

Frédo Durand

Professional Preparation

École Normale Supérieure de Paris	Bachelor (math and computer science)	1993
INPG, Grenoble, France	MS (computer science)	1994
Université J. Fourier, France	PhD (Computer Science)	1999

Appointments

Massachusetts Institute of Technology	Professor of EECS	Jul. 2012 – present
Massachusetts Institute of Technology	Associate Professor of EECS	Jul. 2006 – 2012
Massachusetts Institute of Technology	Assistant Professor of EECS	Sep. 2002 – 2006
Massachusetts Institute of Technology	Post-doctoral fellow	Sep. 1999-Sep. 2002
Université J. Fourier, France	Teaching assistant	Sep. 1997-Sep. 1999

Conference organization: Co-organizer and paper co-chair of the first IEEE International Conference on Computational Photography.
Co-organizer (with Marc Levoy and Rick Szeliski) of the 2005 Symposium on Computational Photography and Video, Member of the advisory board of Image and Meaning 2, an interdisciplinary conference on scientific illustration and education

Program Committees and Editorial Boards: ACM SIGGRAPH, Eurographics Symp. on Rendering, Graphics Interface, Eurographics, NPAR, Symposium on Point-Based Rendering, ACM Transactions on Graphics, Foundations and Trends in Computer Graphics and Computer Vision.

Awards

Eurographics Young Researcher Award 2004
NSF CAREER award 2005
Microsoft Research New Faculty Fellowship 2005
Sloan fellowship 2006
Spira award for distinguished teaching 2007
MIT Faculty Research and Innovation Fellowship 2012
Eurographics fellow 2014
ACM SIGGRAPH Computer Graphics Achievement Award 2016
ACM fellow 2016
ACM Siggraph Academy 2018

Publications

1. Chapters in Books

- 1 Chan, Eric and Frédo Durand. Fast Prefiltered Lines. Chapter in *GPU Gems II* edited by Matt Pharr, Addison-Wesley Professional, March 2005 **

2. Papers in Refereed Journals

1. Durand, Frédo, George Drettakis, and Claude Puech, “Fast and Accurate Hierarchical Radiosity Using Global Visibility,” *ACM Transactions on Graphics* Volume 18, No. 2, pp. 128-170, April 1999.
2. Durand, Frédo, George Drettakis, and Claude Puech, “The 3D Visibility Complex,” *ACM Transactions on Graphics*, 21(2), pp. 176-206, April 2002.
3. Durand, Frédo, Julie Dorsey, “Fast Bilateral Filtering for the Display of High-Dynamic-Range Images,” *ACM Transactions on Graphics (Proceedings of SIGGRAPH)*, 21(3), pp. 257-266, July 2002.
4. Cohen-Or, Daniel, Yiorgos Chrysanthou, Claudio Silva and Frédo Durand, “A Survey of Visibility for Walkthrough Applications,” *IEEE Transactions on Visualization and Computer Graphics*, 9(3), pp. 412-431, July-September 2003.
5. Décoret, Xavier, Frédo Durand, François X. Sillion, Julie Dorsey, “Billboard Clouds for Extreme Model Simplification,” *ACM Transactions on Graphics (Proceedings of SIGGRAPH)*, 22(3), pp. 689-696, July 2003.
6. Jones, Thouis R., Frédo Durand, Mathieu Desbrun, “Non-Iterative, Feature-Preserving Mesh Smoothing,” *ACM Transactions on Graphics (Proceedings of SIGGRAPH)*, 22(3), pp. 943-949, July 2003**.
7. Semet, Yann, Una-May O’Reilly, Frédo Durand, “An Interactive Artificial Ant Approach to Non-photorealistic Rendering,” *Lecture Notes in Computer Science*, Volume 3102, pp. 188-200, January 2004**.
8. Jones, Thouis R., Frédo Durand, Matthias Zwicker, “Normal Improvement for Point Rendering,” *IEEE Computer Graphics & Applications*, pp. 53-56, July/August 2004**.
9. Eisemann, Elmar, Frédo Durand, “Flash photography enhancement via intrinsic relighting,” *ACM Transactions on Graphics (Proceedings of SIGGRAPH)*, 23(3), pp. 673-678, 2004**.
10. Willats, John and Frédo Durand, “Defining Pictorial Style: Lessons from Linguistics and Computer Graphics,” *Axiomathes*, 15(2), pp. 319-351 January 2005
11. Durand, Frédo, Nicolas Holzschuch, Cyril Soler, Eric Chan, François X. Sillion, “A Frequency Analysis of Light Transport,” *ACM Transactions on Graphics (Proceedings of SIGGRAPH)*, 24(3), pp. 1115-1126, July 2005.

