

## Curriculum Vitae

### ALFRED M. BRUCKSTEIN

Technion Ollendorff Professor in Science, Fellow of SIAM

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### PROFESSIONAL INTERESTS

*Research* - Image and Signal Processing, Image Analysis (a.k.a. Computer Vision), Computer Graphics, Pattern Recognition, Robotics and Ants, Applied Geometry, Direct and Inverse Scattering, Estimation Theory in Signal and Image Processing, Point Processes in Neurophysiological Modelling, Array Processing.

*Teaching* - Stochastic Processes, Point Processes, Signal Processing, Linear Estimation and Scattering Theory, Biological Signals and Systems, Computer Graphics, Image Processing, Image Analysis, Introduction to Robotics, Applied Geometry, Discrete Mathematics.

### EDUCATION

1980-1984: PhD in EE, STANFORD U., Stanford, Ca 94305, USA.

1979-1980: MSc in EE, TECHNION, I.I.T., Haifa, 32000, Israel.

1973-1977: BSc in EE, cum laude, TECHNION, I.I.T., Haifa, 32000, Israel.

### EMPLOYMENT

February 1999 - present, Ollendorff Professor: Technion's Ollendorff Chair in Science, Computer Science Department, TECHNION, I.I.T.

March 2009 - present, Visiting Professor, School of Mathematics and Physical Sciences, Nanyang Technological University, Singapore.

January 2007 - January 2012, Head of Technion's Excellence Program, Technion, I.I.T.

October 2002 - January 2006, Dean of the Technion Graduate School, TECHNION, I.I.T.

February 2005, Visiting Professor, Electrical Engineering Department, Karlsruhe University, Germany.

January 2002 - December 2003, Visiting Chaired Professor, Tsinghua University, Beijing, China.

Summer 2000, Visiting Professor, Lucent Technologies, Bell Labs, MURRAY HILL, New Jersey, USA.

Summer 1999, Visiting Professor, Lucent Technologies, Bell Labs, MURRAY HILL, New Jersey, USA.

October 1998 - October 2002, Deputy Dean, Technion Graduate School, I.I.T.

Summer 1998, Visiting Professor, Lucent Technologies, Bell Labs, MURRAY HILL, New Jersey, USA.

November 1995 - February 1999, Professor, Computer Science Department, TECHNION, I.I.T.

April 1995 - September 1997, Member of Technical Staff, Bell Laboratories, AT&T and Lucent Technologies, MURRAY HILL, New Jersey, USA, (on sabbatical leave from the Technion).

Summer 1994, Visiting Professor, A.T.&T. Bell Labs, MURRAY HILL, New Jersey, USA.

Summer 1992, Visiting Professor, A.T.&T. Bell Labs, MURRAY HILL, New Jersey, USA.

Summer 1991, Visiting Professor, A.T.&T. Bell Labs, MURRAY HILL, New Jersey, USA.

Summer 1990, Visiting Professor, A.T.&T. Bell Labs, MURRAY HILL, New Jersey, USA.

Summer 1989, Visiting Professor, A.T.&T. Bell Labs, MURRAY HILL, New Jersey, USA.

Summer 1987, Visiting Assist. Prof., A.T.&T. Bell Labs, MURRAY HILL, New Jersey, USA.

Summer 1986, Visiting Assist. Prof., EE Dept., STANFORD UNIVERSITY, California, USA.

Summer 1985, Visiting Assist. Prof., EE Dept., STANFORD UNIVERSITY, California, USA.

June 1989 - November 1995, Associate Professor, CS Department, TECHNION, I.I.T.

December 1988 - June 1989, Associate Professor, EE and CS Departments, TECHNION, I.I.T.

December 1987- December 1988, Tenured Senior Lecturer, EE Department, TECHNION, I.I.T.

October 1984- December 1987, Lecturer, EE Department, TECHNION, I.I.T.

1980-1984, Research Assistant, EE Dept., STANFORD UNIVERSITY.

1979-1980, Teaching Assistant, EE Dept., TECHNION, I.I.T.

1977-1979, Military Service, I.D.F.

## TEACHING EXPERIENCE

- 1984-present. Teaching at the Technion, I.I.T., Haifa and at NTU, Singapore, undergraduate courses of Introduction to Robotics, Computer Graphics, Computer Graphics Laboratory, Discrete Mathematics, Combinatorics, Introduction to Signal and Image Processing, and graduate courses in Image Processing, Pattern Recognition Computer Vision, Robotics and Ant Robotics and Applied Geometry, Groups and Symmetries.
- 1979-1980. Teaching Assistant at the Technion, I.I.T., in undergraduate and graduate courses of Biological Signals and Systems, Visual and Auditory Systems and Digital Communications.

## RESEARCH EXPERIENCE

- 1984-present. Research in image processing, computer vision and robotics, in particular on image digitization issues, bit allocation problems, shape from shading algorithms, geometric probing, ant-robotics, pattern recognition methodologies, planar shape analysis and visual inspection methods.
- 2007-present (part-time). Research on Variational Image Analysis, Applied Geometry and Interactive Animation Methods at NTU, Singapore.
- 1997-2001 (summers). Research on Image Analysis and Processing with Drs.R.J. Holt and Arun N. Netravali at Bell Laboratories, Lucent Technologies.
- 1995-1997 (sabbatical). Research on various image analysis and image processing topics, with Dr. Arun N. Netravali, Dr. Robert Holt and Dr. Tom Richardson, at Bell Laboratories (AT&T and Lucent Technologies).
- 1994 (summer). Research on object tracking from time varying images and on camera calibration with Prof. Tom Huang and Drs. Robert Holt and Arun N. Netravali at AT&T Bell Laboratories.
- 1992 (summer). Research on object tracking from time varying images with Drs. Robert Holt and Arun N. Netravali at AT&T Bell Laboratories.
- 1991 (summer). Research on shape identification under partial occlusion and general viewing transformations, with Drs. Thomas Richardson, Robert Holt and Arun N. Netravali, at AT&T Bell Laboratories.
- 1990 (summer). Research on shape identification under partial occlusion and general viewing transformations, with Dr. Arun N. Netravali, at AT&T Bell Laboratories.
- 1989 (summer). Research on design of shapes for precise location and registration, with Dr. A. Orbitsky and Dr. L. O’Gorman, on halftoning problems and document processing with Dr. Arun N. Netravali and on shape description with Dr. H.V. Jagadish, at the Computer Systems Laboratory, A.T.&T. Bell Laboratories, Murray Hill, New Jersey.
- 1987 (summer). Research on minimal energy interpolation curves and other problems in computer graphics and vision, with Dr. Arun N. Netravali at the Computer Systems Laboratory, A.T.&T. Bell Laboratories, Murray Hill, New Jersey.

- 1986 (summer). Research on inverse scattering, discrete Schrodinger equations, and related topics, with Prof. T. Kailath at Stanford University.
- 1985 (summer). Research on inverse scattering, fast estimation algorithms and discrete Schrodinger equations, with Prof. T. Kailath at Stanford University. Worked also on array processing algorithms and their application to echo retrieval problems, with Dr. T.J. Shan at Stanford.
- 1980-1984. Research in scattering theory, estimation and control with Prof. T. Kailath at the Information Systems Laboratory, Stanford University. Applied various results of direct scattering theory to fast state ace estimation algorithms, analyzed and exploited connections between inverse scattering problems and given covariance estimation methods.
- 1982/1983 (summers). Investigation of inverse scattering problems and differential methods for their solution - with Prof. B. C. Levy at the Laboratory for Information and Decision Systems, EE Dept., M. I. T.
- 1982 (autumn). Analysis and modeling of the evoked responses in the visual system of the fly - with Prof. H. A. K. Mastebroek and the Biophysics Group at the University of Groningen, Holland.
- 1977-1981. Research in mathematical modeling of neural coding processes - at the Technion, I.I.T. (and in the summer of 1981 at the Man-Vehicle Lab, M. I. T.), Analysis of the adaptive responses of neurons using selfexciting stochastic point process models.

## **INDUSTRY CONSULTING**

- 1985-1994. Consultant to Galai Laboratories, Migdal Haemek, Israel. Participated in the design and development of advanced computerized inspection, shape analysis and image processing systems.
- 1987-2001. Consultant to Lucent Technologies on image analysis and (from 1997) on special omnivision cameras, image watermarking and holographic image representation methods.
- 2000-2001. Consultant to JiGami Corporation (Net2Wireless) on image compression and representation technologies.
- 2004-2005. Consultant to O-Plus on deinterlacing and adaptive scaling of images (presently Intel corporation).
- 2005 - 2007. Consultant and Member of Technical Advisory Board, Camero-Tech Ltd., Kfar Netter, Israel.
- 2005 - 2007. Consultant to Samsung Telecom Research Israel (STRI) Israel, Herzeliya, Israel.
- 2009 - 2010. Consultant and Member of Technical Advisory Board, Novafora Ltd., San Jose, CA, USA.
- 2000-present. Consultant to Ardia Corporation on pathological diagnostics by image analysis and on telepathology.
- 2001 - present. Consultant and Member of Technical Advisory Board, MediGuide Corporation, Haifa, Israel (presently St. Jude Medical Co.).
- 2003 - present. Founder and Member of the Technical Staff of Agileye Technologies Ltd, Haifa, Israel (Technion Consulting Company).

## **FELLOWSHIPS, AWARDS AND HONORS**

- Rothschild Fellowship for Ph.D. Studies, 1980-1981.
- The TAUB Award in Computer Science, 1989-1990.
- Theeman Travel Grant of the Australian Technion Society for a Professional Visit to Australian Universities, 1992.
- Honorable Mention of the Pattern Recognition Society for an Outstanding Contribution to the Pattern Recognition Journal, September 1992, for the paper Probabilistic Hough Transform with N. Kiryati.
- The Hershel Rich Technion Innovation Award for the development of DigiDURER, a Digital Engraving System, 1993 (jointly with Dr. Yachin Pnueli).
- The paper "Why the Ant Trails Look so Straight and Nice" selected as a "top science story in 1993" by DISCOVER Magazine, in the field of Mathematics. The paper was also reviewed in SCIENCE Magazine and in the NEW SCIENTIST (with full page review devoted to it, authored by Prof. Ian Stewart) and several other journals and newspapers worldwide during 1994.

The Hershel Rich Technion Innovation Award for 2002, jointly with Adi Bar-Lev and Prof. Gershon Elber, for the development of Virtual Marionettes, a Computerized Marionette Theater System, 2002.

SIAM Fellow, 2014 for contributions to Signal and Image Processing and Ant Robotics.

2014 SIAG/Imaging Science Prize (for the paper "From Sparse Solutions of Systems of Equations to Sparse Modeling of Signals and Images" with David Donoho and Michael Elad), 2014.

2018 Doctor Honoris Causa of Agora University, Oradea, Romania.

2018 IEEE Signal Processing Society Sustained Impact Paper Award (for the paper "K-SVD: An Algorithm for Designing Overcomplete Dictionaries for Sparse Representation" with Michal Aharon and Michael Elad), IEEE Transactions on Signal Processing, Vol. 54/11, November 2006.

## **FUNDED RESEARCH**

Research on Image Digitization funded for 1987-1988 by the Foundation for Research in Electronics Computers and Communications, administered by the Israeli Academy of Sciences and Humanities (\$ 60,000 with Nahum Kirayti my PhD student, now Professor at Tel Aviv University).

Research on Shape Probing, funded for 1991-1992 by the Ministry of Science and Technology (\$ 40,000 with Michael Lindenbaum, my PhD student, now Professor at Technion).

Research on Image and Action, funded by the Ministry of Science and Technology 1998 (\$ 150,000 with colleagues).

Research on Image Space Technologies for Vision and Robotics, 1998 (\$ 576,000 with colleagues).

Research on "Image Processing Software", Funded by the CS-STL grant 1998 (\$30,000 with Prof. Michael Lindenbaum).

Research on Image Space Technologies for Vision and Robotics, 1999 (\$187,000 with colleagues).

Research on Image Based Wafer Inspection, funded by Applied Materials 1999 - 2001(\$150,000 with colleagues).

Research on Ant Robotics and Internet Search with Distributed A(ge)nts, Funded by the CS-STL grant, 1999-2000 (\$45,000 with colleagues).

Research on Graphics and Imaging, Funded by a grant from Mr. George Haber, founder of Compcore and Gigapixel Corporations, 2000-2001 (\$25, 000).

Research on Image Based Wafer Inspection, funded by the WFCM Consortium, 2000-2004 (\$900,000 with colleagues).

Research on Optimal Registration Fiducials, funded by the KLA and The Ministry of Trade, via a Magnetron Program, 2001-2002 (\$30,000).

Research on "The Computerized Marionette Theater", funded by the CS-STL grant, 2002-2003, (\$25,000)

Research on Image Segmentation via Advanced Edge Integration Processes, funded by the Israel Science Foundation, 2002-2004 (270,000 NIS with Prof. Ron Kimmel).

Research on Medical Tele-Diagnostics Based on Geometric Image Analysis and Statistical Machine Learning, funded by the Ministry of Science, 2002-2004 (700,000 NIS with colleagues)

Research on Image Analysis, funded by the Applied Materials, 2003-2004, (\$47,500).

Research on Artistic Rendition of Images, funded by the CS-STL, 2003-2004, (\$17,000 with Prof. Gill Barequet)

Research on Multi-Robot Teamwork: From Small Teams to Large Swarms, funded by the Ministry of Science, 2004-2007 (412,000 NIS with colleagues)

Research on Intelligent Swarms, funded by the Ministry of Defence, 2004-2006, (\$90,000).

Research on Computational and Cognitive Vision Systems: A Training European Network (VISIONTRAIN) under contract no. MRTN-CT-2004-005439, 2005 - 2009, (325,000 Euro with Profs. Michael Lindenbaum, Ron Kimmel and Ehud Rivlin)

Research on Intelligent Swarms of Robots and Sensors, funded by Dvora foundation, 2005-2006 (\$25,640).

