# Curriculum Vitae—Daphna Weinshall

School of Computer Science and Engineering
Hebrew University of Jerusalem
Jerusalem 91904, ISRAEL
email: daphna@mail.huji.ac.il

Citizenship: Israel & US

## Research Interests

- Computer vision and visual perception
- Machine and human learning
- Affective computing of mental state

## Education

**B.Sc.** 1979–1982. Math. & Computer Science, **Tel-Aviv University**. Summa cum laude.

**M.Sc.** 1983–1985. Department of Statistics, **Tel-Aviv University**. Summa cum laude. Advisor: Prof. Ilan Eshel. **Dissertation:** "A Solution to the prisoner's dilemma in a series of stochastic games with possible application to the evolution of social behavior".

**Ph.D.** 1985–1986. Department of Statistics, **Tel-Aviv University.** Advisor: Prof. Ilan Eshel. **Dissertation:** "The Evolution of Sexual Reproduction - a Mathematical Model".

## Professional Affiliations

- 1987 – 1991. **Postdoctoral Fellow**, Center for Biological Information Processing (CBIP), **Massachusetts Institute of Technology**. Host: Prof. Tomaso Poggio, department of Brain and Cognitive Sciences.
- 1991–1992. **Visiting Scientist**, IBM T.J. Watson Research Center, Yorktown Heights, New-York, USA.
- 1993–1997. **Senior Lecturer**, School of Computer Science and Engineering, Hebrew University, Jerusalem.
- 1996–1997, Sabbatical. **Visiting Professor**, Ctr. for Neural Sciences and Courant Institute, New-York University, New-York, USA.
- 1996–1998, Sabbatical. **Visiting Scientist**, NEC Research Institute, Princeton, NJ, USA.
- 1997 – 2004. **Associate Professor**, School of Computer Science and Engineering, Hebrew University, Jerusalem.
- 2001–2002, Sabbatical. **Visiting Scientist**, Philips Research, Briarcliff NY, New-York, USA.
- 2000 – 2012. Member of the interdisciplinary Center for Neural Computation at the Hebrew University.

- 2007–2008, Sabbatical. **Massachusetts Institute of Technology**. Host: Prof. Tomaso Poggio.
- 2004 – present. **Full Professor**, School of Computer Science and Engineering, Hebrew University, Jerusalem.

## International Editorial Boards and Commissions of Trust

- **Editorial Board:** *IEEE Trans. on Pattern Analysis and Machine Intelligence* (2008 – 2012), *Computer Vision and Image Understanding (CVIU)* (2002 – 2006), *Machine Vision and Applications* (1995-2002).
- **Conference Program Board (Area Chair):** IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2004, 2007, 2009, 2011, 2014, 2017; Conference on Advances in Neural Information Processing Systems (NIPS), 2004, 2005; European Conference on Computer Vision (ECCV), 1996, 1998, 2000, 2006, 2010.
- **Commissions of Trust:** ERC Advance Grants evaluation panel chair 2014, 2016, 2018; ERC Consolidator Grants evaluation panel member 2013. BSF-NSF in Computational Neuroscience program, evaluation panel member 2014. Inria Theme *Interaction and Visualization*, evaluation panel member 2014.

## Student supervision

- **PhD Students:** 9 graudated, 3 currently active.
- **MSc Students:** 15 graudated, 5 currently active.

## Issued patents

- Daphna Weinshall, Mi-Suen Lee. #6993179 Strapdown system for three-dimensional reconstruction. Issued 31/1/2006.
- Padmananbhan Anandan, Michal Irani, Daphna Weinshall. #6198852 View synthesis from plural images using a trifocal tensor data structure in a multi-view parallax geometry. Issued: 6/3/2001.
- Mi-Suen Lee, Tomas Brodsky, Daphna Weinshall, Miroslav Trajkovic. #6965379 N-view synthesis from monocular video of certain broadcast and stored mass media content. Issued 15/11/2005.
- Scott Kirkpatrick, Daphna Weinshall. #7174459 Imprinting an identification certificate. Issued 6/2/2007.

## Grants

- Israel Academy of Sciences (ISF). "Learning Invariants in Temporal and Visual Pattern Recognition". Parincipal Investigators: D. Weinshall and T. Tishby. 1992–1995, $52,000 total.

