

## ANAT LEVIN

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### Education & Academic Appointments:

2014-Present: Associate Professor (tenured), Department of Mathematics and Computer Science, The Weizmann Institute of Science.

2009-2014: Senior Scientist (a.k.a. assistant professor), Department of Mathematics and Computer Science, The Weizmann Institute of Science.

2007-2008: Postdoctoral Associate, MIT CSAIL.  
Advisor: Prof William T. Freeman.

2002-2006: Ph.D.(*summa cum laude*), Computer Science, The Hebrew University of Jerusalem.  
Thesis title: “Learning and inference in low level vision”.  
Thesis Advisor: Prof. Yair Weiss.

2001: M.Sc.(*summa cum laude*), Computer Science, The Hebrew University of Jerusalem.  
Thesis title: “On rigid and non-rigid shape invariants for image understanding purposes”.  
Thesis Advisor: Prof. Amnon Shashua.

1998-2000: B.Sc.(*summa cum laude*), Hebrew University of Jerusalem.  
Majors: Mathematics and Computer Science.  
Dean’s List 1999.

### Research Interests:

My research interests are in the areas of Computer Vision, Computer Graphics and Machine Learning. In particular I work on computational photography as well as on low- and mid-level vision.

### Awards:

M. Bruno Memorial Award from the Rothschild Foundation, 2015.

M. L. Levinson Prize, by the Weizmann Institut Scientific Council, 2015.

PAMI Young Researcher Award, 2013. Given at IEEE CVPR to outstanding computer vision researchers.

Krill Prize, Wolf Foundation, 2013.

Eurographics Young Researcher Award, 2010.

Pazy Memorial Award, 2009. Most outstanding BSF supported project in mathematics and computer science for the year 2009.

TR35 Young Innovator Award, MIT's Technology Review, 2009. Recognizing exciting inventions and research by innovators under the age of 35.

Best Paper Award Runner-Up, IEEE CVPR (Conf. on Computer Vision and Pattern Recognition), 2009.

Alon Fellowship, Israel Council for Higher Education, 2009.

AI's 10 to Watch, 2008. 10 top young researchers selected by the IEEE Intelligent Systems magazine.

The Sara Lee Schupf Post-Doctoral Award, Weizmann Institute, 2007.

Best Paper Award Runner-Up, IEEE CVPR (Conf. on Computer Vision and Pattern Recognition), 2007.

Max Shlumiuk Award for Excellent Ph.D. Dissertations, Hebrew University.

Ph.D. *summa cum laude*.

Longuet-Higgins Best Paper Award at ECCV (European Conference on Computer Vision), 2006.

Kaye Innovation Award, Hebrew University, 2005. For Innovations with high commercial potential.

Ben Wegbreit Best Student Paper Award Finalist, NIPS (Neural Information Processing Systems), 2002.

Horowitz fellowship for Ph.D students, Hebrew University.

M.Sc. *summa cum laude*.

B.Sc. *summa cum laude*.

**Grants:**

2009-2011 ISF (Israel Science Foundation), Legacy program, no. 1993/08.  
"Simplifying computer vision by novel camera and decoding algorithms"

2010-2013 BSF (USA-Israel Binational Science Foundation), no. 2008155.  
"Computational all focus imaging using light field analysis"  
Joint with W. Freeman and F. Durand, MIT.  
Awarded the Pazy memorial award.

2011-2015 ERC (European Research Council), no. 259091.  
"Understanding, Designing and Analyzing Computational Cameras"

2013 Intel ICRI-CI (with M. Elad, B. Nadler and Y. Weiss).  
"Understanding and Utilizing Natural Image Statistics"

2015-2018 ISF (Israel Science Foundation).  
“Passive light sensitive displays”

2016-2020 ERC (European Research Council).  
“Exploiting light and material interaction”

**Professional Activities:**

Area Chair: ICCV 2013, SIGGRAPH 2014.

Editor: IJCV.

Program committee: CVPR 2006-2011, ICCV 2007,2009, ECCV 2008,2010, ICCP 2009-2011.

Reviewed papers for: SIGGRAPH annual conference 2005-2010, ACM Transaction on Graphics, IEEE Transactions on PAMI, IEEE Transactions on Image Processing.

**Teaching:**

Intoduction to Computer Vision, Fall 2009, 2010.

Advanced Topics in Computer Vision, Spring 2010, 2011, 2015

Introduction to Statistical Inference and Learning, Fall 2011, 2012, 2013.