Research on Face Anthropometric Pattern Recognition Technology, Based on 3D Reconstruction Technology, for Computer Aided Diagnosis of Human Genetic Disorders, funded by United States Israeli Binational Science Foundation (BSF), 2005-2008 (\$85,000 with Dr. Dan Waisman, Profs. Ehud Rivlin, Ron Kimmel - Technion, and Prof. Polina Golland from MIT).

Research on Sparseness and over-completeness in signal representation - design of optimal transforms, funded by Israel Science Foundation (ISF), 2005-2007 (158,000 NIS for the 1st year with Dr. Michael Elad).

Research on 3D Vision Based Manufacturing, funded by General Motors Foundation, 2006-2007, (\$40,000).

Research on Setting a Cornerstone for Nano-swarms, funded by Russell Berrie Nanotechnology Institute, Technion, 2006-2007 (\$35,000 with Prof. Elon Rimon).

Research on Development of methods combining time-lapse photography with computerized image analysis for the study of angiogenesis, funded by The Center of Complexity Science (CCS) - Horowitz Fund, 2007-2009 (\$33,000 per year with Prof. Gera Neufeld).

Research on Autonomous Unmanned Aerial Vehicle Flocks: Optimal Self-Organization and Control for Search and Hunt Missions, funded by The Technion Autonomous Systems Program, 2008-2009 (\$34,000 with Dr. Pini Gurfil).

Research on Sparse Models, Algorithms, and Learning for Large-scale data (SMALL), funded by European Commission, FP7, 2009-2012 (360,000 Euro with Prof. Michael Elad).

Research on Over-Parameterized Variational Methods in Signal and Image Analysis, funded by Israel Science Foundation (ISF), 2009-2013 (170,000 NIS per year).

Research on Fronts and Interfaces in Science and Technology (FIRST), Marie Curie Actions - Networks for Initial Training (ITN), funded by European Commission, FP7, 2010-2014 (539,000 Euro with Haim Brezis, Jacob Rubinstein, Gershon Wolansky and Ron Kimmel).

Research on Multi Agents Micro robotics for Security Tasks, funded by Technion's Center for Security Science and Technology, 2011-2012 (200,000 NIS with Elon Rimon).

Research on Optimal Self-Organization and Self-Assembly in Multi-Robot Systems, funded by The Technion Autonomous Systems Program, 2011-2012 (\$25,000 with Pini Gurfil).

Research on Autonomous Collaborative Data Fusion and Optimization Infrastructure for Transportation Systems, funded by The Technion Autonomous Systems Program, 2011-2012 (\$20,000 with Yoram Shiftan).

Research on Security Events Analysis Based on Anomalies Detection Mobile Networks Traffic, funded by Robert Shillman Fund for Global Security - Technion North-Eastern Partnership, 2012-2012 (\$40,000).

Research on Enhanced Active Vision, funded by Broadcom Foundation, 2012-2014 (\$75,000).

Research on Controlled Swarms, funded by Israeli Ministry of Defense, 2012-2013 (120,000 NIS).

Research on Aquatic Swarms, funded by Technion's Center for Security Science and Technology, 2013-2014 (200,000 NIS with Amir Degani).

Research on Dynamic On-Demand Efficient Urban Transportation Infrastructure, funded by The Technion-Cornell Joint Research Fund, 2014-2015 (\$25,000).

Research on "Intelligent Swarms Optimal Dynamic Coverage Infrastructure for Large-Scale Fleets of VISINT / SIGINT Reconnaissance UAVs", funded by Technion's Center for Security Science and Technology, 2015-2016 (120,000 NIS with Yoram Shiftan).

Research on "Efficient Real-Time Infrastructure for Rapid Identification and Localization of Emergencies and Security Threats using Mobile Networks Data", funded by Robert Shillman Fund for Global Security - Technion North-Eastern Partnership, 2015-2016, (\$42,554).

Research on Controlled Swarms, funded by Israeli Ministry of Defense, 2015-2016 (148,725 NIS).

Research on Autonomous Endoscopy Based on Photometric 3D Sensing and Guidance Control and Viscous-Elastic Propulsion Mechanism, funded by The Technion Autonomous Systems Program, 2015-2016, (\$80,000 with Ron Kimmel and Amir Gat).

Research on Controlling an Airborne Multi-Agent Robotic System (MARS) with Limited Sensory Capabilities, funded by The Technion Autonomous Systems Program, 2016-2017, (\$44,000).

Research From Grassmannian Packings to Holographic Coding and Data Representations, with Prof. San Ling, Nanyang Technological University funded by Israel Science Foundation (ISF), 2016-2019 (219,000 NIS per year).

Research on Broadcast Control of a Swarm of Simple Airborne A(ge)nts, funded by The Israeli Ministry of Defense, 2017-2019, (850,000 NIS).

Research on Swarm Smarts: Decision Making in Biological and Synthetic Swarms, funded by Israel Science Foundation (ISF), 2018-2022 (249,000 NIS per year).



## EDITORIAL BOARDS AND CONFERENCE PROGRAM COMMITTEES

Editorial Board of the Journal on Pattern Recognition, edited by Dr. R. Ledley, from 1993 till 2004.

Editorial Board of the International Journal of Imaging Systems and Technology, edited by Dr. Z.H. Cho and Dr. L.A. Shepp, from 1994 till 2010.

Editorial Board of the Circuits, Systems and Signal Processing Journal, edited by Prof. M.N.S. Swamy and previously by Prof. A. Zemanian, from 1995 till 2004.

Editorial Board of the SIAM Journal on Imaging Sciences, edited by Guillermo Sapiro and Jean Michel Morel, from 2007 till 2014.

Editorial board of the Journal of Mathematical Imaging and Vision (JMIV) edited by Gerhard Ritter, from 2009 till 2015.

Editorial Board of Pattern Recognition, The Journal of the Pattern Recognition Society edited by Ching Y. Suen, from 2011 till 2014.

Program Committee of the 6th Israeli AI and CV Conference, 1989.

Program Committee of the 10th International Conference on Pattern Recognition, ICPR'90, Atlantic City, 1990.

Chairman of Computer Vision Track at the 7th Israeli AI and CV Conference, 1990.

Program Committee of the 8th Israeli AI and CV Conference, 1991.

Chairman of the 1992 Italy-Israel Workshop in Computer Vision, June 1992.

Program Committee of NGITS 93, The International Workshop on Next Generation Information Technologies and Systems, Haifa, Israel, June 1993.

Program Committee of the 2nd International Workshop on VISUAL FORM, Capri, Italy, May-June 1994.

Program Committee of the 12th International Conference on Pattern Recognition, ICPR' 94, Jerusalem, Israel, October 1994.

Co-Chair of the 1994 SSPR Workshop on Structural and Syntactic Pattern Recognition, Nahariya, Israel, October 1994.

Program Committee of the 3rd International Workshop on VISUAL FORM, Capri, Italy, May, 1997.

Program Committee of the First International Conference on Scale-Space Theory in Computer Vision, Utrecht, Holland, July 1997.

Program Committee of the Second International Conference on Scale-Space Theory in Computer Vision, Corfu, Greece, September 1999.

Program Committee of CAIP'99, International Computer Analysis of Images and Patterns, Ljubljana, Slovenia, September 1999.

Program Committee of FSPIPA Workshop on Image Structure, Budapest, Hungary, September 1999.

Program Committee of the ANTS'2000 Conference, Bruxelles, Belgium, September 2000.

Co-Organizer of the 2000 Dagstuhl Seminar on Multi-Image Search, Filtering, Reasoning and Visualization, Schloss Dagstuhl, Germany, March 2000.

Program Committee of the Third International Conference on Scale-Space Theory in Computer Vision, Vancouver, Canada, July 2001.

Program Committee of the International Conference on Pattern Recognition ICPR-2002, Quebec City, Canada, August 2002.

Scientific Committee of the Mathematics and Image Analysis, MIA'02, Paris, France, September 2002.

Program Committee of International Workshop on Combinatorial Image Analysis, IWCIA 2003, Palermo, Italy, May 2003.

Program Committee of Scale Space 2003, Isle of Sky, Scotland, United Kingdom, June 2003.

Program Committee of European Conference on Computer Vision, ECCV 2004, Prague, Czech Republic, May 2004.

Program Committee of the 17th International Conference on Pattern Recognition, ICPR-2004, Cambridge, United Kingdom, August 2004.

Program Committee of IEEE International Conference on Image Processing, ICIP-2004, Singapore, October 2004.

Program Committee of the 5th International Conference on Scale Space and PDE Methods in Computer Vision, Scale Space 2005, Schlöbchen Schönburg, Hofgeismar, Germany, April 2005.

Program Committee of the Genetic and Evolutionary Computation Conference, GECCO-2005, Washington D.C., USA, June 2005.

Technical Program Committee of IEEE International Conference on Image Processing, ICIP-2005, Genova, Italy, September 2005.

Program Committee of the 3rd IEEE Workshop on Variational, Geometric and Level Set Methods in Computer Vision, VLISM'05, Beijing, China, October 2005.

Program Committee of 1st International Symposium on Brain, Vision and Artificial intelligence, BVAI 2005, Naples, Italy, October 2005.

Program Committee of the IEEE International Conference on Acoustics, Speech and Signal Processing, ICASSP-2006, Toulouse, France, May 2006.

Program Committee of the European Conference on Computer Vision, ECCV 2006, Graz, Austria, May 2006.

Program Committee of the International Conference on Pattern Recognition ICPR-2006, Hong Kong, China, August 2006.

Program Committee of 2nd Workshop on Multi Agents Robotics Systems (MARS) at the 3rd International Conference on Informatics in Control, Automation and Robotics (ICINCO 2006), Setubal, Portugal, August 2006.

Technical Program Committee of IEEE International Conference on Image Processing, ICIP-2006, Atlanta, USA, October 2006.

Program Committee of 3rd Workshop on Multi Agents Robotics Systems (MARS) at the 4th International Conference on Informatics in Control, Automation and Robotics (ICINCO 2007), Angers, France, May 2007.

Co-Chair of 1st International Conference on Scale Space and Variational Methods in Computer Vision (SSVM 2007), Ischia, Italy, May-June 2007.

Program Committee of 9th Biennial Israeli Symposium on the Foundations of AI (BISFAI'07), Ramat Gan, Israel, June 2007.

Program Committee of International Workshop on Nonlinear Signal and Image Processing, NSIP 2007, Bucharest, Romania, September 2007.

Technical Program Committee of IEEE International Conference on Image Processing, ICIP-2007, San Antonio, Texas, USA, September 2007.

Program Committee of 2nd International Symposium on Brain, Vision and Artificial intelligence, BVAI 2007, Naples, Italy, October 2007.

Program Committee of 3rd International Conference on Computer Vision Theory and Applications (VISAPP 2008), Funchal, Madeira - Portugal, 22-25 January, 2008.

Program Committee of The 33rd International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2008), Las Vegas, March 30 - April 4, 2008.

Program Committee of International Workshop on Combinatorial Image Analysis, IWZIA 2008, Buffalo, NY, USA, April 7-9, 2008.

Reviewing Committee of 14th IAPR International Conference on Discrete Geometry for Computer Imagery (DGCI 2008), Lyon, France, 16-18 April, 2008.

Program Committee of International Symposium on Electronics and Telecommunications 2008, Timisoara, Romania, September 25-26, 2008.

Co-Chair of Image and Signal Processing Track of the 19th International Conference on Pattern Recognition (ICPR 2008), Tampa, Florida, USA, December 8-11, 2008.

Program Committee of 2nd International Conference on Scale Space and Variational Methods in Computer Vision (SSVM 2009), Voss, Norway, June 1-5, 2009.

International Technical Program Committee of the 9th International IEEE Symposium on Signals, Circuits, and Systems (ISSCS-09), Iasi, Romania, July 2009.

Program Committee of 2nd Workshop on Non-Rigid Shape Analysis and Deformable Image Alignment (NORDIA'09), 27 September 2009, Kyoto, Japan (in conjunction with ICCV'09)

Reviewing Committee of IEEE International Conference on Image Processing, ICIP-2009, Cairo, Egypt, November 7-11, 2009.

Program Committee of the 13<sup>th</sup> International Workshop on Combinatorial Image Analysis (IW-CIA 2009), Playa del Carmen, Mexico, November 24-27, 2009.

Program Committee of Track Signal & Image Technologies (SIT) of the 5<sup>th</sup> International Conference on Signal-Image Technology & Internet-Based Systems, SITIS'09, Marrakech, Morocco, November 29 - December 4, 2009.

Scientific Committee of the seventh SMAI-AFA conference on Curves and Surfaces 2010, Avignon, France, June 24-30, 2010.

Technical Program Committee of 20th International Conference on Pattern Recognition (ICPR 2010), Istanbul, Turkey, August 23-26, 2010.

Co-organizer of Dagstuhl Seminar on Innovations for Shape Analysis: Models and Algorithms, Dagstuhl, Germany, April 3-8, 2011.

Program Committee of the 14<sup>th</sup> International Workshop on Combinatorial Image Analysis (IW-CIA 2011), Madrid, Spain, May 23-25, 2011.

Co-Chair of 3rd International Conference on Scale Space and Variational Methods in Computer Vision (SSVM 2011), Ein Gedi, Israel, May 29 - June 2, 2011.

Program Committee of the Computer Graphics International (CGI) Conference, Ottawa, Ontario, Canada, June 13-15, 2011.

International Technical Program Committee of the 2011 International IEEE Symposium on Signals, Circuits, and Systems (ISSCS-2011), Iasi, Romania, June 30 - July 1, 2011.

Program Committee of the 16<sup>th</sup> International Conference on Image Analysis and Processing (ICIAP 2011), Ravenna, Italy, September 14-16, 2011.

Program Committee of The International Conference on Computer Vision Theory and Applications (VISAPP'12), Rome, Italy, February 24-26, 2012.

Technical Program Committee of the 5th International Symposium on Communications, Control, and Signal Processing (ISCCSP 2012), Rome, Italy, May 2-4, 2012.

Program Committee of 8<sup>th</sup> International Conference on Swarm Intelligence (ANTS 2012), Brussels, Belgium, September 12-14, 2012.

Program Committee of 8<sup>th</sup> International Conference on Computer Vision Theory and Applications (VISAPP 2013), Barcelona, Spain, February 21-24, 2013.