- French-Israeli Binational (AFIRST). "Representation and Computation of $3D$ Shape in Vision". Parincipal Investigators: D. Weinshall and R. Mohr (Grenoble U). 1993-1995, 110,000 ISH total.
- US-Israel Binational Science Foundation (BSF). "The Representation of $3D$ Shape in Human and Machine Vision". Parincipal Investigators: D. Weisnhall and M. Pavel (NYU). 1993 – 1996. $54,600 total.
- Advanced Research Projects Agency, U.S. Dept. of Defense (ARPA). "Structure, Object, and Motion Recognition from Image Sequences. Parincipal Investigators: S. Peleg, D. Weinshall and M. Werman. 1993 – 1996, $320,000 total.
- Israeli Ministry of Defense. "Motion Compensation for Video Compression". Parincipal Investigators: S. Peleg, D. Weinshall, M. Werman and H.G. Musmann (Hamburg U.). 1994– 1996, $160,000.
- Ministry of Science. "The computation of temporal qualitative features for the representation of three-dimensional objects". Parincipal Investigator: D. Weinshall. 1994 – 1996, 73,000 ISH total.
- Ministry of Science. "Computer Vision - A strategic infrastructure grant". Parincipal Investigators: S. Peleg, M. Werman and D. Weinshall. 1995–1998, $250,000 total.
- DARPA Image Understanding Program. "Multi-Sensor Representation of Extended Scenes Using Multi-View Geometry". Parincipal Investigators: S. Peleg, A. Shashua, D. Weinshall, M. Werman, M. Irani (Weizmann Institute). 1997 – 1999, $364,000 total.
- Magnet program on Multi-media consortium. "Video Information Management in multimedia systems". Parincipal Investigators from HU: S. Peleg, A. Shashua, D. Weinshall and M. Werman. 1997 – 2000, $279,000.
- US-Israel Binational Science Foundation (BSF). "Computer Vision via Graph Partitioning". Parincipal Investigators: D. Weisnhall and D. Geiger (NYU). 2000 – 2003. $60,000 total.
- Commission of the European Communities, 5th Framework Program. "Being There - Without Going". Parincipal Investigators: S. Peleg and D. Weinshall (Hebrew U.), Tomas Pajdla (CTU Prague), Erik Granum (Aalborg U. Denmark), M. Fahle (Bremen U. Germany), D. Benyon (Napier U. Edinburgh). 2002 – 2005, 405,000 Euro total.
- The Israeli Academy of Sciences. "Innovative Design of Mathematical Projections for Photography for Remote Presence". Parincipal Investigators: S. Peleg and D. Weinshall (Hebrew U.). 2002-2005, 650,000 ISH per year.
- Commission of the European Communities, 6th Framework Program. Detection and Identification of Rare Audiovisual Cues (DIRAC). Role: PI and scientific coordinator. Principal Investigators: H. Hermansky (IDIAP, CH), L. van Gool (ETHZ, CH), D. Weinshall (Hebrew U., IL), T. Pajdla (CTU. CZ), B. Kollmeier (Oldenburg U., DE), F. W. Ohl (LIN Magdeburg, DE), R. Vogels (KUL, BE), M. Pavel (OHSU, OR USA). 2006 – 2010, 6,400,000 Euro total.
- Magnet program "Vulcan" (Video Understanding Learning Content And Notification). Principal Investigators from HU: D. Weinshall and S. Peleg. 2011 – 2013, 300,000 ISH per year.
- India-Israel joint program (MST). "Recognizing Novel Objects in Images". Principal Investigators from HUJI: D. Weisnhall and A. Shashua. 2011 – 2013. $25,000 per year.
- Israeli Ministry of Defense. "Detection of Unexpected Surprising Events in Video and Images". Principal Investigator: D. Weinshall. 2011-2015, 300,000 ISH total.