Advanced Topics in Computational Photography and Optics, Spring 2014

**Journal Publications:**

I. Gkioulekas, A. Levin, F. Durand, T. Zickler. “Micron-scale Light Path Decomposition Using Interferometry”. *SIGGRAPH, ACM Transactions on Graphics*, Aug 2015.

D. Glasner, T. Zickler, A. Levin. “A Reflectance Display”. *SIGGRAPH, ACM Transactions on Graphics*, Aug 2014.

I. Gkioulekas, S. Zhao, K. Bala, T. Zickler and A. Levin “Inverse Volume Rendering with Material Dictionaries”. *SIGGRAPH Asia, ACM Transactions on Graphics*, Nov 2013

A. Levin, D. Glasner, Y. Xiong, F. Durand, W. Freeman, W. Matusik, T. Zickler. “Fabricating BRDFs at High Spatial Resolution Using Wave Optics”. *SIGGRAPH, ACM Transactions on Graphics*, July 2013.

A. Levin, Y. Weiss, F. Durand and W. T. Freeman. “Understanding and Evaluating Blind Deconvolution Algorithms”. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2011.

A. Levin, S. Hasinoff, P. Green, F. Durand, W. T. Freeman. “4D Frequency Analysis of Computational Cameras for Depth of Field Extension”. *SIGGRAPH, ACM Transactions on Graphics*, Aug 2009.

- A. Levin and Y. Weiss. “Learning to Combine Bottom-Up and Top-Down Segmentation”. *International Journal of Computer Vision*, Jan 2009.
- A. Levin, A. Rav-Acha and D. Lischinski. “Spectral Matting”. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Oct 2008.
- A. Levin, P. Sand, T. S. Cho, F. Durand, W. T. Freeman. “Motion-Invariant Photography”. *SIGGRAPH, ACM Transactions on Graphics*, Aug 2008.
- A. Levin, R. Fergus, F. Durand and W. T. Freeman. “Image and Depth from a Conventional Camera with a Coded Aperture”. *SIGGRAPH, ACM Transactions on Graphics*, Aug 2007.
- A. Levin, D. Lischinski and Y. Weiss. “A Closed Form Solution to Natural Image Matting”. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Feb 2008.
- A. Levin and Y. Weiss. “User Assisted Separation of Reflections from a Single Image Using a Sparsity Prior”. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, Sep 2007.
- A. Zomet, A. Levin, S. Peleg and Y. Weiss “Seamless Image Stitching in the Gradient Domain”. *IEEE Transactions on Image Processing*, April 2006.
- A. Levin, D. Lischinski and Y. Weiss. “Colorization using Optimization”. *SIGGRAPH, ACM Transactions on Graphics*, Aug 2004.

### Refereed Conference Papers:

- Note: Conferences are the major publication forum in the computer vision field. The top 3 computer vision conferences (ICCV, ECCV, CVPR) are highly competitive with low acceptance rates of less than 25%. ICCV and ECCV have CiteSeer impact factor rankings in the top 5% and 7%, respectively, of **all computer science** journals and conferences.
- T. Xue, M. Rubinstein, N. Wadhwa, A. Levin, F. Durand, and W.T. Freeman. “Refraction Wiggles for Measuring Fluid Depth and Velocity from Video”. *Proc. of the European Conference on Computer Vision (ECCV)*, Sep 2014.
- N. Efrat, D. Glasner, S. Apartsin, B. Nadler, and A. Levin. “Accurate Blur Models vs. Image Priors in Super-Resolution”. *EEE International Conference on Computer Vision (ICCV)*, Dec 2013.
- A. Levin, B. Nadler, F. Durand, and W. T. Freeman. “Patch Complexity, Finite Pixel Correlations and Optimal Denoising.”. *Proc. of the European Conference on Computer Vision (ECCV)*, Oct 2012.
- S. W. Hasinoff, A. Levin, P. R. Goode, and W. T. Freeman. “Diffuse Reflectance Imaging with Astronomical Applications”. *EEE International Conference on Computer Vision (ICCV)*, Nov 2011.
- A. Levin and B. Nadler. “Natural Image Denoising: Optimality and Inherent Bounds”. *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, June 2011.

A. Levin, Y. Weiss, F. Durand and W. T. Freeman. “Efficient Marginal Likelihood Optimization in Blind Deconvolution”. *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, June 2011.

A. Levin. “Analyzing Depth from Coded Aperture Sets”. *Proc. of the European Conference on Computer Vision (ECCV)*, Sep 2010.

A. Levin and F. Durand. “Linear View Synthesis Using a Dimensionality Gap Light Field Prior”. *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, June 2010.

