

Barak Fishbain

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RESEARCH INTERESTS	Omni-machine-perception of complex systems; Machine understanding of trends and behaviors based on a data collected from distributed sensors of different modalities; Multi-dimensional analysis of environmental and traffic data-sets.	
EDUCATION	Tel-Aviv University , Tel-Aviv, Israel Ph.D., Engineering , September 2008 <ul style="list-style-type: none">Thesis Topic: <i>Real Time Methods for Restoration, Enhancement and Analysis of Videos with Applications in Intelligent Transportation Systems</i>Advisers: Professor David Mahalel Faculty of Environmental and Civil Engineering, The Technion, Haifa Israel Professor Leonid P. Yaroslavsky Faculty of Engineering, Tel-Aviv University, Tel-Aviv Israel M.S., Electrical Engineering , June 2004 <ul style="list-style-type: none">Thesis Topic: <i>Data Fusion Methods for Fusing Thermal and Visual Range Video Sequences</i>Adviser: Professor Leonid P. Yaroslavsky Tel-Aviv University The Technion - Israel Institute of Technology , Haifa, Israel B.S., Electrical Engineering , April 1997	
ACADEMIC APPOINTMENTS	Associate Director for Research October 2010 to present Integrated Media Systems Center, Viterbi School of Engineering University of Southern California Postdoctoral Researcher October 2008 to present Department of Industrial Engineering and Operations Research, University of California, Berkeley	
AWARDS	Ran Naor Foundation October 2008 - October 2009 Research Scholar Applied Materials December 2009 Student Research Excellence Award Faculty of Engineering, Tel-Aviv University November 2009 Rosenberg Excellence Award Israel Ministry of Science and Technology November 2007 - November 2008 National Award - PhD Research Fellowship	

ACADEMIC
SERVICE

Associate Editor

Journal of Real-time Image Processing,
Springer Science & Business Media Publishing

Reviewer

- National Science Fund (NSF) Panelist
- IEEE Transactions on Circuits and Systems for Video Technology
- Optics Letters, Optical Society of America
- Journal of Optical Society of America A (JOSA A), Optical Society of America
- Journal of Real-time Image Processing

Organization Committees

- 12th INFORMS Computing Society Conference, Monterey, CA USA, January 9-11, 2011
- Real-Time Image and Video Processing, SPIE Photonics Europe, Brussels Belgium, April, 12-16, 2010
- 1st Workshop on Special Topics in Homeland Nuclear Security, Berkeley, CA, USA, July 22-24, 2009

TEACHING
EXPERIENCE

Tel-Aviv University, Tel-Aviv Israel

Teaching Assistant October 2006 to August 2008

- Instructor for 0571.4145: Data Communication Systems
- Lab Instructor for 0512.4262: Digital Image Processing, Principals

FUNDED
PROJECTS

Los Angeles County Metropolitan Transportation Authority (Metro)

Advanced Data Management

Leading Researcher, University Southern California August 2010 to present

The Department of Homeland Security

The Domestic Nuclear Threat Security (DoNuTS) Initiative

Post Doctoral Fellow, Univ. of California, Berkeley October 2008 to present

Israeli Ministry of Transportation

Incident detection in Video-based Intelligent Transportation Systems.

Leading Researcher, Tel-Aviv University October 2007 to October 2008

Israeli Defense Advanced Research Project Agency (MAFAT)

Real-time Long Range Video Enhancement

Leading Researcher, Tel-Aviv University November 2006 to March 2008

Elbit Systems Electro-Optics (El-Op)

Turbulent Video Stabilization

Researcher, Tel-Aviv University November 2005 to February 2007

PROFESSIONAL
EXPERIENCE

Rafael - Advanced Defense Systems National Laboratory, Haifa, Israel

Research Associate October 2005 to October 2008

Israeli Defense Forces - Intelligence Corps R&D Unit

Researcher September 1997 to October 2005

- Prime Minister Citation September, 2005
- Head of Intelligence Branch (Major General) Citation January, 2005
- Rank: Officer - Major

PUBLICATIONS

BOOKS

B. Fishbain, *Surveillance, Monitoring and Traffic Video Systems*, VDM-Verlag Pub., Berlin, Germany. 2009. ISBN: 978-3-639-15240-1

JOURNAL PAPERS

Guest editorial of the special issue on real-time vision-based motion analysis and intelligent transportation systems, *Journal of Real-Time Image Processing*, 2010 (with Mehrubeoglu, Mehrube)

Nuclear Threat Detection with Mobile Distributed Sensor Networks, *Annals of Operations Research*, in press (with D.S. Hochbaum)

Visual assessment of pedestrian crashes, *Accident Analysis and Prevention*, in press (with J. Griswold, D.R. Ragland, and S. Washington)

Competitive Analysis of Minimum-Cut Maximum Flow Algorithms in Vision Problems, *IEEE Transaction on Pattern Analysis and Machine Intelligence*, 2010. *Submitted* (with D.S. Hochbaum and S. Mueller)