Program Committee of the 4th International Conference on Scale Space and Variational Methods in Computer Vision (SSVM 2013), Schloss Seggau, Graz region, Austria, June 2-6, 2013.

Program Committee of the 18th Vision, Modeling, and Visualization 2013 (VMV 2013) Workshop, Lugano, Switzerland, September 11-13, 2013.

Program Committee of 9th International Conference on Computer Vision Theory and Applications (VISAPP 2014), Lisbon, Portugal, January 5-8, 2014.

Program Committee of 10th International Conference on Computer Vision Theory and Applications (VISAPP 2015), Berlin, Germany, March 11-14, 2015.

Co-organizer of Conference and Summer School on Imaging for Medical Applications (SSIMA), Sinaia, Romania, June 29 - July 4, 2015.

Program Committee of the 5th International Conference on Scale Space and Variational Methods in Computer Vision (SSVM 2015), Lege Cap Ferret, France, May 31 - June 4, 2015.

Co-organizer of IPAM Workshop on Culture Analytics Beyond Text: Image, Music, Video, Interactivity and Performance, UCLA, Los Angeles, USA, March 21 - 24, 2016.

Co-Organizer of the SSIMA Workshop and Summer School on Imaging for Medical Applications, (Imaging in Cardiology), Bucharest, Romania, July 4-8, 2016.

Program Committee of the PhyCS 201, Lisbon, Portugal, July 27-28, 2016.

Program Committee of the ACIVS 2016 Conference, Lecce, Italy, October 24-27, 2016.

Program Committee of the ACCV 2016 Workshop on DGMM4CV, Taipei, Taiwan, November 20-24, 2016.

Program Committee of the SITIS 2016, Naples, Italy, November 28 - December 1, 2016.

Editorial Board of IJCCC International Journal of Computers Communication & Control, from 2018.

Scientific Board of the SSIMA Workshop and Summer School on Imaging for Medical Applications, Sibiu, Romania, July 2-6, 2018.

Editorial board of Computer Vision and Graphics - International Conference, ICCVG 2018 Proceedings, Warsaw, Poland, September 17-19, 2018.

Co-organizer of Workshop on Shape Analysis: Euclidean, Discrete and Algebraic Geometric Methods, Dagstuhl, Germany, October 14-19, 2018.

Program Committee of of the conference Applications of Intelligent Systems, APPIS 2018, Las Palmas de Gran Canaria, Spain, January 7-12, 2019.

Program Committee of of the 14th International Conference on Computer Vision Theory and Applications, VISAPP 2019, Prague, Czech Republic, February 25-27, 2019.

Editorial board of Computer Vision and Graphics - International Conference, ICCVG 2018 Proceedings, Warsaw, Poland, September 17-19, 2018.

Editorial board of International Journal of Computers Communication and Control (IJCCC) 2018.

## **TECHNION ADMINISTRATIVE JOBS**

- 1997 – 1999 Senior Staff Promotions Preparatory Committee
- 1999 – 2002 Chairman of Professional Committee for Staff Promotion
- 1997 – 2001 Deputy Dean for Undergraduate Studies of the CS Department
- 1998 – 2002 Deputy Dean of the Technion Graduate School
- 2002 – 2006 Dean of the Technion Graduate School
- 2007 – 2012 Head of Technion’s Excellence Program
- 2008 – present. Scientific Advisory Board, Board of Governors of the National Museum of Science, Haifa, Israel
- 2008 – present. Board of Governors of PeKa Art Gallery - Technion, IIT
- 2011 – present. Board of Advisors of the Neeman Institute, Technion, IIT
- 2011 – present. Board of Governors of Technion - Microsoft Research Institute.

## **NATIONAL/INTERNATIONAL ADMINISTRATIVE APPOINTMENTS**

- Cyprus Higher Education Evaluation Committee (1996)
- Scientific Advisory Board of the DI-ENS, École normale supérieure de Cachan, Paris, France (2012)
- ERC Grants Evaluation committee (2012, 2014, 2016)
- Hong Kong Higher Education Evaluation Committee (2014)
- Israel Prize Committee (2011)
- ISF Grants Committee (2008, 2009)
- 2016 Scientific Advisory Board of the DI-ENS, École normale supérieure, Rue D’Ulm, Paris, France
- 2012 – present, Chateaubriand Grants Jury
- 2013 – present, ICORE Steering Committee
- 2013 – present, Board of Advisors of the Rafael Ltd, Israel
- 2014 – present, National Infrastructure Committee of MALAG.

## **MEMBERSHIPS IN PROFESSIONAL SOCIETIES**

SIAM, AMS, MAA, IEEE, IAPR, IROB - The Israeli Robotics Association.

## **EXTRAPROFESSIONAL INTERESTS**

Graphics, Logo Design (designed the logos for: the Computer Science Department, the Graduate School, Technion’s Chais Excellence Program, the Center for Intelligent Systems, the Laboratories for Parallel Computation Research the Laboratory for Computer Communication Networking, and

the Computational Linguistics Lab at the Technion, Bell-Labs' Murray Hill Library, Kluwer's Annals of Math and Artificial Intelligence Journal, for the (ISTCS, NGIT, SSPR, CVPR2001 and several other conferences) and for Prentice Hall's Information Systems Science Series of books), Ink Drawing and Book Illustration (illustrated several books, most of them authored by the late JL (Joseph-Leib/Arye (Ludovic)) Bruckstein), Art and Art history, Poetry, Travel, collecting Walking-Canes, and other interesting things and devices.

## LECTURES AT CONFERENCES/WORKSHOPS

1. Bruckstein, A.M., Zeevi, Y.Y., "COMPARISON OF SSIPFM National IEEE Convention , Tel Aviv , Israel, 1977.
2. Bruckstein, A.M., Zeevi, Y.Y., "ANALYSIS OF A NONLINEAR NEURONAL ENCODER MODEL", 11'th National IEEE Convention, Tel Aviv, Israel, 1979.
3. Bruckstein, A.M., Kailath, T., "ON SLIDING WINDOW KALMAN FILTERING AND SCATTERING THEORY", 16th Asilomar Conf. on Circuits, Systems and Computers, Monterey, California, 1982.
4. Kwon, W.H., Bruckstein, A.M., Kailath, T., "STABILIZING STATE-FEEDBACK DESIGN VIA THE MOVING HORIZON METHOD", 21st IEEE CDC Conference, Orlando, Florida, 1982.
5. Bruckstein, A.M., "ON THE INVARIANT MEASURES OF SOME DISCRETE-TIME MARKOV PROCESSES", Int. Symposium on Information Theory, Ste-Jovite, Canada, 1983.
6. Bruckstein, A.M., Cover, T., "MONOTONICITY OF LINEAR SEPARABILITY UNDER TRANSLATION", Int. Symposium on Information Theory, Ste-Jovite, Canada, 1983.
7. Bruckstein, A.M., Kailath, T., "ON SCHUR ALGORITHMS FOR INVERSE SCATTERING", National Meeting of SIAM, Denver, Colorado, 1983.
8. Bruckstein, A.M., "MUSIC AND THE SHARING OF A SECRET", 17th Asilomar Conference on Circuits, Systems and Computers, Monterey, California, 1983.
9. Bruckstein, A.M., Kailath, T., "ON SCATTERING, TIME REVERSAL AND INFORMATION FORMS", 22nd CDC Conference, San Antonio, Texas, 1983.
10. Bruckstein, A.M., Fiszer, H. and Smadja, M., "ON DETERMINING THE SHAPE OF A MOUNTAIN FROM SHADING INFORMATION", Int. Symposium on Information Theory, Brighton, England, 1985.
11. Bruckstein, A.M., "ON EIGENSTRUCTURE METHODS IN SIGNAL PROCESSING", 2nd Haifa Matrix Theory Conference, Haifa, December 1985,
12. Bruckstein, A.M., "ON SOFT BIT ALLOCATION", 24'th Allerton Conference on Communication, Control and Computing, Monticello, Illinois, October 1-3, 1986.
13. Bruckstein, A.M. and Lindenbaum M., "ON A MULTIPLE REGISTRATION PROBLEM", Proc. 24'th Allerton Conference on Communication, Control and Computing, Monticello, Illinois, 1986.

14. Bruckstein, A.M., "ON OPTIMAL IMAGE DIGITIZATION", Int. Symposium on Information Theory, Ann Arbor, Michigan, 1986.
15. Bruckstein, A.M., "ON MULTIVARIABLE SCATTERING AND THE FACTORIZATION OF STRUCTURED MATRICES", 3rd Haifa Matrix Theory Conference, Haifa, January, 1987.
16. Bruckstein, A.M. and T. Kailath, "ON DISCRETE SCHRODINGER EQUATIONS AND THEIR TWO-COMPONENT WAVE-EQUATION EQUIVALENTS", First International Conference on Industrial and Applied Mathematics, ICIAM-87, La Vilette, Paris, June-July 1987.
17. Bruckstein, A.M., "INVERSE SCATTERING ALGORITHMS", SIAM Workshop on the Mathematics of Systems and Signal Processing, Stanford University, Stanford, California August-September 1987, (Invited Presentation).
18. Bruckstein, A.M., "INVERSE SCATTERING AND FAST MATRIX FACTORIZATION ALGORITHMS", International Conference on Linear Algebra and Applications, Valencia, Spain, September 1987, (Invited Special Session Presentation).
19. Bruckstein, A.M., "ON SOME MATRIX FACTORIZATION IDENTITIES AND A METHOD OF KREIN FOR SOLVING INTEGRAL EQUATIONS" 4th Haifa Matrix Theory Conference, Haifa, January, 1988.
20. Bruckstein, A.M., "ON SHAPE FROM SHADING", First Ollendorff Symposium on Computer Vision, Technion, Haifa, March 1988.
21. Bruckstein, A.M., "ON THE MINIMAL PARTIAL REALIZATION PROBLEM" 5th Haifa Matrix Theory Conference, Haifa, January, 1989.
22. Bruckstein, A.M., "GL(2,Z) AND THE SELF-SIMILARITY OF DIGITIZED LINES", 6th Haifa Matrix Theory Conference, Haifa, June, 1990.
23. Bruckstein, A.M., "THE SELF-SIMILARITY OF DIGITAL LINES", 10th International Conference on Pattern Recognition, Atlantic City, New Jersey, June, 1990.
24. Bruckstein, A.M., and Netravali, A.N., "ON DIFFERENTIAL INVARIANTS OF PLANAR CURVES AND RECOGNIZING PARTIALLY OCCLUDED PLANAR SHAPES", International Workshop on Visual Form, Capri, 1991.
25. Bruckstein, A., Katzir, N., Lindenbaum, M., and Porat, M., "SIMILARITY INVARIANT SIGNATURES FOR PARTIALLY OCCLUDED PLANAR SHAPES", Italian-Israeli Binational Symposium on Computer Vision, Capri, May, 1991.
26. Bruckstein, A.M., "THREE EASY GEOMETRIC PIECES", International Workshop on Computational Geometry, Eilat, Israel, March, 1992.
27. Bruckstein, A.M., "GEOMETRIC INVARIANTS AND APPLICATIONS", Italian-Israeli Binational Symposium on Computer Vision, Kiryat Anavim, Israel, June, 1992.
28. Bruckstein, A.M., "WHY THE ANT TRAILS LOOK SO STRAIGHT AND NICE", SIAM 40'th Anniversary Meeting, Los Angeles, California, July, 1992.
29. Bruckstein, A.M., "POLYGON EVOLUTIONS AND CIRCULANT MATRICES", 8th Haifa Matrix Theory Conference, Haifa, June 7-10, 1993.



30. Bruckstein, A.M., "ON GLOBAL OPTIMIZATION BY LOCAL INTERACTIONS" (Invited Lecture) International Conference on Control Theory and Applications, Maale HaChamisha (Zvi Artstein, organizer), October 18-21, 1993.
31. Bruckstein, A.M., "INVARIANTS FOR PLANAR SHAPE RECOGNITION AND SMOOTHING", (Invited Lecture) ECCV'94 Invariance Workshop (Luc VanGool, organizer), Stockholm, May 7, 1994.
32. Bruckstein, A.M., "INVARIANT SMOOTHING AND SHAPE RECOGNITION", (Invited Lecture) Research Conference on Mathematics of Multiscale Analysis in Image Processing (P.L. Lions, organizer), Lunteren, Holland, October 15-20, 1994.
33. Bruckstein, A.M. and Pnueli, Y., "GRIDLESS HALFTONING: A REINCARNATION OF THE OLD METHOD", (Invited Lecture), Israel-France Binational Symposium on Computer Graphics and Geometric Modeling (C. Gotsman, organizer), Herzliya, December 12-13, 1994.
34. Bruckstein, A.M., "INVARIANT SIGNATURES FOR CURVE MATCHING, SURFACE MATCHING AND SKEW-SYMMETRY DETECTION", (Invited Lecture), Italian-Israeli Workshop on Algorithmic Aspects of Molecular Biology (H. Wolfson and A. Apostolico, organizers), Padova University, Italy, December 19-23, 1994.
35. Bruckstein, A.M., "HAPPY PURSUITS", (Invited Lecture), Applications of Dynamical Systems to Biology Workshop (Shay Gueron, Nadav Liron and Gershon Wolansky, organizers), Technion, Haifa, January 4-14, 1995, and Invited Lecture at The International Conference on Communications, Computing, Control and Signal Processing, in honor of Professor Thomas Kailath, Stanford, June 22-26, 1995.
36. Bruckstein, A.M., Onn, R., Richardson, T.J., "IMPROVING THE VISION OF MAGIC EYES: A GUIDE TO BETTER AUTOSTEREOGRAMS", 1995 Stockholm Workshop on Computational Vision, Rosenon Island, Sweden, July 31- Aug 4, 1995, Int. Workshop on Computer Vision and Applied Geometry, Nordfjordeid, Norway, Aug. 1-7, 1995.
37. Bruckstein, A.M., "SCALE-SPACE INVARIANTS FOR PLANAR SHAPES" (Invited Lecture), Int. Workshop on Computer Vision and Applied Geometry, Nordfjordeid, Norway, Aug. 1-7, 1995.
38. Bruckstein, A.M, and Shaked, D., "SKEW SYMMETRY DETECTION VIA INVARIANT SIGNATURES", 6th International Conference in Computer Analysis of Images and Patterns, CAIP'95, Prague, The Czech Republic, September 6-8, 1995.
39. Bruckstein, A.M., O'Gorman, L., and Orlitsky, A., "DESIGN OF SHAPES FOR PRECISE IMAGE REGISTRATION", (Invited Plenary Lecture) 5th Discrete Geometry for Computer Imagery Workshop, Clermont-Ferrand, France, September 25-27, 1995.
40. Bruckstein, A.M., Rivlin, E. and Weiss, I., "RECOGNIZING OBJECTS USING SCALE SPACE LOCAL INVARIANTS", 13th International Conference on Pattern Recognition, Vienna, Austria, August 25-29, 1996.
41. Bruckstein, A.M, Holt, R.J., and Netravali, A.N., "DISCRETE ELASTICA", 6th Discrete Geometry for Computer Imagery Workshop, Lyon, France, November 13-15, 1996.