- Intel Israel, Center of Excellence in Machine Learning. "Brain-Inspired Sparse Representations for Visual Recognition". Principal Investigators from HUJI and Technion: Y. Weiss, D. Weinshall, Y. Eldar, R. Meir, A. Shashua. 2012-2015, $200,000 per year.
- Intel Israel, Center of Excellence in Machine Learning. "Large scale perceptual summaries of visual information". Principal Investigators from HUJI and Technion: A. Tal, S. Peleg, D. Weinshall, L. Zelnik-Manor, M. Werman. 2012-2015, $150,000 per year.
- The Israeli Science Foundation, Research Center. "Facing the Challenge of Large Unstructured Datasets: images, video and 3d models". Principal Investigators from HUJI and TAU: D. Lischinski, D. Cohen-Or, D. Weinshall, M. Werman, R. Fattal, S. Peleg, A. Shashua. 2012-2016, 1,250,000 ISH per year.
- Intel Israel, Center of Excellence in Machine Learning. "Mental phenotyping from 3D cameras". 2015-2017, $45,000 per year.

# Publications

## Peer-Reviewed Journal Papers

[A1] **D. Weinshall**, Why is a two environment system not rich enough to explain the evolution of sex?. *Am. Nat.* 128(5):736-750, 1986.

[A2] I. Eshel and **D. Weinshall**, Sexual reproduction and viability of future offspring. *Am. Nat.* 130(5):775-787, 1987.

[A3] **D. Weinshall** and I. Eshel, On the evolution of an optimal rate of sexual reproduction. *Am. Nat.* 130(5):758-774, 1987.

[A4] I. Eshel and **D. Weinshall**, Cooperation in a repeated game with random payment function. *J. Appl. Prob.* **25**:478-491, 1988.

[A5] E. Gamble, D. Geiger, T. Poggio and **D. Weinshall**, Integration of vision modules and labeling of surface discontinuities. *IEEE Trans. on Systems, Man and Cybernetics* 19(6):576–1581, 1989.

[A6] **D. Weinshall**, Perception of multiple transparent planes in stereo vision. *Nature* 341(2):737–739, 1989.

[A7] **D. Weinshall**, Qualitative depth from stereo, with applications. *Computer Vision, Graphics and Image Processing* 49:222-241, 1990.

[A8] S. Edelman and **D. Weinshall**, A self-organizing multiple-view representation of 3D objects. *Biological Cybernetics* 64:209-219, 1991.

[A9] **D. Weinshall**, Seeing "ghost" planes in stereo vision. *Vision Research* 31(10):1731–1748, 1991.

[A10] **D. Weinshall**, Direct computation of qualitative 3D shape and motion invariants. *IEEE Trans. on Pattern Analysis and Machine Intelligence* 13(12):1236–1240, 1991.

[A11] **D. Weinshall**, Shortcuts in shape classification from two images. *Computer Vision, Graphics and Image Processing* 56(1):57–68, 1992.

[A12] **D. Weinshall**, Model-based invariants for $3D$ vision. *International Journal of Computer Vision* 10(1):27–42, 1993.

[A13] **D. Weinshall**, The computation of multiple matching in doubly ambiguous stereograms with transparent planes. *Spatial Vision* 7(2):183–198, 1993.

[A14] **D. Weinshall**, Local shape approximation from shading. *Journal of Mathematical Imaging and Vision* 4(2):119–138, April 1994.

[A15] **D. Weinshall** and C. Tomasi, Linear and Incremental Acquisition of Invariant Shape Models from Image Sequences. *IEEE Trans. on Pattern Analysis and Machine Intelligence* 17(5):512–517, May 1995.

[A16] M. Werman and **D. Weinshall**, Similarity and Affine Distance Between Point Sets. *IEEE Trans. on Pattern Analysis and Machine Intelligence* 17(8):810-814, August 1995.

[A17] **D. Weinshall**, M. Werman and N. Tishby, Stability and Likelihood of Views of Three Dimensional Objects. *Computing Suppl.* 11:237-256, 1996.

[A18] R. Basri and **D. Weinshall**, Distance Metric between 3D Models and 2D Images for Recognition and Classification. *IEEE Trans. on Pattern Analysis and Machine Intelligence* 18(4):465-470, 1996.

[A19] **D. Weinshall** and M. Werman, On View Likelihood and Stability. *IEEE Trans. on Pattern Analysis and Machine Intelligence* 19(2):97–108, February, 1997.

[A20] H. Zabrodsky and **D. Weinshall**, Three Dimensional Symmetry from Two Dimensional Data. *Computer Vision and Image Understanding* 67(1):48-57, 1997.