Non-uniform signal sampling, signal and image recovery from sparse data and the discrete sampling theorem, *Journal of Optical Society of America A.*, 26(3):566-575, 2009 (with L.P. Yaroslavsky, G. Shabat, I.A. Ideses and B.G. Salomon)

Super-resolution in color turbulent videos, *Optics Letters*, 34:587-589, 2009 (with G. Shabat, I.A. Ideses, B.G. Salomon, L.P. Yaroslavsky)

Spatial, Temporal, and Inter-channel Image Data Fusion for Long-Distance Terrestrial Observation Systems, *Advances in Optical Technologies*, Vol. 2008, Article ID 546808, 2008. doi:10.1155/2008/546808 (with L.P. Yaroslavsky and I.A. Ideses).

Super-resolution in turbulent videos: making profit from damage, *Optics Letters*, 32(20):3038-3040, 2007 (with L.P. Yaroslavsky, G. Shabat and I.A. Ideses)

Real-time stabilization of long range observation system turbulent video, *Journal of Real-Time Image Processing*, 2(1):11-22, 2007 (with L.P. Yaroslavsky and I.A. Ideses)

Real-Time 2D to 3D Video Conversion, *Journal of Real-Time Image Processing*, 2(1):3-9, 2007 (with I.A. Ideses and L.P. Yaroslavsky)

In Preparation

Video Segmentation Using Pseudoflow Algorithm Through Utilization of Intensity and Coarse Motion Data (with D.S. Hochbaum and Y.T. Yang)

Detecting, Classifying and Identifying Special Nuclear Materials, (with Y.T. Yang, D.S. Hochbaum, E.B. Norman and E. Swanberg)

Identifying Differentially Expressed Genes with Graph Partitioning: Unravelling the Role of Uterine Dendritic Cells in Embryo Implantation, (with E. Bitton, D.S. Hochbaum, and V. Plaks)

PATENTS

An Apparatus and Method for Real-time Super-resolution which Incorporates the Family of ITU and MPEG Video Coding Standards, *US Patent (Pending)*, filed 10-Jan-2009 (with I.A. Ideses and L.P. Yaroslavsky)

Methods and Systems for Use in 3D Video Generation, Storage and Compression, *US Patent (Pending)*, filed 13-Oct-2007 (with I.A. Ideses, L.P. Yaroslavsky and R. Vistuch)

TECHNICAL PAPERS

Automated and semi-automated knee cartilage segmentation using graph cuts, *UC Berkeley manuscript*, 2009 (with D.S. Hochbaum, J.E. Baumler, and G.E. Gold)

CONFERENCES

- Detecting, Classifying and Identifying Special Nuclear Materials, *12th INFORMS Computing Society Conference*, Monterey, California, January 9-11, 2011 (with Y.T. Yang, D.S. Hochbaum, E.B. Norman and E. Swanberg)
- Competitive Analysis of Minimum-Cut Maximum Flow Algorithms in Vision Problems, *12th INFORMS Computing Society Conference*, Monterey, California, January 9-11, 2011 (with D.S Hochbaum and Stefan Mueller)
- Segmentation and Target Tracking Using Pseudoflow Algorithm Through Joint Utilization of Color and Coarse Motion Data, *12th INFORMS Computing Society Conference*, Monterey, California, January 9-11, 2011 (with Y.T. Yang, D.S. Hochbaum)
- Dynamic stand-off 3D gamma-ray imaging, *12th Symposium on Radiation Measurements and Applications (SORMA)*, 2010, University of Michigan - Ann Arbor, USA, 24-27 May 2010 (with L. Mihailescu, D.S. Hochbaum, J. Maltz, C.J. Moore, J. Rohel, L. Supic and K. Vetter)
- Real-Time Vision-Based Traffic Flow Measurements and Incident Detection, *Proc. Real-time Image and Video Processing/Electronic Imaging 2009*, SPIE Vol. 7244, San-Jose, CA, USA, 18-22 January 2009 (with I.A. Ideses, D. Mahalel and L.P. Yaroslavsky)
- Real-Time Depth Map Manipulation for 3D Visualization, *Proc. Real-time Image and Video Processing/Electronic Imaging 2009*, SPIE Vol. 7244, San-Jose, CA, USA, 18-22 January 2009 (with I.A. Ideses and L.P. Yaroslavsky)
- Non-uniform sampling, signal and image recovery from sparse data and the discrete sampling theorem, *Proc. Algorithms and Systems VII/Electronic Imaging 2009*, SPIE Vol. 7245A, San-Jose, CA, USA, 18-22 January 2009 (with L.P. Yaroslavsky, G. Shabat, B.G. Salomon and I.A. Ideses)
- Depth Map Manipulation for 3D Visualization, *Proc. IEEE 3DTV Conference*, Istanbul Turkey, 28-30 May 2008 (with I.A. Ideses and L.P. Yaroslavsky)
- Real Time Turbulent Video Super-Resolution Using MPEG 4, *Proc. Real-Time Image Processing/Electronic Imaging 2008*, SPIE Vol. 6811, pp. 6-9, San-Jose, CA, USA, 28 January - 1 February 2008 (with L.P. Yaroslavsky and I.A. Ideses)
- No-Reference Method for Image Effective Bandwidth Estimation, *Proc. Image Quality and System Performance V/Electronic Imaging 2008*, SPIE Vol. 6808, San-Jose, CA, USA, 28 January - 1 February 2008 (with L.P. Yaroslavsky, I.A. Ideses and F. Roffet-Crete)
- Super-Resolution of Turbulent Video: Potentials and Limitations, *Proc. Image Processing: Algorithms and Systems VI/Electronic Imaging 2008*, SPIE Vol. 6812, pp. 5-13, San-Jose, CA, USA, 28 January - 1 February 2008 (with L.P. Yaroslavsky, G. Shabat, and I.A. Ideses)
- Precise differentiation can significantly improve the accuracy of optical flow measurements, *Proc. Image Processing: Algorithms and Systems VI/Electronic Imaging 2008*, SPIE Vol. 6812, pp. 11-19, San-Jose, CA, USA, 28 January - 1 February 2008 (with L.P. Yaroslavsky, A. Agranovich and I.A. Ideses)
- Depth Maps: Faster, Higher and Stronger?, *Proc. Three-Dimensional Image Capture and Applications/Electronic Imaging 2008*, SPIE Vol. 6805, pp. 1-11, San-Jose, CA, USA, 28 January - 1 February 2008 (with I.A. Ideses, and L.P. Yaroslavsky)
- Real Time Turbulent Video Perfecting by Image Stabilization and Super-resolution, *Proc. 7th IASTED International Conference on Visualization, Imaging, and Image Processing (VIIP 2007)*, pp. 213-218, Palma de Mallorca Spain, 29-31 August 2007 (with L.P. Yaroslavsky and I.A. Ideses)