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12. Liu, Ce, Antonio Torralba, William T. Freeman, Frédo Durand, Edward H. Adelson, "Motion Magnification," ACM Transactions on Graphics (Proceedings of SIGGRAPH), 24(3), pp. 519-526, July 2005.
13. McGuire, Morgan, Wojciech Matusik, Hanspeter Pfister, John F. Hughes, and Frédo Durand, "Defocus Video Matting," ACM Transactions on Graphics (Proceedings of SIGGRAPH), 24(3), pp. 567-576, July 2005.
14. Matusik, Wojciech, Matthias Zwicker, and Frédo Durand, "Texture design using a simplicial complex of morphable textures," ACM Transactions on Graphics (Proceedings of SIGGRAPH), 24(3), pp. 787-794, July 2005.
15. Bae, Soonmin, Sylvain Paris, and Frédo Durand, "Two-scale Tone Management for Photographic Look." ACM Transactions on Graphics (Proceedings of SIGGRAPH), 25(3), pp. 637-645, July 2006.**
16. Kautz, Jan, Solomon Boulos, and Frédo Durand, "Interactive Editing and Modeling of Bidirectional Texture Functions" ACM Transactions on Graphics (Proceedings of SIGGRAPH), 26(3), (8 pages), July 2007.
17. Levin, Anat, Rob Fergus, Frédo Durand, and William Freeman, "Image and Depth from a Conventional Camera with a Coded Aperture" ACM Transactions on Graphics (Proceedings of SIGGRAPH), 26(3), (9 pages), July 2007.
18. Dachsbacher, Carsten, Marc Stamminger, George Drettakis, and Frédo Durand "Implicit Visibility and Antiradiance for Interactive Global Illumination" ACM Transactions on Graphics (Proceedings of SIGGRAPH), 26(3), (10 pages), July 2007
19. Ragan-Kelley, Jonathan, Charlie Kilpatrick, Brian Smith, Doug Epps, Paul Green, Christophe Hery, and Frédo Durand, "The Lightspeed Automatic Interactive Lighting Preview System" ACM Transactions on Graphics (Proceedings of SIGGRAPH), 26(3), (11 pages), July 2007. **
20. Green, Paul, Wenyang Sun, Wojciech Matusik, and Frédo Durand, "Multi-aperture Photography" ACM Transactions on Graphics (Proceedings of SIGGRAPH), 26(3), (7 pages), July 2007. **
21. Chen, Jiawen, Sylvain Paris, and Frédo Durand, "Real-time Edge-Aware Image Processing with the Bilateral Grid" ACM Transactions on Graphics (Proceedings of SIGGRAPH), 26(3), (9 pages), July 2007. **
22. Judd, Tilke, Frédo Durand, and Edward H. Adelson, "Apparent Ridges for Line Drawing" ACM Transactions on Graphics (Proceedings of SIGGRAPH), 26(3), (7 pages), July 2007. **
23. Zwicker, Matthias, Anthony Vetro, Sehoon Yea, Wojciech Matusik, Hanspeter Pfister, Frédo Durand, "Signal Processing for Multi-View 3D Displays: Resampling, Antialiasing and Compression" IEEE Signal Processing Magazine, pp. 88-96, November 2007.