[A21] S. Carlsson and **D. Weinshall**, Dual Computation of Projective Shape and Camera Positions from Multiple Images. *International Journal of Computer Vision* 27(3):227-241, 1998.

[A22] **D. Weinshall** and M. Werman, Minimal decomposition of model-based invariants. *Journal of Mathematical Imaging and Vision* 10(1):77-87, 1999.

[A23] G. Halevy and **D. Weinshall**, Motion of Disturbances: Detection and Tracking of Multi-body non rigid Motion. *Machine Vision and Applications* 11(3):122-137, 1999.

[A24] Y. Gdalyahu and **D. Weinshall**, Flexible Syntactic Matching of Curves and its Application to Automatic Hierarchical Classification of Silhouettes. *IEEE Trans. on Pattern Analysis and Machine Intelligence* 21(12):1312–1328, December 1999.

[A25] Z. Liu and **D. Weinshall**, Mechanisms of Generalization in Perceptual Learning. *Vision esearch* 40(1):97-109, 2000.

[A26] D. W. Jacobs, **D. Weinshall** and Y. Gdalyahu, Classification with Non-Metric Distances: Image Retrieval and Class Representation. *IEEE Trans. on Pattern Analysis and Machine Intelligence* 22(6):583-600, June 2000.

[A27] Y. Gdalyahu, **D. Weinshall** and M. Werman, Self organization in vision: stochastic clustering for image segmentation, perceptual grouping and image database organization. *IEEE Trans. on Pattern Analysis and Machine Intelligence* 23(10):1053-1074, Oct 2001.

[A28] A. Zomet, D. Feldman, S. Peleg and **D. Weinshall**, Mosaicing New Views: The Crossed-Slits Projection. *IEEE Trans. on Pattern Analysis and Machine Intelligence* 25(6):741-754, June 2003.

[A29] A. Bar-Hillel, T. Hertz, N. Shental and **D. Weinshall**, Learning a Mahalanobis Metric from equivalence constraints. *Journal of Machine Learning Research (JMLR)* 6(Jun): 937–965, 2005.

[A30] A. Sorkin, **D. Weinshall**, I. Modai and A. Peled, Improving the Accuracy of the Diagnosis of Schizophrenia by Means of Virtual Reality. *American Journal of Psychiatry*, 163(3):512-520, 2006.

[A31] A. Bar-Hillel and **D. Weinshall**, Efficient Learning of Relational Object Class Models. *Int J Comput Vis*, 77: 175–198, 2008.

[A32] D. Feldman and **D. Weinshall**, Motion Segmentation and Depth Ordering Using an Occlusion Detector. *IEEE Trans. on Pattern Analysis and Machine Intelligence*, 30(7):1171-1185, July 2008.

[A33] R. Hammer, A. Bar-Hillel, T. Hertz, **D. Weinshall** and S. Hochstein, Comparison Processes in Category Learning: From Theory to Behavior. *Brain Research*, 1225:102-118, 2008.

[A34] R. Hammer, T. Hertz, S. Hochstein and **D. Weinshall**, Category Learning from Equivalence Constraints. *Cognitive Processing*, 10(3):211-232, 2009.

[A35] R. Hammer, G. Diesendruck, **D. Weinshall** and S. Hochstein, The development of category learning strategies: What makes the difference? *Cognition*, 112(1):105-119, 2009.

[A36] R. Hammer, A. Brechmann, F. W. Ohl, **D. Weinshall** and S. Hochstein, Differential category learning processes: The neural basis of comparison-based learning and induction. *Neuroimage*, 52, 699-709, 2010.

[A37] Uri Shalit, **Daphna Weinshall**, and Gal Chechik. Online Learning in the Manifold of Low-Rank Matrices. *Journal of Machine Learning Research*, 13:429-458, Feb 2012.

[A38] **D. Weinshall**, A. Zweig, H. Hermansky, S. Kombrink, F. W. Ohl, J. Anemüller, J-H. Bach, L. Van Gool, F. Nater, T. Pajdla, M. Havlena and M. Pavel, Beyond Novelty Detection: Incongruent Events, when General and Specific Classifiers Disagree. *IEEE Trans. on Pattern Analysis and Machine Intelligence*, 34(10):1886-1901, Oct 2012.

