

Undergraduate Research Assistant, U. of Mannheim 1997 - 1998
Department of Mathematics and Computer Science
Investigated the 3D reconstruction of catheter paths from multiple X-ray projections.

WORK
EXPERIENCE

Internship at Intel Research Summer 2004
Santa Clara, CA
Worked on new models for learning prior distributions of images. Studied their applications to image denoising and related image reconstruction tasks.

Internship at Intel Research Summer 2003
Santa Clara, CA
Worked on various improvements for nonlinear diffusion techniques for image denoising. Investigated the use of higher-order statistics in image denoising.

Internship at Mitsubishi Electric Research Laboratory Spring 2000
Cambridge, MA
Designed and implemented libraries for Adaptively Sampled Distance Fields (ADFs), a volumetric representation of object shape.

Freelance Programmer for Volume Graphics GmbH 1998 - 2001
Heidelberg, Germany
Implemented several parts of a commercial volume visualization and analysis system.

PUBLICATIONS

Theses

S. Roth. *High-Order Markov Random Fields for Low-Level Vision*. Ph.D. dissertation, Brown University, Department of Computer Science, Providence, Rhode Island, May 2007.

S. Roth. Analysis of a deterministic annealing method for graph matching and quadratic assignment problems in computer vision. Diplom thesis, University of Mannheim, Germany, May 2001.

Peer-Reviewed Journal Papers

S. Roth and M. J. Black. On the spatial statistics of optical flow. *International Journal of Computer Vision (IJCV)*, 74(1):33–50, Aug. 2007.

C. Schellewald, S. Roth, and C. Schnörr. Evaluation of a convex relaxation to a quadratic assignment matching approach for relational object views. *Image and Vision Computing (IVC)*, 25(8):1301–1314, Aug. 2007.

Peer-Reviewed Conference Papers

T. M. Moldovan, S. Roth, and M. J. Black. Denoising archival films using a learned Bayesian model. In *Proc. of the IEEE International Conference on Image Processing (ICIP)*, pp. 2641–2644, Atlanta, Georgia, Oct. 2006.

- S. Roth and M. J. Black. Specular flow and the recovery of surface structure. In *Proc. of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, vol. 2, pp. 1869–1876, New York, New York, June 2006.
- X. Lan, S. Roth, D. P. Huttenlocher, and M. J. Black. Efficient belief propagation with learned higher-order Markov random fields. In A. Leonardis, H. Bischof, and A. Prinz, eds., *Proc. of the European Conference on Computer Vision (ECCV)*, vol. 3952 of *LNCS*, pp. 269–282. Springer, 2006.
- F. Wood, S. Roth, and M. J. Black. Modeling neural population spiking activity with Gibbs distributions. In Y. Weiss, B. Schölkopf, and J. Platt, eds., *Advances in Neural Information Processing Systems (NIPS)*, vol. 18, pp. 1539–1546, 2006.
- S. Roth and M. J. Black. On the spatial statistics of optical flow. In *Proc. of the IEEE International Conference on Computer Vision (ICCV)*, vol. 1, pp. 42–49, Beijing, China, Oct. 2005. *Oral presentation.*
- S. Roth and M. J. Black. Fields of experts: A framework for learning image priors. In *Proc. of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, vol. 2, pp. 860–867, San Diego, California, June 2005. *Oral presentation.*
- S. Roth, L. Sigal, and M. J. Black. Gibbs likelihoods for Bayesian tracking. In *Proc. of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, vol. 1, pp. 886–893, Washington, DC, June 2004.
- L. Sigal, S. Bhatia, S. Roth, M. J. Black, and M. Isard. Tracking loose-limbed people. In *Proc. of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, vol. 1, pp. 421–428, Washington, DC, June 2004.
- C. Schellewald, S. Roth, and C. Schnörr. Evaluation of convex optimization techniques for the weighted graph-matching problem in computer vision. In B. Radig and S. Florczyk, eds., *Proc. of the 23rd DAGM-Symposium*, vol. 2191 of *LNCS*, pp. 361–368. Springer, 2001.
- H.-J. Bender, R. Männer, C. Poliwoda, S. Roth, and M. Walz. Reconstruction of 3D catheter paths from 2D x-ray projections. In C. Taylor and A. C. F. Colchester, eds., *Medical Image Computing and Computer-Assisted Intervention - MICCAI'99*, vol. 1679 of *LNCS*, pp. 981–989. Springer, 1999.