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24. Ben-Artzi, Aner, Kevin Egan, Ravi Ramamoorthi and Frédo Durand, “A Precomputed Polynomial Representation for Interactive BRDF Editing with Global Illumination” *ACM Transactions on Graphics*, 27(2) , (12 pages), April 2008.
25. Goldberg, Alexander, Matthias Zwicker and Frédo Durand, “Anisotropic Noise” *ACM Transactions on Graphics*, 27(3), (Proc.Siggraph), (8 pages), August 2008.
26. Hsu, Eugene, Tom Mertens, Sylvain Paris, Shai Avidan, Frédo Durand. “Light Mixture Estimation for Spatially Varying White Balance” *ACM Transactions on Graphics*, 27(3), (Proc.Siggraph), (7 pages), August 2008.**
27. Lehtinen, Jaakko, Matthias Zwicker, Emmanuel Turquin, Janne Kontkanen, Frédo Durand, François Sillion, Timo Aila. “A Meshless Hierarchical Representation for Light Transport” *ACM Transactions on Graphics*, 27(3), (Proc.Siggraph), (9 pages), August 2008.
28. Paris, Sylvain, Will Chang, Wojciech Jarosz, Oleg Kozhushnyan, Wojciech Matusik, Matthias Zwicker, Frédo Durand. “Hair Photobooth: Geometric and Photometric Acquisition of Real Hairstyles” *ACM Transactions on Graphics*, 27(3), (Proc.Siggraph), (9 pages), August 2008.
29. Levin, Anat, Peter Sand, Taeg Sang Cho, Frédo Durand, William T. Freeman. “Motion Invariant Photography” *ACM Transactions on Graphics*, 27(3), (Proc.Siggraph), (9 pages), August 2008.
30. Paris, Sylvain and Frédo Durand. “A Fast Approximation of the Bilateral Filter using a Signal Processing Approach” *International Journal of Computer Vision*, 81(1), pp. 24-52, (IJCV'09), January 2009.
31. Soler, Cyril, Kartic Subr, Frédo Durand, Nicolas Holzschuch, François Sillion. “Fourier Depth of Field” *ACM Transactions on Graphics*, 28(2), (12 pages), April 2009.
32. Levin, Anat, Samuel W. Hasinoff, Paul Green, Frédo Durand, and William T. Freeman “4D Frequency Analysis of Computational Cameras for Depth of Field Extension” *ACM Transactions on Graphics*, 28(3), (Proc.Siggraph), (14 pages), August 2009.
33. Egan, Kevin, Yu-Ting Tseng, Nicolas Holzschuch, Frédo Durand, Ravi Ramamoorthi “Frequency Analysis and Sheared Reconstruction for Rendering Motion Blur” *ACM Transactions on Graphics*, 28(3), (Proc.Siggraph), (13 pages), August 2009.
34. Da Silva, Marco, Frédo Durand and Jovan Popovic “Linear Bellman Combination for Control of Character Animation” *ACM Transactions on Graphics*, 28(3), (Proc.Siggraph), (10 pages), August 2009.**
35. Eisemann, Elmar, Sylvain Paris and Frédo Durand “A Visibility Algorithm for Converting 3D Meshes into Editable 2D Vector Graphics” *ACM Transactions on Graphics*, 28(3), (Proc.Siggraph), (8 pages), August 2009.
36. Subr, Kartic, Cyril Soler, Frédo Durand “Edge-preserving Multiscale Image Decomposition based on Local Extrema” *ACM Transactions on Graphics*, 28(5)-Article 147, (Proc. SIGGRAPH Asia 2009), (9 pages), December 2009.