[A39] Y. S. Resheff, S. Rotics, R. Nathan and **D. Weinshall**, Topic modeling of behavioral modes using sensor data. *International Journal of Data Science and Analytics*, 2016.

[A40] Haim Dubossarsky, **Daphna Weinshall** and Eitan Grossman, Verbs Change more than Nouns: a Bottom-up Computational Approach to Semantic Change. *LINGUE E LINGUAGGIO XV.1* (2016) 5-25.

### Peer-Reviewed Conference papers (full papers)

[B1] **D. Weinshall**, Qualitative depth from vertical and horizontal binocular disparities, in agreement with psychophysical evidence. *Proceedings: IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* 159–164, Ann Arbor, June 1988.

[B2] **D. Weinshall**, Application of qualitative depth and shape from stereo. *Proceedings: IEEE second International Conference of Computer Vision (ICCV)* 144–148, Tarpon Springs, December 1988.

[B3] **D. Weinshall**, S. Edelman and H. Bülthoff, A self-organizing multiple-view representation of 3D objects. In *Advances in Neural Information Processing Systems (NIPS) 2* 274–281, Morgan Kaufmann Publishers, San-Mateo, CA, 1990.

[B4] **D. Weinshall**, Shortcuts in the computation of qualitative 3D shape and motion invariants. *AAAI-90 workshop on qualitative vision* 31–35, Boston, July 1990.

[B5] **D. Weinshall**, Direct computation of qualitative 3D shape and motion invariants. *Proceedings: IEEE third International Conference of Computer Vision (ICCV)* 230-237, Osaka, December 1990.

[B6] **D. Weinshall**, Qualitative structure from motion. In *Advances in Neural Information Processing Systems (NIPS) 3*, 356–362, Morgan Kaufmann Pub., San-Mateo CA, 1991.

[B7] **D. Weinshall**, Local shape approximation from shading. *Proceedings: IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* 716–718, IL, June 1992.

[B8] **D. Weinshall** and C. Tomasi Linear and incremental acquisition of invariant shape models from image sequences. *Proceedings: IEEE fourth International Conference of Computer Vision (ICCV)* 675-682, Berlin, May 1993.

[B9] R. Mohan, **D. Weinshall** and R. R. Sarukkai, 3D object recognition by indexing structural invariants from multiple views. *Proceedings: IEEE fourth International Conference of Computer Vision (ICCV)* 264-268, Berlin, May 1993.

[B10] **D. Weinshall**, Model-based invariants for 3*D* vision. *Proceedings: IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* 695–696, NY, June 1993.

[B11] **D. Weinshall** and R. Basri, Distance Metric between 3D Models and 2D Images for Recognition and Classification. *Proceedings: IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* 220–225, NY, June 1993.

[B12] **D. Weinshall**, A Hierarchy of Invariant Representations of 3*D* Shape. *Proceedings: IEEE Workshop on Qualitative Vision* 97–106, NY, June 1993.

[B13] **D. Weinshall**, M. Werman and N. Tishby, Stability and Likelihood of Views of Three Dimensional Objects. *Proceedings: Third European Conference of Computer Vision (ECCV)* 24–35, Stockholm, May 1994.

[B14] H. Zabrodsky and **D. Weinshall**, Three Dimensional Symmetry from Two Dimensional Data. *Proceedings: Third European Conference of Computer Vision (ECCV)* 403–410, Stockholm, May 1994.

[B15] B. Boufama, **D. Weinshall** and M. Werman Shape from motion algorithms: a comparative analysis of scaled orthography and perspective. *Proceedings: Third European Conference of Computer Vision (ECCV)* 199–204, Stockholm, May 1994.

[B16] M. Werman and **D. Weinshall**, Similarity and Affine Distance Between Point Sets. *Proceedings: International Conference of Pattern Recognition (ICPR)* 723–725, Jerusalem, October 1994.

[B17] **D. Weinshall**, Michael Werman and Amnon Shashua, Shape Tensors for Efficient and Learnable Indexing. *Proceedings: IEEE Workshop on Representation of Visual Scenes* Boston, USA, 1995.

[B18] **D. Weinshall** and M. Werman, Disambiguation techniques for recognition in large databases and for under-constrained reconstruction. *Proceedings: IEEE International Symposium on Computer Vision (ICCV)* 425–430, Coral Gables, USA, 1995.