42. Bruckstein, A.M., "INVARIANCE IN PLANAR SHAPE ANALYSIS AND PROCESSING", (Invited Main Speaker) Mathematics for Object Recognition Workshop, Shape, Invariance and Deformations, CIRM Luminy, France, Nov. 10-14, 1997.
43. Bruckstein, A.M., Holt, R.J., Huang T.S. and Netravali A.N., "NEW DEVICES FOR 3D POSE ESTIMATION: MANTIS EYES, AGAM PAINTINGS, SUNDIALS AND OTHER SPACE FIDUCIALS, 14th International Conference on Pattern Recognition, Brisbane, Australia, August, 1998.
44. Bruckstein, A.M., "SOME REMARKS ON IMAGE WATERMARKING AND HOLOGRAPHIC REPRESENTATIONS". (Invited Presentation) Israel-New Jersey Workshop on Multimedia Technology, Tel-Aviv University, December 13-14, 1999.
45. Bruckstein, A.M., Holt, R.J., Huang, T.S and Netravali, A.N., "OPTIMUM FIDUCIALS UNDER WEAK PERSPECTIVE PROJECTIONS" International Conference on Computer Vision, Corfu, Greece, September, 1999.
46. Bruckstein, A.M., Holt, R.J., and Netravali, A.N., "SELF-SIMILAR IMAGE SAMPLING SCHEMES: HOLOGRAPHIC AND LOW DISCREPANCY PROPERTIES" (Invited Presentation) Fundamental Structural Properties in Image and Pattern Analysis Workshop, Budapest, Hungary, September, 1999.
47. Bruckstein, A.M., "FIDUCIALS FOR SELF LOCATION", The Ollendorff German-Israeli Symposium on Image processing and Computer Vision, Technion, Haifa, March 7-9, 2000.
48. Bruckstein, A.M., "SPACE FIDUCIALS FOR ROBOTIC SELF-LOCATION" Schloss Dagstuhl Workshop on Multi-Image Search, Filtering, Reasoning and Visualization, Germany, March, 2000.
49. Bruckstein, A.M., and Richardson T.J., "OMNIVIEW CAMERAS WITH CURVED SURFACE MIRRORS", IEEE CVPR Workshop on Omnidirectional Vision, Hilton Head Island, June, 2000.
50. Bruckstein, A.M., Holt, R.J., and Netravali, A.N., "HOLOGRAPHIC JPEG COMPRESSION", ICPR'2000 Conference, Barcelona, Spain, September, 2000.
51. Sochen, N., Kimmel, R. and Bruckstein, A.M., "DIFFUSIONS AND CONFUSIONS IN SIGNAL AND IMAGE PROCESSING", Mathematics and Image Analysis Workshop, Paris, France, September, 2000.
52. Lebanon G., and Bruckstein, A.M., "ON DESIGNING MOIRE PATTERNS", Visual Attention Mechanisms, "E.R. Caianiello" International School on Neural Nets, Vietri sul Mare, Salerno, Italy, October, 2000.
53. Bruckstein, A.M., "SPACE FIDUCIALS", (Invited Lecture) The Prague Spring Pattern Recognition and Computer Vision Colloquium, Prague, The Czech Republic, May, 2001.
54. Bruckstein, A.M., "INVARIANT RECOGNITION AND PROCESSING OF PLANAR SHAPES", (Invited Lecture) 4th International Workshop on Visual Form, Capri, Italy, May, 2001.
55. Bruckstein, A.M., "ON SPARSE REPRESENTATIONS IN PAIRS OF ORTHOGONAL BASES", (Invited Lecture) International Linear Algebra Conference, Haifa, June, 2001.

56. Lebanon G., and Bruckstein, A.M., "THE MAGIC OF MOIRE PATTERNS", (Invited Lecture) 2001 Stockholm Workshop on Computational Vision, Rosenon Island, Sweden, July 30-August 1, 2001.
57. Elad M., and Bruckstein, A.M., "ON SPARSE REPRESENTATIONS IN PAIRS OF ORTHOGONAL BASES", (Invited Lecture) International Conference on Image Processing, Thessaloniki, Greece, September 2001 (presented due to the "situation" by Prof. Martin Vetterli).
58. Bruckstein, A.M., "LAPLACIAN SNAKES", (Invited Lecture) Sapporo Symposium on PDE's in Image Processing, Sapporo, Japan, Nov. 8, 2001.
59. Bruckstein A.M., "DIGITAL GEOMETRY FOR IMAGE-BASED METROLOGY", (Invited Plenary Lecture) Discrete Geometry for Computer Imagery, DGCI'2002, Bordeaux, France, April 3-5, 2002.
60. Bruckstein A.M., "INSIGHTS INTO VISUALIZATION", (Keynote Lecture) International Symposium on Visualization and Imaging in Transport Phenomena, Antalya, Turkey, May 5-10, 2002.
61. Bruckstein A.M., "WHY THE ANT-TRAILS LOOK SO STRAIGHT AND NICE: OR THE MATHEMATICS OF MULTI A(GE)NT INTERACTION", (Invited Plenary Lecture) Applied Mathematics and Applications of Mathematics, AMAM 2003, Nice, France, Feb. 10-12, 2003.
62. Bruckstein A.M., "VARIATIONAL EDGE INTEGRATION", (Invited Lecture) Principal Investigators Meeting, Office of Naval Research, ONR Workshop, Minneapolis, USA, May 7-9, 2003.
63. Bruckstein A.M., "GLOBAL OPTIMIZATION VIA LOCAL INTERACTIONS", (Invited Lecture) 5th Negev Workshop on Applied Mathematics, June 17-21, 2003.
64. Bruckstein A.M., "ON VARIATIONAL EDGE DETECTION AND INTEGRATION", 5th International Congress on Industrial and Applied Mathematics, ICIAM 2003, Sydney, Australia, July 7-11, 2003.
65. Bruckstein A.M., "EDGE-FLOWS AND OPTIMAL VECTOR FIELDS", (Invited Lecture) SIAM Conference on Geometric Design and Computing, Seattle, USA, Nov. 10-13, 2003.
66. Bruckstein, A.M., "THE VARIATIONAL APPROACH TO IMAGE ANALYSIS", (Invited Lecture) 2004 Annual Meeting of the Israel Mathematical Union, Shefayim, May 2004.
67. Bruckstein A.M., "VARIATIONAL METHODS FOR IMAGE ANALYSIS: DO WE KNOW WHAT TO OPTIMIZE FOR?", (Invited Lecture) Mathematics and Image Analysis 2004, MIA'04, Paris, France, September 06-09, 2004.
68. Bruckstein A.M., "PRINCIPLES OF VISUAL SURVEILLANCE", (Invited Lecture) 1st Workshop on Integrative Information Systems for Homeland Security, Hadley, Massachusetts, USA, September 21-22, 2004.
69. Bruckstein A.M., "GRAND CHALLENGES IN IMAGE PROCESSING AND ANALYSIS", (Invited Special Session Lecturer) 11th IEEE International Conference on Electronics, Circuits and Systems, Tel Aviv, Israel, December 13-15, 2004.

70. Bruckstein A.M., "THE MATHEMATICS OF MULTI-A(GE)NT INTERACTIONS, OR HOW TO COORDINATE A SWARM OF SIMPLE ROBOTS", (Invited Lecture) Information Theory and Application (ITA) Inaugural Workshop, San Diego, USA, February 05-10, 2006.
71. Bruckstein A.M., Aharon M., Elad M., "IMAGE DENOISING VIA SPARSE AND REDUNDANT REPRESENTATIONS OVER LEARNED DICTIONARIES", 2006 SIAM Conference on Imaging Science, Mineapolis, USA, May 15-17, 2006.
72. Bronstein, A.M., Bronstein M.M., Kimmel R., Bruckstein A.M., "PARTIAL SIMILARITY OF OBJECTS AND TEXT SEQUENCES", The 2007 Information Theory and Application Workshop (ITA), San Diego, USA, Jan. 29th - Feb. 2nd, 2007.
73. Bruckstein A.M., "THE CHIMERA OF OPTIMALITY IN SIGNAL AND IMAGE PROCESSING", (Invited Lecture), The 3rd Tel-Hai Conference in Computer Science: Signal Processing and Multimedia Applications, Israel, June 14th, 2007.
74. Bruckstein A.M., "ON VARIATIONAL METHODS FOR IMAGE ANALYSIS", Ben Gurion University Interdisciplinary Vision Day (BGUVD07), Israel, June 25th, 2007.
75. Bruckstein A.M., "THE CHIMERA OF OPTIMALITY IN SIGNAL AND IMAGE PROCESSING", (Invited Lecture), 2007 Workshop on Recent Trends in Signal Processing, Technical University of Cluj-Napoca, Cluj-Napoca, Romania, July 9-10, 2007.
76. Nir T., Bruckstein A.M., "ON OVER-PARAMETERIZED MODEL BASED TV-DENOISING", International Symposium on Signals, Circuits and Systems (ISSCS 2007), Iasi, Romania, July 12-13, 2007.
77. Bruckstein A.M., "VESICLES AND AMOEBAE: ON GLOBALLY CONSTRAINED SHAPE DEFORMATION", European Visiontrain Project Meeting (FP6), Haifa, Israel, Nov. 26-27, 2007.
78. Bruckstein A.M., "FROM ANTS TO A(GE)NTS", The Israeli Association for Artificial Intelligence, IAAI07 Symposium, Ashkelon College, Israel, December 26, 2007.
79. Vainsencher D., Bruckstein A.M., "ISOPERIMETRIC PARETO-OPTIMALITY ON THE HEXAGONAL GRID", Information Theory and Applications (ITA) Workshop, San Diego, USA, January 27 - February 1, 2008.
80. Bruckstein A.M., Elad M., Zibulevsky M., "SPARSE NON-NEGATIVE SOLUTION OF LINEAR SYSTEM OF EQUATIONS IS UNIQUE", 3rd International Symposium on Communications, Control and Signal Processing (ISCCSP 2008), St. Julians, Malta, March 12-14, 2008.
81. Bruckstein A.M., "VIRTUAL HUMAN 3.0: THE VIRTUAL MARIONETTE THEATER", The NTU International Workshop on Interactive Digital Media Research, Singapore, April 28-30, 2008.
82. Bruckstein A.M. "OPTIMIZATION AND BEYOND: THE CHIMERA OF OPTIMALITY", International Workshop on Computer Vision" (IWCV'08), Venice, Italy, May 27-29, 2008 (Invited Talk).

83. Bruckstein A.M., "THE MATHEMATICS OF MULTI-A(GE)NT INTERACTION", Graph Theory, Computational Intelligence and Thought, A conference celebrating Martin Golumbic's 60th Birthday, Israel, September 21-25, 2008.
84. Bruckstein A.M. and Shaked D., "EFFICIENT SOLUTIONS FOR CRAZY-CUT PUZZLES OR CUTTING PLANAR SHAPES IN TWO IDENTICAL PARTS", Information Theory and Applications (ITA) Workshop, San Diego, USA, February 2-13, 2009.
85. Bruckstein A.M., "AN INFORMATION THEORETIC APPROACH TO TRANSLATION ESTIMATION IN IMAGE-BASED METROLOGY", (Invited lecture) WITMSE 2009, Tampere Finland, August 16-19, 2009.
86. Bruckstein A.M., "SEARCHING FOR THE BEST OF THE BEST OR THE CHIMERA OF OPTIMALITY IN SIGNAL AND IMAGE PROCESSING", (invited keynote speaker), 2009 International Workshop on Local and Non-Local Approximation in Image Processing (LNLA), Tuusula, Finland, August 19-21, 2009.
87. Bruckstein A.M. and Shaked D., "CRAZY-CUTS: DISSECTING PLANAR SHAPES INTO TWO IDENTICAL PARTS", (Invited Talk), IMA Mathematics of Surfaces XIII conference, The University of York, UK, September 7-9, 2009 .
88. Elad M., and Bruckstein A.M., "ON GLOBALLY OPTIMAL LOCAL MODELING: FROM MOVING LEAST SQUARES TO OVER-PARAMETRIZATION", (Invited Lecture), workshop on Sparse Representation of Multiscale Data and Images: Theory and Applications, the Institute of Advanced Study, the Nanyang, Technological University, Singapore, December 14-17, 2009.
89. Bruckstein A.M., "THE CHIMERA OF OPTIMALITY IN SIGNAL AND IMAGE PROCESSING", (Plenary Talk), Israel Machine Vision Conference (IMVC 2010) 2010, Avenue Conference Center, Airport City, Israel, January 28th, 2010.
90. Bruckstein A.M., "VARIATIONAL PHOTOMETRIC STEREO", (Invited Talk) 2010 SIAM Conference on Imaging Science, Chicago, USA, April 12-14, 2010.
91. Bruckstein A.M., "ON GLOBALLY OPTIMAL LOCAL MODELING: FROM MOVING LEAST SQUARE TO OVERPARAMETRIZATION", (Invited Talk) 2010 SIAM Conference on Imaging Science, Chicago, USA, April 12-14, 2010.
92. Bruckstein A.M., "THE MATHEMATICS OF MULTI A(GE)NT INTERACTIONS ON HOW TO COORDINATE A SWARM OF SIMPLE ROBOTS", (Invited Plenary Talk), IMU Meeting, Weizmann Institute of Science, Rehovot, Israel, June 2, 2010.
93. Bruckstein A.M., "FROM ANTS TO CARS: ON MANAGING SWARMS WITH SIMPLE LOCAL RULES", (Invited Talk), 1st International Symposium on Cognitive Cars: Driving the Future", organized by General Motors Advanced Technical Center in Herzliya, Israel, 16 June 2010.
94. Bruckstein A.M., "FROM DURER'S ENGRAVINGS TO PICASSO'S ONE-LINE DRAWINGS: ON NON-PHOTOREALISTIC IMAGE RENDERINGS VIA CURVE EVOLUTIONS", (Invited Plenary Talk), Workshop on Computational Photography and Aesthetics, held at ACCV 2010, Queenstown, New Zealand, 9 November 2010.