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37. Whiting, Emily, John Ochsendorf, and Frédo Durand “Procedural Modeling of Structurally-Sound Masonry Buildings” ACM Transactions on Graphics, 28(5)-Article 112, (Proc. SIGGRAPH Asia 2009), (9 pages), December 2009.**
38. Bousseau, Adrien, Sylvain Paris, and Frédo Durand, “User-Assisted Intrinsic Images” ACM Transactions on Graphics, 28(5)-Article 130, (Proc. SIGGRAPH Asia 2009), (10 pages), December 2009.
39. Paris, Sylvain, Pierre Kornprobst, Jack Tumblin, and Frédo Durand, “Bilateral Filtering: Theory and Applications, Foundations and Trends in Computer Graphics and Vision, 4(1), (73 pages), 2009
40. Hasinoff, Samuel W., Kiriakos N. Kutulakos, Frédo Durand, and William T. Freeman, “Time-Constrained Photography” IEEE 12th International Conference on Computer Vision (ICCV), pp. 333-340, September-October 2009.
41. Judd, Tilke, Krista Ehinger, Frédo Durand, and Antonio Torralba, “Learning to predict where humans look” IEEE 12th International Conference on Computer Vision (ICCV), pp. 2106-2113, September-October 2009.**
42. Hasinoff, Samuel, Martyna Jóźwiak, Frédo Durand, and William T. Freeman, “Search-and-Replace Editing for Personal Photo Collections” IEEE International Conference on Computational Photography (ICCP 2010), (8 pages), March 2010.
43. Cho, Taeg Sang, Anat Levin, Frédo Durand, and William T. Freeman, “Motion blur removal with orthogonal parabolic exposures” IEEE International Conference on Computational Photography (ICCP 2010), (8 pages), March 2010.**
44. Bae, Soonmin, Aseem Agarwala, and Frédo Durand, “Computational Rephotography” ACM Transactions on Graphics, 29(3) Article 24, (15 pages), June 2010. **
45. Rivers, Alec, Takeo Igarashi and Frédo Durand, “2.5D Cartoon Models” ACM Transactions on Graphics, 29(4) Article 59, (Proc.Siggraph), (7 pages), July 2010.**
46. Rivers, Alec, Frédo Durand, and Takeo Igarashi, “3D Modeling with Silhouettes” ACM Transactions on Graphics, 29(4) Article 109, (Proc.Siggraph), (8 pages), July 2010.**
47. Baran, Ilya, Jiawen Chen, Jonathan Ragan-Kelley, Frédo Durand, and Jaakko Lehtinen, “A Hierarchical Volumetric Shadow Algorithm for Single Scattering” ACM Transactions on Graphics, 29(6)-Article 178, (Proc. SIGGRAPH Asia 2010), (9 pages), December 2010.**
48. Grabli, Stéphane, Emmanuel Turquin, Frédo Durand, François Sillion, “Programmable rendering of line drawing from 3D scenes.” ACM Transaction on Graphics, Volume 29, Issue 2, Article 18 (20 pages) - March 2010
49. Ragan-Kelley, Jonathan, Jaakko Lehtinen, Jiawen Chen, Michael Doggett, and Frédo Durand, “Decoupled Sampling for Real-Time Graphics Pipelines” ACM Transactions on Graphics, (17 pages), 30(3), 2011. **
50. Jaakko Lehtinen, Timo Aila, Jiawen Chen, Samuli Laine, Frédo Durand “Temporal Light Field Reconstruction for Rendering Distribution Effects” ACM Transactions on Graphics, 30(4), (Proc.Siggraph), (20 pages), August 2011.