[B19] M. Werman and **D. Weinshall**, Complexity of Indexing: Efficient and Learnable Large Database Indexing. *Proceedings: Fourth European Conference of Computer Vision (ECCV)* I:660–670, Cambridge, April 1996.

[B20] **D. Weinshall**, M. Werman and Amnon Shashua, Shape Descriptors: Bilinear, Trilinear and Quadrilinear Relations for Multi-Point Geometry. *Proceedings: Fourth European Conference of Computer Vision (ECCV)* II:217-227, Cambridge, April 1996.

[B21] Y. Gdalyahu and **D. Weinshall**, Measures for Silhouettes Resemblance and The Most Representative Silhouette of a Curved Object. *Proceedings: Fourth European Conference of Computer Vision (ECCV)* II: 363–375, Cambridge, April 1996.

[B22] G. Halevy and **D. Weinshall**, Motion of Disturbances: Detection and Tracking of Multi-body non rigid Motion. *Proceedings: IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* 897–902, San-Juan, June 1997.

[B23] D. Jacobs, **D. Weinshall** and Y. Gdalyahu, Condensing Image Databases when Retrieval is based on Non-Metric Distances. *Proceedings: IEEE sixth International Conference of Computer Vision (ICCV)* 596–601, Bombay, January 1998.

[B24] M. Irani, P. Anandan and **D. Weinshall**. From Reference Frames to Reference Planes: A New Framework for 3D Scene Analysis. *Proceedings: Fifth European Conference of Computer Vision (ECCV)* II:829–845, Freiburg, June 1998.

[B25] Y. Gdalyahu and **D. Weinshall**, Flexible Syntactic Matching of Curves. *Proceedings: Fifth European Conference of Computer Vision (ECCV)* II:123–139 Freiburg, June 1998.

[B26] **D. Weinshall**, P. Anandan and M. Irani, A Stratified Approach to 3D Reconstruction from Uncalibrated Images, with Partial Scene Calibration. *Proceedings: Workshop on 3D Structure from Multiple Images of Large Scale Environments (SMILE '98)* LCNS 1506, 208-223, Springer-Verlag 1998.

[B27] Y. Gdalyahu and **D. Weinshall**, Automatic Hierarchical Classification of Silhouettes Images of 3D Objects. *Proceedings: IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* 787–793, Santa-Barbara, June 1998.

[B28] Z. Liu and **D. Weinshall**, Mechanisms of Generalization in Perceptual Learning. In *Advances in Neural Information Processing Systems (NIPS)* 45–51, MIT Press, 1998.

[B29] Y. Gdalyahu, **D. Weinshall** and M. Werman, A Randomized Algorithm for Pairwise Clustering. In *Advances in Neural Information Processing Systems (NIPS)* 424–430, MIT Press, 1998.

[B30] **D. Weinshall**, D. W. Jacobs and Y. Gdalyahu, Classification in Non-Metric Spaces. In *Advances in Neural Information Processing Systems (NIPS)* 838–844, MIT Press, 1998.

[B31] E. Domany, M. Blatt, Y. Gdalyahu and **D. Weinshall**, Superparamagnetic clustering of data: application to computer vision. *Proceedings: Conference on Computational Physics* Granada, 1998; Comp. Phys. Comm. 121-122, 5 (1999).

[B32] Y. Gdalyahu, **D. Weinshall** and M. Werman, Stochastic Image Segmentation by Typical Cuts. *Proceedings: IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* II:596–601, Fort Collins, June 1999.

[B33] Y. Gdalyahu, N. Shental and **D. Weinshall**, Perceptual Grouping and Segmentation by Stochastic Clustering. *Proceedings: IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* I:367–374, South Carolina, June 2000.

[B34] M.S. Lee, **D. Weinshall**, E. Cohen-Solal, A. Colmenarez and D. Lyons, A Computer Vision System for On-Screen Item Selection by Finger Pointing. *Proceedings: IEEE Conference on Computer Vision and Pattern Recognition (CVPR)* I:1026-1033, Hawaii, Dec 2001.

