    MIT Undergraduate Research Opportunities Program, Summer 2010
    Project title: Home Movies of the Earth from Space
  - Martyna Jóźwiak
    MIT Undergraduate Research Opportunities Program, Summer 2009
    Project title: Search-and-Replace Editing for Personal Photo Collections

References

- Available on request