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51. Judd, Tilke, Frédo Durand, Antonio Torralba “Fixations on Low-Resolution Images” *Journal of Vision*, vol. 11 no. 4 article 14, (12 pages) 2011.**
52. Laffont, Pierre-Yves, Adrien Bousseau, Sylvain Paris, Frédo Durand, George Drettakis, “Coherent intrinsic images from photo collections.” *ACM Transactions on Graphics* (TOG), 31(6), 2012.
53. Bousseau, Adrien, James P O’Shea, Frédo Durand, Ravi Ramamoorthi, Maneesh Agrawala, “Gloss perception in painterly and cartoon rendering.” *ACM Transactions on Graphics* (TOG), 32(2), 2013.
54. Boyadzhiev, Ivaylo, Kavita Bala, Sylvain Paris, Frédo Durand, “User-guided white balance for mixed lighting conditions.” *ACM Transactions on Graphics* (TOG), 31(6), 2012.
55. Whiting, Emily, Hijung Shin, Robert Wang, John Ochsendorf, Frédo Durand, “Structural optimization of 3D masonry buildings.” *ACM Transactions on Graphics* (TOG), 31(6), 2012.
56. Rivers, Alec, Andrew Adams, Frédo Durand, “Sculpting by numbers.” *ACM Transactions on Graphics* (TOG), 31(6), 2012.
57. Adelson, Edward H, Forrester Cole, Phillip Isola, William T Freeman, Frédo Durand, “Estimating material by estimating shape.” *Journal of Vision* 12(9), p. 946, 2012.
58. Isola, Phillip, Forrester Cole, William T Freeman, Frédo Durand, Edward H Adelson, “A unified approach to estimating shape from images.” *Journal of Vision* 12(9), p. 276, 2012.
59. Lehtinen, Jaakko, Timo Aila, Samuli Laine, Frédo Durand, “Reconstructing the indirect light field for global illumination.” *ACM Transactions on Graphics* (TOG), 31(4), (10 pages), 2012.
60. Rivers, Alec, Ilan E Moyer, Frédo Durand, “Position-correcting tools for 2D digital fabrication.” *ACM Transactions on Graphics* (TOG), 31(4), 2012.
61. Wu, Hao-Yu, Michael Rubinstein, Eugene Shih, John V Guttag, Frédo Durand, William T Freeman, “Eulerian video magnification for revealing subtle changes in the world.” *ACM Transactions on Graphics* (TOG), 31(4), 2012.
62. Ragan-Kelley, Jonathan, Andrew Adams, Sylvain Paris, Marc Levoy, Saman P Amarasinghe, Frédo Durand, “Decoupling algorithms from schedules for easy optimization of image processing pipelines.” *ACM Transactions on Graphics* (TOG), 31(4), 2012.
63. Davis, Abe, Marc Levoy, Frédo Durand, “Unstructured light fields.” *Computer Graphics Forum* 31(2pt1), pp. 305-314, 2012.
64. Wadhwa, Neal, Michael Rubinstein, Frédo Durand, William T Freeman, “Riesz pyramids for fast phase-based video magnification.” In *Proceedings of 2014 IEEE International Conference on Computational Photography* (ICCP), pp. 1-10, 2014.
65. Semet, Yann, Frédo Durand, Una-May O’Reilly, “Non-Photorealistic Rendering with Interactive, Agent-Based Computation.” *Leonardo* 47(1), p. 14, 2014.
66. Shih, Yichang, Sylvain Paris, Frédo Durand, William T Freeman, “Data-driven hallucination of different times of day from a single outdoor photo.” *ACM Transactions on Graphics* (TOG), 32(6), 2013.