95. Bruckstein A.M., "FROM MLS TO OVERPARAMETERIZED NONLOCAL VARIATIONAL METHODS", Workshop on Innovations for Shape Analysis: Models and Algorithms, Dagstuhl, Germany, April 3-8, 2011.
96. Bruckstein A.M., "FROM ANTS TO A(GE)NTS: MODELLING AND ANALYZING MULTI-AGENT SYSTEMS", (Invited Talk), International Workshop "SCIENCE" IMAGE IN ACTION", Erice, Italy, April 15-22, 2011.
97. Bruckstein A.M., "EVOLUTION AND REVOLUTION IN SIGNAL AND IMAGE PROCESSING FOR NEW MEDIA APPLICATIONS", (Invited Talk), Symposium "Creating the Future, Transforming the University - A tribute to President Su Guaning, Singapore, June 29-30, 2011.
98. Bruckstein A.M., "FROM MOVING LEAST SQUARES TO NONLOCAL OVERPARAMETERIZED VARIATIONAL METHODS OR GLOBALLY OPTIMAL LOCAL MODELING OF SIGNALS AND IMAGES", (Invited Talk), VIA'11: Symposium on Variational Image Analysis, Heidelberg, Germany, July 4-6, 2011.
99. Bruckstein A.M., "AMOEBAS, OR MODELING DEFORMABLE PLANAR SHAPES", ITN FIRST: Fronts and Interfaces in Science and Technology Workshop on Image Processing and Reaction-Diffusion, Jerusalem, ISRAEL, September 11-13, 2012.
100. Bruckstein A.M., "FROM SHORT-CUTS TO CRAZY-CUTS: TOPICS IN SHAPE ANALYSIS", (Invited Talk) Computer Vision and Video Analysis: An international workshop in honor of Prof. Shmuel Peleg, Jerusalem, ISRAEL, October 21, 2012.
101. Bruckstein A.M., "AMOEBAE IN MOTION AND OPTIMAL VESICLE SHAPES: SHAPE DEFORMATIONS UNDER GLOBAL CONSTRAINTS", (Invited Talk), International Conference on Imaging Science 2012 (in honor of Professor Stanley Osher at his 70th birthday), Hong Kong, December 12-14 2012.
102. Bruckstein A.M., "MULTI-A(GE)NT PATROLLING OF LARGE AND DYNAMIC ENVIRONMENTS", 2013 Information Theory and Applications (ITA) Workshop, San Diego, USA, February 10-15, 2013.
103. "FROM ANTS TO MULTI-A(GE)NT SYSTEMS", (Invited Talk), AUVSI Israel conference on Land Based Systems, Haifa, Israel, April 18, 2013.
104. Bruckstein A.M., "ON GLOBALLY OPTIMAL LOCAL MODELLING IN IMAGE ANALYSIS AND PROCESSING: FROM MOVING LEAST SQUARES TO OVER-PARAMETRIZATION" (Invited Talk), NTU-SNU Joint Workshop on Mathematics and Applications, Singapore, October 3-5, 2013.
105. Bruckstein A.M., "JOYS OF THE ELEMENTARY: ON CUTTING SHAPES AND FINDING GOOD CENTERS", (Invited Plenary Talk) 30th European Workshop on Computational Geometry EuroCG 2014, Dead Sea, Israel, March 3-5, 2014.
106. Bruckstein, A.M., "FROM SPARSE SOLUTIONS OF SYSTEMS OF EQUATIONS TO SPARSE MODELING OF SIGNALS AND IMAGES: ON OVERVIEW OF SPARSITY RESEARCH", (Prize Lecture), SIAM Conference on IMAGING SCIENCE (SIAM-IS14), Hong Kong Baptist University, May 12-14, 2014.

107. Bruckstein A.M., "THE MAGIC AND WONDER OF IMAGES: MOIRE PATTERNS, AUTOSTEREOGRAMS AND HOLOGRAPHIC PROCESSES", (Invited Talk), Shape and Image Modeling and Analysis, SIMA 2014, Dead Sea, Israel, May 28-31, 2014.
108. Bruckstein A.M., "AUTOSTEREOGRAM PERCEPTION: 1f NOISE IS BEST", (Invited Talk), CFAR 50'th anniversary, University of Maryland, Maryland, USA, November 17th, 2014.
109. Bruckstein A.M., "EVOLUTION AND REVOLUTION IN SIGNAL AND IMAGE PROCESSING", (Invited Talk), KAIST - Technion Symposium, Haifa, Israel, December 7-8, 2014.
110. Bruckstein A.M., "FROM ANTS TO A(GE)NTS", (Invited Talk), KI-Net Conference on Groups and interactions in data, networks and biology, Carnegie Mellon University, USA, May 27-29, 2015.
111. Bruckstein A.M., "VARIATIONAL AND SPARSITY-BASED METHODS FOR IMAGE PROCESSING AND ANALYSIS", (Invited Talk), Conference and Study School on Imaging for Medical Applications (SSIMA), Sinaia, Romania, June 29 - July 4, 2015.
112. Bruckstein A.M., "FROM ANTS TO A(GE)NTS", The 2015 Kailath Lecture and Colloquium, Stanford, USA, September 17 - 18, 2015.
113. Bruckstein A.M., "SPARSITY BASED METHODS FOR OVERPARAMETERIZED VARIATIONAL PROBLEMS", (Invited Talk), Workshop on Stochastic Geometry and Big Data, INRIA Sophia Antipolis Méditerranée, France, November 24th, 2015.
114. Bruckstein A.M., "DIGITAL ENGRAVINGS AND ONE LINERS : UNDERSTANDING AND MODELING ARTISTIC RENDERINGS", (Invited Talk), IPAM Workshop on Culture Analytics Beyond Text: Image, Music, Video, Interactivity and Performance, UCLA, Los Angeles, USA, March 21 - 24, 2016.
115. Bruckstein A.M., "ON PROBABILISTIC PURSUITS ON GRID AND OTHER GRAPHS", (Keynote Talk), 18th International Workshop on Combinatorial Image Analysis (IWCIA'17), Plovdiv, Bulgaria, June 19-21, 2017.
116. Bruckstein A.M., "ON OVERPARAMETRIZATION IN VARIATIONAL METHODS", (Invited Talk), Workshop on Variational Methods, New Optimizational Techniques and New Fast Numerical Algorithms, Isaac Newton Institute of Mathematical Sciences, Cambridge, UK, September 4 - 8, 2017.
117. Bruckstein A.M., "ON LOCATION AND REGISTRATION FIDUCIALS: THEIR ANALYSIS AND DESIGN", (Keynote Talk), 7th The International Conference on Pattern Recognition Applications and Methods (ICPRAM 2018), Funchal, Madeira-Portugal, January 16-18, 2018.
118. Bruckstein A.M., "FROM ANST TO A(GE)NTS: THE WONDERFULLY WEIRD WORLD OF MULTI-AGENT SWARMS", (Plenary Invited Lecture), 7th International Conference on Computers Communication and Control (ICCCC2018), Oradea, Romania, May 8-12, 2018.
119. Bruckstein A.M., "ON OVERPARAMERIZED VARIATIONAL METHODS FOR PHOTOMETRIC PROBLEMS", (Invited Talk), SIAM Conference on Imaging Science, Bologna, Italy, June 5-8, 2018.

120. Bruckstein A.M., "ENGRAVINGS AND ONE LINERS: ON NON-PHOTOREALISTIC RENDERINGS", (Invited Talk), International Conference on Computer Vision (ICCVG 2018), Warsaw, Poland September 17-19, 2018.



## LECTURES AND SEMINARS AT UNIVERSITIES AND INDUSTRY

1. ON MODELING NEURAL CODING PROCESSES, ATAT Bell Laboratories at Crawford Hill, NJ, USA, September 14, 1981 (organized by Prof. J. Salz).
2. ON STATE-SPACE ESTIMATION AND SCATTERING THEORY, Distributed Sensor Network Group Meeting, I.S.L., Stanford University, CA, November 16, 1981 (organized by Prof. M. Morf).
3. ON CODING OF VISUAL STIMULI IN SEQUENCES OF NEURAL SPIKES, Biophysics Seminar at the Physics Department, Groningen University, Holland, October 22, 1982 (organized by Prof. H.A.K. Mastebroek).
4. MODELS FOR NEURAL COMMUNICATION PROCESSES, Distributed Sensor Network Group Meeting, I.S.L., Stanford University, CA, November 1982 (organized by Prof. M. Morf).
5. FAST ALGORITHMS FOR ONE-DIMENSIONAL INVERSE SCATTERING, Mathematics Workshop on Computational Methods in Ill Posed and Inverse Problems, Center for Applied Mathematics, Cornell University, Ithaca, NY, July 26, 1983 (organized by Prof. L. Payne).
6. NEW RESULTS IN 1-D INVERSE SCATTERING, Hughes Aircraft Co., Radar Division, Los Angeles, CA, January 27, 1984 (organized by Dr. R. Madan).
7. INVERSE SCATTERING VIA SCHUR COEFFICIENTS, Industrial Affiliates Meeting, I.S.L., Stanford University, CA., February 17, 1983.
8. AN EIGENSTRUCTURE METHOD FOR SIGNAL RESOLUTION, Industrial Affiliates Meeting, I.S.L., Stanford University, CA., February 16, 1984.
9. NUMERICAL PROBLEMS ARISING IN INVERSE SCATTERING ALGORITHMS, Bay Area Numerical Analysis Day, Center for Pure and Applied Mathematics, University of California at Berkeley, February 25, 1984 (organized by Prof. B.N. Parlett).
10. CONTINUED FRACTIONS, PARTIAL REALIZATION AND INVERSE SCATTERING, Bay Area Inverse Problems Workshop, Stanford University, CA., July 24, 1984 (organized by Prof. M. Cheney).
11. THE MUSIC ALGORITHM AND SOME OF ITS APPLICATIONS, EE Colloquium, Technion, IIT, Haifa, November 28, 1984.
12. ALGORITHMS FOR INVERSE SCATTERING AND MATRIX FACTORIZATIONS, RECURSIVE PARTIAL REALIZATIONS, OPERATOR DILATIONS, Two Lectures at Prof. I. Gohberg's Seminar on Operator Theory, Tel Aviv University Mathematics Department, February 27, March 6, 1985.
13. ALGORITHMIC ASPECTS OF INVERSE SCATTERING, Bell Laboratories at Murray Hill, N.J., August 1986 (organized by Dr. H.J. Landau).
14. DESIGN OF PERIMETER ESTIMATORS FOR DIGITIZED IMAGES, Computer Science Department, Hebrew University, Jerusalem, April 5, 1987 (organized by Dr. S. Peleg).
15. ON SOME TOPICS IN COMPUTER VISION, Computer Systems Laboratory, A.T.&T. Bell Labs at Murray Hill, New Jersey, August 20, 1987 (organized by Dr. Larry O'Gorman).

16. ON THREE OPEN PROBLEMS IN PATTERN RECOGNITION, Mathematics Group Seminar, A.T.&T. Bell Labs at Murray Hill, New Jersey, August 1987, (organized by Dr. H.J. Landau).
17. ON SEVERAL PROBLEMS IN COMPUTER VISION, Robotics and Vision Lab., Electrical Engineering and Computer Science Department, U.C. at Berkeley, Berkeley, California, Sept 4, 1987 (organized by Prof. Shankar Sastry).
18. DESIGN OF PERIMETER ESTIMATORS, Center for Automation Research, Computer Science Department, University of Maryland, College Park, Maryland, September 21, 1987 (organized by Dr. Peter Meer).
19. SHAPE ANALYSIS, Air-Force Institute for Advanced Studies, Jerusalem, January 6, 1988, April 17, 1989, November 6, 1990 and November 27, 1991, December 12, 1994 Workshop on Image Processing and Analysis (organized by Dr. Shmuel Peleg).
20. ON SOME TOPICS IN COMPUTER VISION, Department of Mathematics and Computer Science Colloquium, University of the NEGEV, Beer-Sheva, March 8, 1988 (organized by Prof. R. N. Sen).
21. ON DIRECT AND INVERSE SCATTERING AND APPLICATIONS, Department of Electrical Engineering, Communication and Signal Processing Seminar, Haifa, April 13, 1989 (organized by Dr. S. Shamai).
22. ON SOME SHAPE-FROM SHADING PROBLEMS, Department of Mathematics Colloquium, University of Connecticut, Storrs, September 21, 1989, (organized by Prof. I. Koltracht).
23. ON SHAPE-FROM SHADING AND PHOTOMETRIC STEREO, Image Processing Seminar, Lab 1122, AT&T Bell Labs, Murray-Hill, NJ, September 29, 1989 (organized by Dr. C. Podilchuk).
24. SELF-SIMILARITY OF DIGITIZED STRAIGHT LINES, Mathematics Research Colloquium, AT&T Bell Labs, Murray Hill, NJ October 12, 1989 (organized by Dr. H.J. Landau) also Computer Science Department Colloquium, The Hebrew University of Jerusalem, December 4, 1989 (organized by Dr. Mike Werman) and Computer Science Department Colloquium, The Technion of Haifa, December 12, 1989 (organized by Dr. Zvi Rosberg).
25. SOME RECENT OBSERVATIONS ON DIGITIZED SHAPES, Center for Automation Research Seminar, University of Maryland, College Park, October 16, 1989 (organized by Dr. Peter Meer).
26. IMAGE PROCESSING, A SHORT COURSE, Three 4 hour lectures at Elscint Co. Ltd., Haifa, April 23, May 7, May 21, 1990 (organized by Dr. Dov Maor). and at Elbit Co. Ltd, Haifa, May 7, 9 and 14, 1991 (organized by Ran Helerstein and Daniela Doron)
27. DIFFERENTIAL INVARIANTS AND PLANAR SHAPE RECOGNITION, Mathematics Research Colloquium, AT&T Bell Labs, Murray Hill, NJ September 27, 1990 (organized by Dr. H.J. Landau) also Electrical Engineering and Computer Science Seminar, Yale University, October 5, 1990 (organized by Prof. Arye Nehorai and Prof. Jean-Marc Delosme).
28. WHY THE ANT TRAILS LOOK SO STRAIGHT AND NICE, Computer Engineering Seminar, EE Department, Technion, IIT, Haifa, January 1991 (organized by Dr. Amos Israeli).