- Depth map Quantization how much is Sufficient?, *Proc 3DTV-Conference*, Capture, Transmission and Display of 3D Video, pp. 1-4, Kos Island, Greece, 7-9 May 2007 (with I.A. Ideses, L.P. Yaroslavsky and I. Amit)
- Turbulent video enhancement: Image stabilization and super-resolution”, *The 11th. Meeting on Optical Engineering and Science in Israel*, Tel-Aviv, Israel, 26-27 March 2007 (with I.A. Ideses, Sh. Gepstein and L.P. Yaroslavsky)
- Turbulent Compensation Implementation for Embedded Systems, *The 11th. Meeting on Optical Engineering and Science in Israel*, Tel-Aviv, Israel, 26-27 March 2007 (with O. Shapira, D. Ravid, I.A. Ideses, L.P. Yaroslavsky and Z. Hadas)
- 3D video from compressed 2D video, *Proc. Stereoscopic Displays and Applications XVIII/Electronic Imaging*, SPIE Vol. 6490, pp. 28-35, San-Jose, CA, USA, 28 January - 1 February 2007 (with I.A. Ideses, L.P. Yaroslavsky and R. Vistuch)
- Real-time stabilization of long-range observation system turbulent video, *Proc. Real-Time Image Processing/Electronic Imaging 2007*, SPIE Vol. 6496, pp. 12-22, San-Jose, CA, USA, 28 January - 1 February 2007 (with L.P. Yaroslavsky, I.A. Ideses, A. Shtern, and O. Ben-Zvi)
- 3D Video from 2D MPEG streams, Methods and applications, *ICO Topical Meeting on, Optoinformatics*, pp. 136-137, Saint-Petersburg, Russia, 4-7 September 2006 (with L.P. Yaroslavsky, I.A. Ideses, R. Vistuch and L. Ridel)
- Simple methods for real time stabilization of turbulent video, *ICO Topical Meeting on, Optoinformatics*, pp. 138-140, Saint-Petersburg, Russia, 4-7 September 2006 (with L.P. Yaroslavsky, I.A. Ideses, D. Slasky and Z. Hadas)
- Restoration of atmospheric turbulent video containing real motion using elastic image registration, *Proc. the 2004 European Signal Processing Conference (EUSIPCO-2004)*, pp. 477-480, Vienna, Austria, 6-10 September 2004 (with Sh. Gepshtein, A. Shtainman, and L.P. Yaroslavsky)
- Processing and Fusion of Thermal and Video Sequences for Terrestrial Long Range Observation Systems, *Proc. the 7th International Conference on Information Fusion*, pp. 848-855, Stockholm, Sweden, June 2004 (with L. Yaroslavsky, A. Shteinman and Sh. Gepshtein)

REFERENCES

Available upon request