[B35] **D. Weinshall**, M.S. Lee, T. Brodsky, M. Trajkovic and D. Feldman, New view generation with a bi-centric camera. *Proceedings: seventh European Conference of Computer Vision (ECCV)* Copenhagen, May 2002.

[B36] N. Shental, T. Hertz, **D. Weinshall** and M. Pavel, Adjustment Learning and Relevant Component Analysis. *Proceedings: seventh European Conference of Computer Vision (ECCV)* Copenhagen, May 2002.

[B37] D. Feldman, A. Zomet, S. Peleg and **D. Weinshall**, New video generation with the Crossed-Slits Camera. *Proceedings: IEEE Workshop on Motion and Video Computing* Orlando FL, Dec 2002.

[B38] T. Hertz, N. Shental, A. Bar-Hillel and **D. Weinshall**, Enhancing Image and Video Retrieval: Learning via Equivalence Constraints. *Proceedings: IEEE Conf. on Computer Vision & Pattern Recognition (CVPR)*, Madison WI, June 2003.

[B39] A. Bar-Hillel, T. Hertz, N. Shental and **D. Weinshall**, Learning Distance Functions using Equivalence Relations. *Proceedings: 20th International Conference on Machine Learning (ICML) 2003*, Washington DC, August 2003.

[B40] A. Bar-Hillel and **D. Weinshall**, Learning with Equivalence Constraints and the Relation to Multiclass Learning. *Proceedings: 16th Conference on Learning Theory (COLT) 2003* Washington DC, August 2003.

[B41] N. Shental, A. Bar-Hillel, T. Hertz and **D. Weinshall**, Computing Gaussian Mixture Models with EM using Side-Information. *Proceedings: workshop* The Continuum from labeled to unlabeled data in machine learning and data mining ICML 2003.

[B42] D. Feldman, T. Pajdla and **D. Weinshall**, On the Epipolar Geometry of the Crossed-Slits Projection. *Proceedings: IEEE 9th International Conference of Computer Vision (ICCV)* Nice, France, Oct 2003.

[B43] N. Shental, A. Bar-Hillel, T. Hertz and **D. Weinshall**, Computing Gaussian Mixture Models with EM using Equivalence Constraints. In *Advances in Neural Information Processing Systems (NIPS)* MIT Press, Dec 2003.

[B44] **D. Weinshall** and S. Kirkpatrick, Passwords you'll never forget, but can't recall. *Proceedings: ACM Conf. on Computer Human Interfaces (CHI)*, Viena Austria, April 2004.

[B45] T. Hertz, A. Bar-Hillel and **D. Weinshall**, Learning Distance Functions for Image Retrieval. *Proceedings: IEEE Conf. on Computer Vision & Pattern Recognition (CVPR)*, Washington DC, June 2004.

[B46] T. Hertz, A. Bar-Hillel and **D. Weinshall**, Boosting Margin Based Distance Functions for Clustering. *Proceedings: 21st International Conference on Machine Learning (ICML)*, Banff Canada, Aug 2004.

[B47] A. Sorkin, A. Peled and **D. Weinshall**, Virtual Reality Testing of Multi-Modal Integration in Schizophrenic Patients. *Proceedings: 13th Annual Medicine Meets Virtual Reality Conference (MMVR)*, Long Beach CA, Jan 2005.

[B48] A. Bar-Hillel, T. Hertz and **D. Weinshall**, Object class recognition by boosting a part based model. *Proceedings: IEEE Conf. on Computer Vision & Pattern Recognition (CVPR)*, San-Diego CA, June 2005.

[B49] R. Hammer, T. Hertz, S. Hochstein and **D. Weinshall**, Category Learning from Equivalence Constraints. *Proceedings: XXVII Annual Conference of the Cognitive Science Society (CogSci2005)*, Piedmont Italy, July 2005.

[B50] D. Feldman and **D. Weinshall**, Realtime IBR with Omnidirectional Crossed-Slits Projection. *Proceedings: IEEE 10th International Conference of Computer Vision (ICCV)*, Beijing China, Oct 2005.

[B51] A. Bar-Hillel, T. Hertz and **D. Weinshall**, Efficient Learning of Relational Object Class Models. *Proceedings: IEEE 10th International Conference of Computer Vision (ICCV)*, Beijing China, Oct 2005.