29. SOME MATHEMATICAL METHODS IN COMPUTER VISION, Department of Mathematics Colloquium, University of Connecticut, Storrs, September 3, 1991 (organized by Prof. I. Koltracht).
30. DIFFERENTIAL, SEMI-DIFFERENTIAL AND LOCAL INVARIANTS FOR PLANAR SHAPE RECOGNITION UNDER PARTIAL OCCLUSION, Lems and Electrical Sciences Seminar, Brown University, Rhode Island, September 6, 1991 (organized by Prof. Ben Kimia).
31. RECOGNIZING OCCLUDED PLANAR SHAPES, Computer Engineering Seminar, EE Department, Technion, IIT, Haifa, January 1992 (organized by Dr. Amos Israeli), Computer Science Department, Tel Aviv University, May 1992 (organized by Dr. Haim Wolfson).
32. SOME TOPICS IN CURVE AND POLYGON EVOLUTION, Mathematics Research Group Seminar, AT&T Bell Laboratories at Murray Hill, September 10, 1992, (organized by Dr. H.J. Landau)
33. COMPUTER VISION ACTIVITIES AT THE TECHNION, Mathematics Seminar, Macquarie University, Sydney, Australia, September 28, 1992 (organized by Prof. P. Pleasants).
34. TOPICS IN IMAGE DIGITIZATION, Special Seminar in Number Theory and Discrete Geometry, Department of Mathematics, Adelaide University, Adelaide, Australia, October 1, 1992 (organized by Prof. J. Pitman).
35. SOME TOPICS IN ROBOT NAVIGATION AND SHAPE RECOGNITION, Signal Processing Research Institute Lecture, Adelaide, Australia, October 2, 1992 (organized by Prof. M. Brooks).
36. CURVE EVOLUTIONS IN CAD AND COMPUTER VISION, Computer Science Seminar, University of Western Australia, Perth, Australia, October 6, 1992, (organized by Dr. R. Kozera).
37. SOME MATHEMATICAL PROBLEMS IN COMPUTER VISION, Department of Electrical and Computer Engineering Lecture, University of Queensland, Brisbane, Australia, October 12, (organized by Prof. A.C. Tsoi).
38. IMAGE ANALYSIS AND UNDERSTANDING: Its Future, Present and Past, Second International Seminar on Artificial Intelligence and Expert Systems, Sao Paulo, Brazil, 2nd of June 1993, (Invited Lecture), and The Pixel Club, November 2nd, 1993, (organized by Ron Kimmel and Doron Shaked).
39. WHY THE ANT TRAILS LOOK SO STRAIGHT AND NICE, Biomedical Engineering Department Colloquium, March 6th, 1994 (organized by Prof. I.Gath).
40. HAPPY PURSUITS, Mathematics Research Colloquium AT&T Bell Laboratories at Murray Hill, September 22, 1994, (organized by Dr. H.J. Landau), Mathematics Department Colloquium, University of Connecticut, Storrs, September 29, 1994, (organized by Prof. I. Koltracht), Computer Science Department Colloquium, Hebrew University, Jerusalem, December 12, 1995, (organized by Dr. Daphna Weinshall), Computer Science Colloquium, Technion, Haifa, January 24, 1995, (organized by dr. Michael Lindenbaum), Ecology and Evolutionary Biology Department Talk, Princeton University, October 24, 1995, (organized by Prof. Simon Levin), Math Group Seminar, Lawrence Berkeley Lab, June 17, 1996, (organized by Dr. Ron Kimmel and Prof. Jamie Sethian), GRASP Lab Seminar, University of

Pennsylvania, Philadelphia, October 7th, 1996, (organized by Prof. Ruzena Bajcsy), Center for Intelligent Control Systems and LIDS Colloquium, LIDS M.I.T., November 5, 1996, (organized by Prof. Sanjoy Mitter), EE Department Seminar, Princeton University, November 7, 1996, (organized by Prof. M. Orchard), Department of Computer Science Seminar, La Sapienza University, Roma, May 26, 1997, (organized by Prof. Stefano Levialdi and Prof. Janos Korner), Mathematics Club Meeting, Haifa University Mathematics Department, May 16, 1999, (organized by Prof. David Blanc). LaMI Colloquium, Evry University, Paris, July 5, 2001, (organized by Prof. Jean-Marc Delosme).

41. INVARIANCE GAMES IN PLANAR SHAPE ANALYSIS, Pixel Club Lecture, January 3, 1995, (organized by Ron Kimmel and Doron Shaked).
42. INVARIANCES FOR PLANAR SHAPE ANALYSIS AND PROCESSING, NEC Research Seminar, Princeton, July 21, 1995 (organized by Dr. David Jacobs and Dr. Ronen Basri), Division of Applied Sciences Seminar, Harvard University, November 1, 1996, (organized by Prof. Roger Brockett).
43. IMPROVING THE VISION OF MAGIC EYES: A GUIDE TO BETTER AUTOSTEREOGRAMS, Center for Automation Research Seminar, University of Maryland, College Park, February 26, 1996 (organized by Prof. A. Rosenfeld), Mathematics Research Colloquium AT&T Bell Laboratories at Murray Hill, March 7, 1996, (organized by Dr. H.J. Landau), Information Systems Laboratory EE370 Seminar series, Stanford University, Stanford, California, March 14th, 1996 (organized by Prof. T. Kailath), Department of Mathematics, University of Connecticut, Storrs, April 18, 1996, (organized by Prof. I. Koltracht), Rutgers University Colloquium on Human and Computer Vision, April 29, 1996 (organized by Prof. Bela Julesz and Prof. Sven Dickinson), Computer Science Department, SUNY at Stony Brook, October 9, 1996 (organized by Prof. Theo Pavlidis), AI Lab Seminar, M.I.T., November 4, 1996, (organized by Prof. Berthold Horn), Princeton University Computer Science Department, Geometry Seminar, April 28, 1997 (organized by Prof. Bernard Chazelle), Computer Vision Seminar, Columbia University, August 1, 1997 (organized by Prof. Shree Nayar), Pixel Club, Technion, November 18, 1997, Netanya College Computer Science Seminar, January 13th, 1998, (organized by Dr. Amos Israeli), Distinguished Lecture, Computer Science Department at Hebrew University, Jerusalem, June 16th, 1998 (organized by Dr. Amnon Shasua), Computer Science Colloquium, University of the Negev, Beer Sheva, February 23, 1999 (organized by Prof. Y. Dinitz), LaMI Colloquium, Evry University, Paris, July 12, 2001, (organized by Prof. Jean-Marc Delosme).
44. ON ANT-ROBOTICS, INVARIANCE AND AUTOSTEREOGRAMS, Special Seminar at U.C. Berkeley EECS Department, June 21, 1996, (organized by Prof. Shankar Shastri).
45. FROM IMAGE WATERMARKING TO HOLOGRAPHIC IMAGE REPRESENTATIONS, Mathematics Research Colloquium, Bell Labs, Murray Hill, NJ February 13, 1997 (organized by Dr. H.J. Landau), Information Systems Laboratory Seminar, Electrical Engineering Department, Stanford University, June 19, 1997 (organized by Prof. T. Kailath), Research Seminar, INRIA Sophia Antipolis, November 14, 1997 (organized by Prof. Olivier Faugeras and Prof. Rachid Deriche), Computer Science Department Colloquium and Pixel Club, January 27, 1998 (organized by Dr. Reuven Bar-Yehuda), Research Seminar at the Weizmann Institute Applied Mathematics, June 9th, 1998 (organized by Prof. Moni Naor), Research Seminar at IBM Haifa Research Center, October 26th, 1999 (organized by Dr. Israel Wag-

- ner), EE Department Seminar at Tel-Aviv University, November 15th, 1999 (organized by Prof Nahum Kiryati).
46. QUO VADIS COMPUTER VISION, Multimedia Research Lab, Discussion Series, May 7, 1997 (organized by Dr. Mohan M. Sondhi).
  47. A PUZZLE, A SEQUENCE, AND SOME CONSEQUENCES, Mathematical Research Colloquium, Bell Laboratories, Lucent Technologies, February 17, 1998 (organized by Dr. Henry Landau), The Technion Mathematics Club, Mathematics Department, January 13, 1999, (organized by Dr. Itai Shafrir).
  48. IMAGE ANALYSIS: DETECTING STRUCTURES IN SETS OF POINTS, Philip Merlin Memorial Lecture, Department of Electrical Engineering, May 5, 1999, (organized by Prof. Adrian Segall).
  49. "DESIGN OF SHAPES FOR PRECISE IMAGE REGISTRATION", Lecture at KLA-Tencor, November 26, 2000, (organized by Dr. Mike Adel).
  50. "ON THE EVOLUTION OF POLYGONS", Lecture at the Center for Geometric Computing, Tel-Aviv University, May 3, 2001, (organized by Dr. Nir Sochen).
  51. "EDGE INTEGRATION REVISITED", Vision and Robotics Seminar, The Weizmann Institute of Science, May 17, 2001, (organized by Prof. Michal Irani).
  52. "BETTER MAGIC EYES and THE MAGIC OF MOIREES, or How To Have Fun in Graduate School", Lecture to Graduate Students, Tohoku University, Sendai, Japan, November 11, 2001 (organized by Prof. Koichiro Deguchi).
  53. "THE MAGIC OF MOIRE PATTERNS", Computer Science Colloquium, University of Tokyo, Tokyo, Japan, November 13, 2001, (organized by Prof. Sugihara).
  54. "DIFFUSIONS AND CONFUSIONS IN IMAGE PROCESSING" and "IMPROVING THE VISION OF MAGIC EYES", Kyoto ATR Research Colloquium, Kyoto-Nara, Japan, November 15, 2001, (organized by Dr. Kinoshita).
  55. "HAPPY PURSUITS", Departmental Computer Science Colloquium, Bar-Ilan University, January 24, 2002 (organized by Prof. N. Netanyahu).
  56. "WHY THE ANT TRAILS LOOK SO STRAIGHT AND NICE: ON ROBOTICS AND MULTIPLE A(GE)NT INTERACTIONS", New Discoveries in Science Lecture, Department of Physics, Technion, April 15, 2002 (organized by Prof. Y. Avron).
  57. "DIGITAL GEOMETRY FOR IMAGE BASED METROLOGY", Seminar In Geometric Computing and Its Applications, Tel Aviv University, April 22, 2002 (organized by Prof. M. Sharir).
  58. "HAPPY PURSUITS: WHY ANT TRAILS LOOK SO STRAIGHT AND NICE", lecture at "Machshevim u'Machshevet" Computers and Thought, Seminar in celebration of Yom Yerushalaim, Jerusalem, May 9-11, 2002 (organized by Martin Golumbic and Shlomo Kipnis).
  59. "SEXY APPLIED GEOMETRY, or THE BEAUTY AND USE OF SIMPLE GEOMETRY IN REAL LIFE", 1st TAU-Technion Workshop on Geometric Computing, Nachsholim, Israel, June 14, 2002.

60. "IMAGE ANALYSIS: A Mini-Course" Part I, TsingHua University, Beijing, China, September, 2002.  
 Lecture 1: Introduction: the Structure of Images  
 Lecture 2: Edge Detection and Integration and Image Segmentation  
 Lecture 3: Planar Shape Analysis Principles  
 Lecture 4: Invariance in Shape Analysis and Shape Evolutions  
 Lecture 5: Geometry of the Integer Grid.
61. "VARIATIONAL IMAGE ANALYSIS: A Mini-Course" Part II, TsingHua University, Beijing, China, November - December, 2002.  
 Lecture 1: Variational Principles in Image Processing  
 Lecture 2: Shape from Shading Methods  
 Lecture 3: Photometric Stereo and Structured Light  
 Lecture 4: Optic Flow Algorithms  
 Lecture 5: Stereo and Motion Analysis.
62. "ON VARIATIONAL PRINCIPLES IN EDGE INTEGRATION", National Laboratory of Pattern Recognition, Institute of Automation, Chinese Academy of Sciences, Beijing, December, 2002 (invited by Dr. Tienu Tan).
63. "ON VARIATIONAL PRINCIPLES IN EDGE INTEGRATION", Bell Labs China, Beijing, December, 2002 (invited by Dr. David Lee).
64. "TOPICS IN IMAGE ANALYSIS: A Mini- Course" Part III, TsingHua University, Beijing, China, February, 2003.  
 Lecture 1: Minimal Time Path in the Plane and Eikonal Equations in Image Analysis.  
 Lecture 2: The mathematics of Multi-A(ge)nt Interactions
65. "THE GEOMETRY OF VECTOR FIELDS" 2nd TAU-Technion Workshop on Geometric Computing, Nachsholim, Israel, May 2003 .
66. "APPLIED GEOMETRY" and "TRACKING LEVEL SETS BY LEVEL SETS IN SHAPE FROM SHADING AND MOTION ANALYSIS", lectures at EVRY University, Paris, France, October 2003 (organized by Prof. Jean Marc Delosme).
67. "VARIATIONAL METHODS FOR IMAGE ANALYSIS", lecture at School of Computer Science and Engineering colloquium, The Hebrew University of Jerusalem, January 2004 (organized by Prof. A. Shabsua).
68. "VARIATIONAL METHODS FOR IMAGE ANALYSIS", Vision and Robotics Seminar, The Weizmann Institute of Science, January 2004 (organized by Prof. M. Irani).
69. "TOPICS IN IMAGE ANALYSIS: A Mini- Course" Part IV, APPLIED GEOMETRY, TsingHua University, Beijing, China, April 2004.
70. "VARIATIONAL METHODS FOR IMAGE ANALYSIS", special colloquium at Department of Electrical Engineering-Systems, Faculty of Engineering, Tel Aviv University, May 2004.
71. "WHY DO WE LOVE GEOMETRY SO MUCH?", 3rd TAU-Technion Workshop on Geometric Computing, Nachsholim, Israel, May 2004.