T. S. Cho, A. Levin, F. Durand, and W. T. Freeman. “Motion Blur Removal with Orthogonal Parabolic Exposures”. *IEEE International Conf. on Computational Photography (ICCP)*, April 2010.

A. Levin, Y. Weiss, F. Durand and W. T. Freeman. **Best paper award runner up.**

“Understanding and Evaluating Blind Deconvolution Algorithms”. *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, June 2009.

A. Levin, W. T. Freeman and F. Durand. “Understanding Camera Trade-offs Through a Bayesian Analysis of Light Field Projections”. *Proc. of the European Conference on Computer Vision (ECCV)*, Oct 2008.

A. Levin, A. Rav-Acha and D. Lischinski. **Best paper award runner up.**  
“Spectral Matting”. *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, June 2007.

A. Levin. “Blind Motion Deblurring Using Image Statistics”. *Advances in Neural Information Processing Systems (NIPS)* Dec 2006.

A. Levin, D. Lischinski and Y. Weiss. “A Closed Form Solution to Natural Image Matting”. *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, June 2006.

A. Levin and Y. Weiss. “Learning to Combine Bottom-Up and Top-Down Segmentation”. **Longuet-Higgins best paper award.**  
*Proc. of the European Conference on Computer Vision (ECCV)*, LNCS 3954, p. 581-594, May 2006.

A. Levin and R. Szeliski “Visual Odometry and Map Correlation”. *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, June 2004.

A. Levin, A. Zomet and Y. Weiss. “Separating Reflections from a Single Image Using Local Features”. *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, June 2004.

A. Levin and Y. Weiss. “User Assisted Separation of Reflections from a Single Image Using a Sparsity Prior”. *Proc. of the European Conference on Computer Vision (ECCV)*, LNCS 3021, p. 602-613, May 2004.

A. Levin, A. Zomet, S. Peleg and Y. Weiss. “Seamless Image Stitching in the Gradient Domain”. *Proc. of the European Conference on Computer Vision (ECCV)*, LNCS 3024, p. 377-389, May 2004.

A. Levin, P. Viola and Y. Freund. “Unsupervised Improvement of Visual Detectors using Co-Training”. *International Conference on Computer Vision (ICCV)*, Oct 2003.

A. Levin, A. Zomet and Y. Weiss. “Learning How to Inpaint from Global Image Statistics”. *International Conference on Computer Vision (ICCV)*, Oct 2003.

A. Levin, A. Zomet and Y. Weiss. “Learning to Perceive Transparency from the Statistics of Natural Scenes”. **Finalist for the Ben-Wegbreit best student paper award.**

*Advances in Neural Information Processing Systems (NIPS)*, Dec 2002.

A. Shashua and A. Levin. “Ranking with Large Margin Principle: Two Approaches”. *Advances in Neural Information Processing Systems (NIPS)*, Dec 2002.

A. Levin and A. Shashua . “Principal Component Analysis Over Continuous Subspaces and Intersection of Half-spaces”. *Proc. of the European Conference on Computer Vision (ECCV)*, LNCS 2352, p.635-650, May 2002.

A. Levin and A. Shashua. “Revisiting Single-view Shape Tensors: Theory and Applications”. *Proc. of the European Conference on Computer Vision (ECCV)*, LNCS 2351, p.399-414, May 2002.

A. Shashua A. Levin and S. Avidan. “Manifold Pursuit: A New Approach to Appearance Based Recognition”. *Proc. of the Int. Conf. on Pattern Recog. (ICPR)*, Aug 2002.

A. Shashua and A. Levin. “Linear Image Coding for Regression and Classification using the Tensor-rank Principle”. *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, Dec 2001.

A. Levin L. Wolf and A. Shashua. “Time-varying Shape Tensors for Scenes with Multiply Moving Points”. *IEEE Conf. on Computer Vision and Pattern Recognition (CVPR)*, Dec 2001.

A. Shashua and A. Levin. “Multi-frame Infinitesimal Motion Model for the Reconstruction of (Dynamic) Scenes with Multiple Linearly Moving Objects”. *International Conference on Computer Vision (ICCV)*, July 2001.

### Technical Reports:

A. Levin and R. Szeliski “Motion Uncertainty and Field of View” *Microsoft Research* MSR-TR-2006-37. May 2006.

A. Shashua, R. Meshulam, L. Wolf, A. Levin and G. Kalai. “Representation Theory in Computer Vision Problems”. Technical Report 2002-44, Leibniz Center for Research, School of Computer Science and Eng., The Hebrew University of Jerusalem, July, 2002