Journal Papers under Review or in Preparation

- S. Roth and M. J. Black. Fields of experts (working title). *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*. In preparation.

Technical Reports

C. Schellewald, S. Roth, and C. Schnörr. Performance evaluation of a convex relaxation approach to the quadratic assignment of relational object views. Technical Report TR-2002-02, University of Mannheim, Germany, Feb. 2002.

Refereed Abstracts

M. J. Black and S. Roth. On the receptive fields of Markov random fields. *Cosyne*, 2005.

S. Roth, F. Domini, and M. J. Black. Specular flow and the perception of surface reflectance. *Journal of Vision*, 3(9):413a, 2003.

INVITED WORKSHOP PRESENTATIONS

“*High-order Markov Random Fields for Low-level Vision*”, Dagstuhl Workshop on Visual Computing, Dagstuhl, Germany, April 2007.

“*Specular Flow and the Recovery of Surface Structure*”, BIRS Workshop on Mathematical Methods in Computer Vision, Banff, Canada, October 2006.

“*Fields of Experts: A Framework for Learning Image Priors*”, CIAR NCAP Workshop, Vancouver, Canada, December 2005.

“*On the Spatial Statistics of Optical Flow: Modeling, Learning, and Flow Estimation*”, Locomotor Workshop, Jülich, Germany, October 2005.

INVITED TALKS

“*On the Spatial Statistics of Optical Flow*”:

- Massachusetts Institute of Technology, October 2006.

“*High-order Markov Random Fields for Low-level Vision*”:

- Ecole Polytechnique Fédérale de Lausanne, January 2007.
- Microsoft Research, Cambridge, January 2007.
- Darmstadt University of Technology, January 2007.
- California Institute of Technology, December 2006.
- Princeton University, April 2006.
- University of Rochester, March 2006.

“*Modeling Spatial Statistics with Fields of Experts*”:

- University of Minnesota, November 2005, guest lecture.

“*Fields of Experts: A Framework for Learning Image Priors*”:

- Forschungszentrum Jülich, Germany, October 2005.
- New York University, Courant Institute, August 2005.
- Brown University, Center for Computation and Visualization, April 2005.
- Massachusetts Institute of Technology, March 2005.
- Brown University, Division of Applied Mathematics, November 2004.

“*Reconstruction of 3D Catheter Paths from 2D X-ray Projections*”:

- University Clinic of Mannheim, July 2000.

OTHER TALKS	<p><i>“Efficient Belief Propagation for MRFs in Low-level Vision”</i>. CIAR Machine Learning Summer School, Toronto, Canada, August 2006.</p> <p><i>Guest lectures</i> at Brown University in:</p> <ul style="list-style-type: none"> • Computer Science 143 (Introduction to Computer Vision), fall term 2005. • Computer Science 296-4 (Topics in Computer Vision), spring term 2006. <p><i>“On the Spatial Statistics of Optical Flow”</i>. IEEE International Conference on Computer Vision (ICCV), Beijing, China, October 2005.</p> <p><i>“Fields of Experts: A Framework for Learning Image Priors”</i>. IEEE Conference on Computer Vision and Pattern Recognition, San Diego, California, June 2005.</p>
PROFESSIONAL ACTIVITIES	<p>Program Committees:</p> <ul style="list-style-type: none"> • IEEE International Conference on Computer Vision (ICCV) 2007 • IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2007 <p>Journal Reviewing:</p> <ul style="list-style-type: none"> • IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI) 2005 & 2006 • International Journal of Computer Vision (IJCV) 2005 & 2006 <p>Conference Reviewing:</p> <ul style="list-style-type: none"> • European Conference on Computer Vision (ECCV) 2004 • IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2004, 05, 06. • IEEE International Conference on Computer Vision (ICCV) 2005 • Neural Information Processing Systems (NIPS) 2006 <p>Departmental Service:</p> <ul style="list-style-type: none"> • Student member of the Brown CS faculty committee for computing • Organized student involvement in Brown CS faculty search for 2005 • Student volunteer \LaTeX administrator <p>Professional Societies: Member of the ACM, the IEEE, the IEEE Computer Society, and Sigma Xi.</p>
BIOGRAPHIC INFORMATION	<p><i>Citizenship:</i> German</p> <p><i>Visa status in the US:</i> J-1</p>
REFERENCES	<p><i>available upon request</i></p>

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