72. "ON LOGO DESIGN", seminar in Faculty of Architecture and Town Planning, Technion - IIT., Haifa, Israel, Dec. 2004 (organized by Prof. N. Bitterman).
73. "ON SPACE FIDUCIALS", Robotics Colloquium, Karlsruhe University, Germany, February 2005 (organized by Prof. K. Kroschel).
74. "ON OMNIVIEWING WITH CURVED MIRROR SURFACES", Robotics Colloquium, Karlsruhe University, Germany, February 2005 (organized by Prof. K. Kroschel).
75. "TO SEE AND TO ACT: VISION GUIDED ROBOTIC MANIPULATION", lecture at General Motors Corporation, Detroit, USA, May 2005.
76. "VARIATIONAL METHODS IN IMAGE ANALYSIS", colloquium lecture at ETH University, Zurich, Switzerland, August 2005 (organized by Prof. A. Lapidoth).
77. "VARIATIONAL METHODS IN IMAGE ANALYSIS", colloquium lecture at University EPFL, Lausanne, Switzerland, August 2005 (organized by Prof. R. Cohen).
78. "MATHEMATICS OF MULTI AGENT INTERACTION", lecture at seminar on Cooperative Decision and Control for Unmanned Systems, Israel Association for Automatic Control, Herzlia, May 2006 (organized by Prof. A. Feuer).
79. "DISCRETE SCHRODINGER EQUATIONS", lecture at Theor./Math. Physics Seminar, Physics Department, Technion, July 2006 (organized by Prof. M. Segev).
80. "DIGITAL GEOMETRY FOR IMAGE ANALYSIS TASKS", (Invited Lecture), The Kailath Colloquium, Stanford University, USA, July 6-7, 2006.
81. "ON LOGO DESIGN", seminar in Faculty of Architecture and Town Planning, Technion - IIT., Haifa, Israel, Nov. 2006 (organized by Prof. N. Bitterman).
82. "VARIATIONAL IMAGE ANALYSIS: DO WE KNOW WHAT TO OPTIMIZE FOR?", and "OVER-PARAMETERIZED VARIATIONAL OPTICAL FLOW" two lectures at Vision and Robotics Seminar, Faculty of Mathematics and Computer Science, The Weizmann Institute of Science, January 2007 (presented jointly with Tal Nir), (organized by Prof. M. Irani).
83. "VARIATIONAL METHODS IN IMAGE ANALYSIS" invited lecture at School of Computer Engineering, Nanyang Technological University, Singapore, April 2007.
84. "TOPICS IN GEOMETRY APPLIED TO ANT ROBOTICS AND MULTI A(GE)NT INTERACTIONS, invited lecture at School of Computer Engineering, Nanyang Technological University, Singapore, April 2007.
85. "THE CHIMERA OF OPTIMALITY IN SIGNAL AND IMAGE PROCESSING", lecture at Netanya College Colloquium, Israel, May 2007 (organized by Prof. A. Israeli).
86. "ON VARIATIONAL METHODS FOR IMAGE ANALYSIS", Seminar Artzi on Computational Vision and BGU Interdisciplinary Vision Day, Ben-Gurion University of the Negev, Beer Sheva, Israel, June 2007 (organized by Dr. O. Ben-Shahar).
87. "METHODS FOR IMAGE DE-NOISING", lecture at Samsung Telecom Research Israel (STRI), June 2007 (organized by Dr. N. Sorek).

88. "VARIATIONAL METHODS IN IMAGE ANALYSIS" short course at Division of Mathematical Sciences School of Physical & Mathematical Sciences, Nanyang Technological University, August 2008 (organized by Prof. Xue-Cheng Tai.).
89. "FROM ANTS TO A(GE)NTS", (Invited lecture) at The Israeli Association for Artificial Intelligence (IAAI'07) Symposium, Ashkelon College, Israel, December 2007 (organized by Prof. E. David).
90. "THE IMPORTANCE OF BEING EARNEST... ABOUT OPTIMALITY", lecture at Signal Processing and Systems (SP&S) Seminar, Department of Electrical Engineering, Technion, Haifa, Israel, 13 April 2008 (organized by Prof. Y. Eldar).
91. "THE MATHEMATICAL CHALLENGES OF ANALYZING MULTI-AGENT SYSTEMS", lecture at Evry University, Paris, France, 18 November 2008 (organized by Dr. N. Thibault).
92. "DIGITAL GEOMETRY FOR IMAGE BASED METROLOGY", seminar at Division of Mathematical Sciences, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore, March 31, 2009.
93. "ON RESOLUTION/QUANTIZATION TRADEOFFS IN IMAGE /SIGNAL REPRESENTATION", lecture at Jury Award Ceremony, EE Department, Technion, May 7th, 2009 (organized by Prof. E Zeheb).
94. "SEARCHING FOR THE BEST OF THE BEST OR THE CHIMERA OF OPTIMALITY IN SIGNAL AND IMAGE PROCESSING", official opening of the School of Physical and Mathematical Sciences Building, Nanyang Technological University, Singapore, July 20-22, 2009 (organized by Prof. San Ling).
95. "THE CAR OF THE FUTURE", lecture at GM R&D Labs, Israel, 23 November 2010, (organized by Mr. Asaf Degani)
96. "FROM CRAZY CUTS TO SHORT CUTS", lecture at Applied Mathematics Seminar, Tel Aviv University, May 3, 2011 (organized by Dr. A. Ditkowski).
97. "ANT ROBOTICS", lecture at CS-TA Cafe, Computer Science Department, Technion, June 28, 2011.
98. "FROM SHORT CUTS TO CRAZY CUTS", colloquium at Division of Mathematical Sciences, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore, August 25, 2011 (organized by Prof. S. Robins).
99. "THE MATHEMATICS OF MULTI A(EG)NT INTERACTIONS", colloquium at Division of Mathematical Sciences, School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore, September 8, 2011 (organized by Prof. S. Robins) .
100. "ON VESICLES AND AMOEBAE OR MODELING CONSTRAINED SHAPE DEFORMATIONS", seminar at Department of Physics, Technion, December 1, 2011 (organized by Prof. Moti Segev).
101. "THE MATHEMATICS OF MULTI-A(GE)NT INTERACTIONS OR HOW TO COORDINATE A SWARM OF SIMPLE ANT-LIKE ROBOTS", Complex Systems Seminar, Department of Mathematics, Uppsala University, Sweden, June 19, 2012.



102. "DIGITAL METROLOGY", Center for Image Analysis, Department of Mathematics, Uppsala University, Sweden, June 20, 2012 (organized by Prof. Christer Kiselman).
103. "FROM ANTS TO ROBOTS", Swedish Technion Society (STS) Automation seminar, Vasteras, Sweden, November 20, 2012.
104. "INVARIANTS FOR SHAPE RECOGNITION UNDER PARTIAL OCCLUSIONS", at Summer School in Cabrerets, Toulouse, France, May 21-24, 2013 (organized by Prof. Jean Denis Durou).
105. "ON AUTO-STEREOGRAM PERCEPTION, OR THE BEST PATTERNS FOR MAGIC-EYES PICTURES", CS Colloquium, Technion, Israel, January 13, 2015.
106. "SOME TOPICS IN MULTI-A(GE)NT INTERACTION ANALYSIS AND DESIGN", Seminar at IBISC, University of Evry, France, July 8, 2015 (organized by Prof. Jean-Marc Delosme).
107. "THE RISE OF SPARSE REPRESENTATIONS", RAPPEL Seminar, IBISC, University of Evry, France, July 20, 2015 (organized by Prof. Jean-Marc Delosme).
108. "FROM MUSIC TO SPARSITY", Distinguished Data Sciences Seminar, Central for Visual Computing, INRIA, Paris, France, December 8, 2015 (organized by Prof. Nikos Paragios).
109. "FROM MUSIC TO SPARSITY", Holon Institute of Technology, Israel, March 28, 2016 (organized by Prof. Yirmeyahu Kaminski).
110. "THE JOYS OF THE ELEMENTARY: THREE EASY PIECES" lecture at Uppsala University, Sweden, April 18, 2016 (organized by Prof. Christer Kiselman).
111. "STATE-OT-THE-ART RESEARCH IN SCALE-SPACE AND VARIATIONAL METHODS", lecture at Prof. Bart ter Haar Romenij's Retirement Symposium, TU/e, Eindhoven University of Technology, The Netherlands, December 1, 2017.
112. "PROBABALISTIC MULTI-A(GE)NT PURSUITS AND GRID GEOMETRY" lecture at ISIEE Paris, France, December 5, 2018.

## LIST OF PUBLICATIONS

### THESES

1. Bruckstein, A.M., "MODELS OF CODING IN THE NERVOUS SYSTEM", MSc Thesis, Technion, I.I.T, Haifa, Israel, July 1980.
2. Bruckstein, A.M., "SCATTERING MODELS IN SIGNAL PROCESSING", PhD Dissertation, Stanford University, Stanford, Ca 94305, October 1984.

### JOURNAL PAPERS

1. Zeevi, Y.Y., Bruckstein, A.M., "A NOTE ON THE SSIPFM", IEEE Trans. on Systems, Man and Cybernetics, Vol. SMC-7, pp. 875-877, 1977.
2. Bruckstein, A.M., Zeevi, Y.Y., "ANALYSIS OF INTEGRATE-TO-THRESHOLD NEURAL CODING SCHEMES", Biol. Cybernetics, Vol. 34, pp. 63-79, 1979.
3. Zeevi, Y.Y., Bruckstein, A.M., "ADAPTIVE NEURAL ENCODER MODEL WITH SELFINHIBITION AND THRESHOLD CONTROL", Biol. Cybernetics, Vol. 40, pp. 79-92, 1981.
4. Kwon, W.H., Bruckstein, A.M., Kailath, T., "STABILIZING STATE-FEEDBACK DESIGN VIA THE MOVING HORIZON METHOD", Int. Journal on Control, Vol. 37/3, pp. 631-643, 1983.
5. Bruckstein, A.M., Morf, M., Zeevi, Y.Y., "DEMODULATION METHODS FOR AN ADAPTIVE NEURAL ENCODER MODEL", Biological Cybernetics, Vol. 49, pp. 45-53, 1983.
6. Bruckstein, A.M., "ON THE INVARIANT MEASURES OF SOME DISCRETE-TIME MARKOV PROCESSES", IEEE Trans on Information Theory, Vol. IT-30/1, pp. 125-126, 1984.
7. Bruckstein, A.M., Levy, B.C. and Kailath, T., "DIFFERENTIAL METHODS IN INVERSE SCATTERING", SIAM J. on Appl. Math., Vol. 45/2, pp. 312-335, 1985.
8. Bruckstein, A.M., Kailath, T., "RECURSIVE LIMITED MEMORY FILTERING AND SCATTERING THEORY", IEEE Trans. on Information Theory, Vol. IT-31/3, pp. 440-443, 1985.
9. Bruckstein, A.M., Zeevi, Y.Y., "AN ADAPTIVE STOCHASTIC MODEL FOR THE NEURAL CODING PROCESS", IEEE Trans on Systems, Man and Cybernetics, Vol. SMC-15/3, pp. 343-351, 1985.
10. Bruckstein, A.M., Shan, T.J., Kailath, T., "THE RESOLUTION OF OVERLAPPING ECHOES", IEEE Trans on Acoustics, Speech and Signal Processing, Vol. ASSP-33/6, pp. 1357-1367, 1985.
11. Bruckstein, A.M., Cover, T., "MONOTONICITY OF LINEAR SEPARABILITY UNDER TRANSLATION", IEEE Trans. on Pattern Analysis and Machine Intelligence, Vol. PAMI-7/3, pp. 355-358, 1985.
12. Broder, A.Z., Bruckstein, A.M., Kopolowitz, J., "ON THE PERFORMANCE OF EDITED NEAREST NEIGHBOR RULES IN HIGH DIMENSIONS", IEEE Trans on Systems, Man and Cybernetics, Vol. SMC-15/1, pp. 136-139, 1985.