67. Didyk, Piotr, Pitchaya Sitthi-Amorn, William T Freeman, Frédo Durand, Wojciech Matusik, "Joint view expansion and filtering for automultiscopic 3d displays." ACM Transactions on Graphics (TOG), 32(6), 2013.
68. Lehtinen, Jaakko, Tero Karras, Samuli Laine, Miika Aittala, Frédo Durand, Timo Aila, "Gradient-domain Metropolis light transport." ACM Transactions on Graphics (TOG), 32(4), 2013.
69. Wadhwa, Neal, Michael Rubinstein, Frédo Durand, William T Freeman, "Phase-based video motion processing." ACM Transactions on Graphics (TOG), 32(4), 2013.
70. Levin, Anat, Daniel Glasner, Ying Xiong, Frédo Durand, William T Freeman, Wojciech Matusik, Todd Zickler, "Fabricating BRDFs at high spatial resolution using wave optics." ACM Transactions on Graphics (TOG), 32(4), 2013.
71. Mehta, Soham Uday, Brandon Wang, Ravi Ramamoorthi, Frédo Durand, "Axis-aligned filtering for interactive physically-based diffuse indirect lighting." ACM Transactions on Graphics (TOG), 32(4), 2013.
72. Balakrishnan, Guha, Frédo Durand, John V Guttag, "Detecting pulse from head motions in video." In Proceedings of 2013 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2013.
73. Ragan-Kelley, Jonathan, Connelly Barnes, Andrew Adams, Sylvain Paris, Frédo Durand, Saman P Amarasinghe, "Halide: a language and compiler for optimizing parallelism, locality, and recomputation in image processing pipelines." ACM SIGPLAN Notices 48(6), pp. 519-530, 2013.
74. Belcour, Laurent, Cyril Soler, Kartic Subr, Nicolas Holzschuch, Frédo Durand, "5D covariance tracing for efficient defocus and motion blur." ACM Transactions on Graphics (TOG), 32(3), 2013.
75. Durand, Frédo, William T Freeman, Michael Rubinstein, "A World—of—Movement." Scientific American, 312(1), pp. 46-51, 2015.
76. Shi, Lixin, Haitham Hassanieh, Abe Davis, Dina Katabi, Frédo Durand, "Light Field Reconstruction Using Sparsity in the Continuous Fourier Domain." ACM Transactions on Graphics (TOG), 34(1), 2014.
77. Du, Song-Pei, Piotr Didyk, Frédo Durand, Shi-Min Hu, Wojciech Matusik, "Improving visual quality of view transitions in automultiscopic displays." ACM Transactions on Graphics (TOG), 33(6), 2014.
78. Aubry, Mathieu, Sylvain Paris, Samuel William Hasinoff, Jan Kautz, Frédo Durand, "Fast local laplacian filters: Theory and applications." ACM Transactions on Graphics (TOG), 33(5), 2014.
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82. Mehta, Soham Uday, JiaXian Yao, Ravi Ramamoorthi, Frédo Durand, "Factored axis-aligned filtering for rendering multiple distribution effects." ACM Transactions on Graphics (TOG), 33(4), 2014.
83. Chen, Justin G, Neal Wadhwa, Frédo Durand, William T Freeman, Oral Buyukozturk, "Developments with Motion Magnification for Structural Modal Identification Through Camera Video." Dynamics of Civil Structures, Volume 2, pp. 49-57, 2015.
84. Chaurasia, Gaurav, Jonathan Ragan-Kelley, Sylvain Paris, George Drettakis, Frédo Durand, "Compiling high performance recursive filters." High Performance Graphics, 2015.
85. Balakrishnan, Guha, Frédo Durand, John V Guttag, "Video diff: highlighting differences between similar actions in videos." ACM Transactions on Graphics (TOG), 34(6), 2015.
86. Kettunen, M., Manzi, M., Aittala, M., Lehtinen, J., Durand, F., & Zwicker, M. (2015). Gradient-domain path tracing. ACM Transactions on Graphics.
87. Li, T. M., Lehtinen, J., Ramamoorthi, R., Jakob, W., & Durand, F. (2015). Anisotropic Gaussian mutations for metropolis light transport through Hessian-Hamiltonian dynamics. ACM Transactions on Graphics.
88. Gharbi, M., Chaurasia, G., Paris, S., & Durand, F. (2016). Deep joint demosaicking and denoising. ACM Transactions on Graphics.
89. Shin, H. V., Porst, C. F., Vouga, E., Ochsendorf, J., & Durand, F. (2016). Reconciling elastic and equilibrium methods: For static analysis. ACM Transactions on Graphics.
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91. Durand, F., Freeman, W., & Rubinstein, M. (2016). Capter les mouvements invisibles. Pour La Science.
92. Balakrishnan, G., Durand, F., & Guttag, J. (2015). Video diff. ACM Transactions on Graphics.
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94. Chen, J. G., Wadhwa, N., Cha, Y. J., Durand, F., Freeman, W. T., & Buyukozturk, O. (2015). Modal identification of simple structures with high-speed video using motion magnification. Journal of Sound and Vibration.
95. Shin, H. V., Berthouzoz, F., Li, W., & Durand, F. (2015). Visual transcripts. ACM Transactions on Graphics.
96. Popov, S., Ramamoorthi, R., Durand, F., & Drettakis, G. (2015). Probabilistic Connections for Bidirectional Path Tracing. Computer Graphics Forum.
97. Balakrishnan, G., Durand, F., & Guttag, J. (2015). Video Diff: Highlighting differences between similar actions in videos. ACM Transactions on Graphics.
98. Murmann, L., Davis, A., Kautz, J., & Durand, F. (2016). Computational bounce flash for indoor portraits. ACM Transactions on Graphics.
99. Wadhwa, N., Dekel, T., Wei, D., Durand, F., & Freeman, W. T. (2015). Deviation magnification. ACM Transactions on Graphics.

100. Adib, F., Hsu, C. Y., Mao, H., Katabi, D., & Durand, F. (2015). Capturing the human figure through a wall. *ACM Transactions on Graphics*.
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106. Yan, L. Q., Mehta, S. U., Ramamoorthi, R., & Durand, F. (2015). Fast 4D sheared filtering for interactive rendering of distribution effects. *ACM Transactions on Graphics*.
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111. Srikanth, M., Bala, K., & Durand, F. (2015). Computational rim illumination of dynamic subjects using aerial robots. *Computers and Graphics* (Pergamon).
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122. HV Shin, CF Porst, E Vouga, J Ochsendorf, F Durand “Reconciling Elastic and Equilibrium Methods for Static Analysis” *ACM Transactions on Graphics* (TOG) 35 (2), 13,2016
123. I Gkioulekas, K Bala, F Durand, A Levin, S Zhao, T Zickler “Computational Imaging for Inverse Scattering” *Electronic Imaging* 2016 (9), 1-1, 2016
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