13. Bruckstein, A.M., Kailath, T., "SOME MATRIX FACTORIZATION IDENTITIES FOR DISCRETE INVERSE SCATTERING", *Linear Alg. and Appl.*, Vol. 74, pp. 157-172, 1986.
14. Kailath, T., Bruckstein, A.M., Morgan, D., "FAST MATRIX FACTORIZATIONS VIA DISCRETE INVERSE SCATTERING", *Linear Alg. and Appl.*, Vol. 75, pp. 1-25, 1986.
15. Kailath, T., Bruckstein, A.M., "NAIMARK DILATIONS, STATE-SPACE GENERATORS AND TRANSMISSION-LINES", *Operator Theory: Advances and Applications*, Vol. 17, pp. 173-186, 1986.
16. Bruckstein, A.M., Koltracht, I., Kailath, T., "INVERSE SCATTERING WITH NOISY DATA", *SIAM J. on Scientific and Statistical Computing*, Vol. 7/4, pp. 1331-1349, 1986.
17. Bruckstein, A.M., Kailath, T., "INVERSE SCATTERING FOR DISCRETE TRANSMISSION LINE MODELS", *SIAM Review*, Vol. 29/3, pp. 359-389, 1987.
18. Bruckstein, A.M., Kailath, T., "AN INVERSE SCATTERING FRAMEWORK FOR SEVERAL PROBLEMS IN SIGNAL PROCESSING", *IEEE ASSP Magazine*, Vol. 4/1, 1987.
19. Bruckstein, A.M., "ON SOFT BIT ALLOCATION", *IEEE Trans. on Acoustics, Speech and Signal Processing*, Vol. ASSP-35/5, pp. 614-617, 1987.
20. Bruckstein, A.M., "ON OPTIMAL IMAGE DIGITIZATION", *IEEE Trans. on Acoustics, Speech and Signal Processing*, Vol. ASSP-35/4, pp. 553-555, 1987.
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## GRADUATE STUDENTS

### Studies Completed - Masters of Science

1. Baruch Bardugo, MSc, "DESIGN OF FINITE MEMORY KALMAN FILTERS" December, 1986. (went on to get a PhD at Technion in Biomedical Engineering, now works in Hi-Tech in Israel).
2. Henry Fiszer, MSc, "ANALYSIS OF A SHAPE-FROM-SHADING ALGORITHM OVER A PIXEL ARRAY", July, 1986 (went on to get an MBA, now is an economist in Paris, France).
3. Marc Smadja, MSc, "SHAPE-FROM-SHADING USING A CONTOUR CLIMBING ALGORITHM", March, 1987 (went on to get an MBA, now is an economist in Paris, France).
4. Ronald Riesenbach, MSc, "A VLSI ARCHITECTURE FOR REAL TIME IMAGE PROCESSING" (Dr. Ran Ginosar was principal advisor) July, 1986 (now works in Hi-Tech in Canada).
5. (\*) Michael Lindenbaum, MSc, "SHAPE DETERMINATION FROM LOCAL VELOCITY MEASUREMENTS", April, 1987. (PhD at Technion with Alfred Bruckstein).
6. (\*) Shimon Yanowitz, MSc, "IMAGE SEGMENTATION WITH ADAPTIVE THRESHOLD SURFACES", May, 1987 (worked in VLSI Inspection Industry).
7. Eliezer Cohen, MSc, "ESTIMATION OF PULSE SHAPE AND LOCATION FROM INTEGRAL MEASUREMENTS" June, 1987 (currently in Hi-Tech).
8. (\*) Ruth Onn, MSc, "SHAPE FROM SHADING FROM TWO ILLUMINATION DIRECTIONS", June, 1987 (PhD at Cornell University with Allan Johns, now works for Rafael Ltd. Haifa, Israel).
9. (\*) Nahum Kiryati, MSc, "BIT ALLOCATION TRADEOFFS IN DIGITIZING BINARY IMAGES", February, 1988. (PhD at Technion with Alfred Bruckstein).
10. (\*) Raanan Bornstein, MSc, "FINDING THE KERNEL OF PLANAR SHAPES", June, 1988 (now works in Hi-Tech in Silicon Valley in California, USA).
11. Arkadi Gluchovski, MSc, "ON SURFACE INTERPOLATION METHODS IN A NEW ADAPTIVE THRESHOLDING PROCEDURE", May, 1989. ( PhD at Technion with Prof. Dan Adam, then CTO at Given Imaging).
12. Itai Nehoran, MSc, "TWO IMAGE REGISTRATION", July, 1989 (working in Hi Tech).
13. Rami Baruch, MSc, "RECOGNIZING FINGERPRINTS", June, 1990 (now works in Hi-Tech, founder of Koranix Ltd. in Koranit, Israel).
14. (\*)Einat Adin, MSc, "NAVIGATING BETWEEN MOVING OBSTACLES", October, 1990 (now works for Rafael Ltd., Haifa, Israel).
15. Iftach Maayan, MSc, "DIGITIZED LINES AND PLANES", June, 1991 (currently in Hi-Tech).
16. (\*)Doron Shaked, MSc, "DIGITAL STAR-SHAPEDNESS", December 1991. (PhD at Technion with Alfred Bruckstein).
17. Ziva Zommer, MSc, "SUBPIXEL PRECISION LINE AND BORDER TRACKING", December 1991 (now works in Hi-Tech, Elbit, Haifa, Israel).

18. (\*)Ronny Kimmel, MSc, "SHAPE FROM SHADING VIA LEVEL SETS", 1992. (PhD at Technion with Alfred Bruckstein).
19. (\*) Amir Arnon, MSc, "DEPTH RECONSTRUCTION WITH STRUCTURED LIGHT", 1992. (PhD at Technion with Michael Lindenbaum and Alfred Bruckstein, now at IBM Almaden Research, California, USA).
20. (\*)Daphna Palti,MSc, "LINE FOLLOWING FOR MEDICAL APPLICATIONS" (Prof. Rafi Beyar was principal advisor) 1993/4. (PhD at Technion with Nahum Kirayti, Alfred Bruckstein and Rafael Beyar).
21. Tzachi Shalit, MSc, "ROBOTICS BIN-PICKING PROJECT", 1993/4.
22. (\*)Polina Golland, MSc, "USE OF COLOR FOR OPTICAL FLOW ESTIMATION", 1995. (PhD at MIT with W.E.L. Grimson, now Professor at MIT).
23. (\*)Ami Steiner, MSc, "PLANAR SHAPE EXAGGERATION", 1995 (now works in Hi-Tech, founder of E-Teacher Ltd.).
24. Michael Kliot, MSc, "LOCAL MULTIVALUED INVARIANT SIGNATURES AND THEIR USAGE IN PICTORIAL DATABASES", 1996, (joint advisor with Dr. E. Rivlin, now works for Rafael Ltd., Haifa, Israel).
25. Boris Zemlyak, MSc, "CAMERA MOTIONS FOR DEPTH ESTIMATION", 1997 (now works in Hi-Tech in California, USA).
26. (\*) Guy Lebanon, MSc, "MOIRE PATTERN DESIGN", 2000. (PhD at Carnegie Mellon with John Lafferty, formerly Professor at Purdue University, then Georgia Tech, currently at NetFlix, USA).
27. (\*) Vladimir Yanovsky, MSc, "SIMPLE A(GE)NTS FOR COMPLEX TASKS", 2001, (jointly with Dr. Israel Wagner, PhD from Waterloo Univ., Canada).
28. Barak Hermesh, MSc, "FIDUCIALS FOR PRECISE LOCATION ESTIMATION", 2001 (works in Hi-Tech in Israel).
29. (\*) Alexander Nisenboim, MSc, "SHAPE-FROM-SEM IMAGES", 2003. (now works for IBM Research in Haifa, Israel).
30. (\*) Adi Bar-Lev, MSc, "COMPUTERIZED MARIONETTES", 2003, (jointly with Prof. Gershon Elber, now works in Hi-Tech in USA).
31. (\*) Vadim Makhervaks, MSc, "ON IMAGE-FLOWS AND ONE-LINER IMAGE TRACINGS", 2003, (jointly with Dr. Gill Barequet, now works for IBM Research in Haifa, Israel).
32. Dimitry Livshitz, MSc, "SELF LOCATION WITH 3D FIDUCIALS AND OMNICAMERAS", 2003 (currently works in HiTech).
33. Tamer Salman, MSc, "KERNEL METHODS FOR IMAGE CLASSIFICATION AND SHAPE CATEGORIZATION", (jointly with Prof. Yoram Baram, PhD from Technion with Yoram Baram).
34. (\*) Eliyahu Osherovich, MSc, "PHEROMONE BASED MULTIAGENT COVERING", 2007. (PhD from Technion with Prof. Irad Yavneh, currently at Amazon Research, Israel).
35. Miriam Inberg, MSc, "BLOOD VESSEL NETWORK ANALYSIS", 2007 (works in HiTech).

36. Erez Brickner, MSc, "MULTI-AGENT PROBLEMS IN NANOROBOTICS - AGENT SPREADING ON NETWORKS", 2007 (currently works in Hi-Tech).
37. Mark Ginzburg, MSc, "VIDEO WATERMARKING", 2008 (currently works in Hi-Tech).
38. (\*) Ishay Goldin, MSc, "MODELING GLOBALLY CONSTRAINED DEFORMABLE OBJECTS", 2008 (currently at a HiTech Start-up in Israel).
39. (\*) Daniel Vainsencher, MSc, "2D DIGITAL DISCS", 2009. (PhD from Technion with Dr. Shie Manor).
40. (\*) Einat Tevel, MSc, "SIGNAL DIGITIZATION USING SHORTEST PATH METHODS", 2009 (jointly with Prof. Arie Feurer), (Currently works in Hi-Tech).
41. (\*) Shachar Shem-Tov, MSc, "TOPICS IN OVER-PARAMETRIZATION VARIATIONAL METHODS", 2011 (currently at Rafael).
42. Eyal Regev, MSc, "MULTI AGENTS SYSTEMS IN DYNAMIC STOCHASTIC ENVIRONMENTS", 2012 (jointly with Dr. Yaniv Altshuler).
43. (\*) Ishai Shwartz, MSc, "THE EFFECT OF NOISE PATTERNS ON DEPTH PERCEPTION IN AUTOSTEREOGRAMS" (jointly with Dr. Avraham Tamar), 2014 (currently works in Hi-Tech).
44. (\*) Yehuda Dar, MSc, "SPATIO-TEMPORAL BIT-ALLOCATION FOR LOW BIT-RATE VIDEO CODING", 2014 (currently pursuing PhD at Technion with A.M. Bruckstein and M. Elad).
45. (\*) Roy Or-El, MSc, "ENHANCED ACTIVE VISION", 2015 (currently a PhD candidate at University of Washington with Prof. Ira Kemelmacher-Shlizerman).
46. (\*) Levy Itshak Bellaiche, MSc, "MULTI-ROBOT GRADIENT ASCENT", 2016 (Currently at MobilEye).
47. David Dovrat, MSc, "CONTROLLING SWARM OF AGENTS WITH CRUDE SENSING CAPABILITIES", 2016 (Currently pursuing a PhD with A.M. Bruckstein).
48. Michael Amir, MSc, "PROBABILISTIC PURSUITS IN GRAPH ENVIRONMENTS", 2017 (Currently pursuing a PhD with A.M. Bruckstein).

### **Studies Completed - PhD**

1. (\*) Michael Lindenbaum, PhD, "TOPICS IN GEOMETRIC PROBING", June, 1990 (currently Professor at CS Department, Technion).
2. (\*) Nahum Kiryati, PhD, "THE HOUGH TRANSFORM: ANALYSIS, EXTENSIONS AND APPLICATIONS", January 1991 (currently Professor at EE Department, Tel Aviv University).
3. (\*) Yachin Pnueli, PhD, "GRIDLESS HALFTONING", 1993 (currently at Google, Haifa).
4. (\*) Guillermo Sapiro, PhD, "AFFINE INVARIANT SHAPE EVOLUTIONS", 1993 (joint advisor with Prof. Allen Tannenbaum, presently Chaired Professor at Duke University).
5. (\*) Doron Shaked, PhD, "SYMMETRY, INVARIANCE AND EVOLUTION IN PLANAR SHAPE ANALYSIS", 1995 (former Head of Hewlett Packard Research Center, HP Labs, Haifa, Israel presently at GE Haifa).

6. (\*) Ronny Kimmel, PhD, "CURVE EVOLUTION ON SURFACES", 1995 (joint advisor with Dr. Nahum Kiryati, currently Professor at CS Department, Technion).
7. (\*) Arnon Amir, PhD, "A QUANTATIVE APPROACH TO PERCEPTUAL GROUPING IN COMPUTER VISION", (Prof. Michael Lindenbaum was a principal advisor), 1997 (now at IBM-Almaden).
8. (\*) Israel Wagner, PhD, "ANT-ROBOTICS: SEARCH, EXPLORATION AND COVERING IN MULTI-A(GE)NT SYSTEMS", 1997, (joint Dr. Michael Lindenbaum, currently Member of Technical Staff at IBM Research, Haifa, Israel).
9. (\*) Daphna Palti, PhD "LINE FOLLOWING FOR MEDICAL APPLICATIONS", 1998 (Prof. Rafael Beyar and Dr. N. Kiryati were principal advisors, currently at a Hi-Tech Company in Israel).
10. (\*) Tal Nir, PhD, "TOPICS IN MOTION ANALYSIS", 2007 (currently at Rafael Ltd, Israel).
11. (\*) Ilya Blayvas, PhD, "ON ACCURACY ANALYSIS OF 3D SCANNERS, BINARIZATION, AND MACHINE LEARNING", (Prof. Ron Kimmel was a principal advisor), 2009 (now in Hi-Tech, Israel).
12. Noam Gordon, PhD, "DISTRIBUTED GEOMETRIC COORDINATION", (jointly with Dr. Israel Wagner, currently Head of Algorithms Team at Camtek Ltd., Israel), 2010.
13. Yaniv Altshuler, PhD, "MULTI AGENTS ROBOTICS IN DYNAMIC ENVIRONMENTS", (jointly with Dr. Israel Wagner, currently at ENDOR, his start-up, and affiliated with MIT's Media Lab), 2010.
14. Yotam Elor, PhD, "ALGORITHMS FOR ROBOTIC SWARMS AND MULTI-A(GE)NT SYSTEMS", 2013 (currently at Final, an algo-trading company).
15. Rotem Manor, PhD, "GATHERING AND GUIDANCE OF MULTI-AGENT SYSTEMS", 2017 (currently at Rafael).
16. Yehuda Dar. PhD, "NEW METHODS FOR VIDEO CODING", (jointly with M. Elad), December 2018.
17. Ariel Barel, PhD, "DISTRIBUTED CONTROL OF MULTI-AGENT SYSTEMS", December 2018 (currently at Rafael).

**Studies in Progress:**

1. Ilana Segal, PhD, "BROADCAST CONTROL OF SWARMS".
2. Dmitry Rabinovich, PhD, "GATHERING ON THE LINE PROCESS".
3. Roei Francos, MSc, "SWARMS IN SEARCH AND SWEEP".
4. Gidi Elazar, pursuing Independent Research.
5. David Dovrat, PhD.
6. Michael Amir, PhD.
7. Thomas Dages, MSc, "SPATIO-TEMPORAL SALIENCY DETECTION".