[B52] I. Weiner, T. Hertz, I. Nelken and **D. Weinshall**, Analyzing Auditory Neurons by Learning Distance Functions. In *Advances in Neural Information Processing Systems (NIPS)*, Vancouver, Dec 2005.

[B53] **D. Weinshall**, Cognitive Authentication Schemes Safe Against Spyware. *Proceedings: IEEE Symposium on Security and Privacy (S&P)*, Berkeley, May 2006.

[B54] D. Feldman and **D. Weinshall**, Motion Segmentation Using an Occlusion Detector. *Proceedings: Workshop on Dynamical Vision, in 9th European Conference on Computer Vision (ECCV)*, Graz Austria, May 2006.

[B55] T. Hertz, A. Bar-Hillel and **D. Weinshall**, Learning a Kernel Function for Classification with Small Training Samples. *Proceedings: 23rd International Conference on Machine Learning (ICML)*, Pittsburgh PA, June 2006.

[B56] A. Bar-Hillel and **D. Weinshall**, Subordinate class recognition using relational object models. In *Advances in Neural Information Processing Systems (NIPS)*, Vancouver, Dec 2006.

[B57] A. Bar-Hillel and **D. Weinshall**, Learning Distance Function by Coding Similarity. *Proceedings: International Conference on Machine Learning (ICML)*, Corvallis OR, June 2007.

[B58] R. Hammer, T. Hertz, S. Hochstein and **D. Weinshall**, Classification with Positive and Negative Equivalence onstraints: Theory, Computation and Human Experiments. F. Mele et al. (Eds.): Brain, Vision, and Artificial Intelligence: Second International Symposium. BVAI 2007, LNCS 4729. pp. 264-276, 2007. Berlin Heidelberg: Springer-Verlag Press.

[B59] A. Zweig and **D. Weinshall**, Exploiting Object Hierarchy: Combining Models from Different Category Levels. *Proceedings: IEEE 11th International Conference of Computer Vision (ICCV)*, Rio de Janeiro Brazil, October 2007.

[B60] **D. Weinshall** and L. Zamir, Image Classification from Small Sample, with Distance Learning and Feature Selection. *Proceedings: 3rd International Symposium on Visual Computing*, G. Bebis et al. (Eds.): ISVC 2007, Part II, LNCS 4842, pp. 106-115, 2007.

[B61] A. Sorkin, **D. Weinshall** and A. Peled, The distortion of reality perception in schizophrenia patients, as measured in Virtual Reality. *Proceedings: 16th Annual Medicine Meets Virtual Reality Conference (MMVR)*, Long Beach CA, Jan 2008.

[B62] J. Anemueller, J.-H. Bach, B. Caputo, J. Luo, F. Ohl, F. Orabona, R. Vogels, A. Zweig, and **D. Weinshall**. Biologically Motivated Audio-Visual Cue Integration for Object Categorization. International Conference on Cognitive Systems (CogSys08), Karlsruhe, Germany, April 2008.

[B63] **D. Weinshall**, H. Hermansky, A. Zweig, J. Luo, H. Jimison, F. Ohl, and M. Pavel. Beyond Novelty Detection: Incongruent Events, when General and Specific Classifiers Disagree. *Proceedings: Advances in Neural Information Processing Systems (NIPS)*, Vancouver, Dec 2008 [oral presentation].

[B64] R. Kliper, T. Serre, **D. Weinshall**, and I. Nelken. The Story of A Single Cell: Peeking into the Semantics of Spikes. *Proceedings: IAPR Workshop on Cognitive Information Processing (CIP)*, Elba Island, June 2010. Winner of 2nd best student paper award.

[B65] R. Kliper, Y. Vaizman, **D. Weinshall**, and S. Portuguese. Evidence for depression and schizophrenia in speech prosody. *Proceedings: Second ISCA Tutorial and Research Workshop on Experimental Linguistics - ExLing*, Athens Greece, August 2010.

[B66] A. Hendel, **D. Weinshall**, and S. Peleg. Identifying Surprising Events in Videos Using Bayesian Topic Models. *Proceedings: 10th Asian Conference of Computer Vision (ACCV)*, Queenstown New Zealand, Nov 2010.

[B67] U. Shalit, **D. Weinshall**, and G. Chechik. Online Learning in the Manifold of Low-Rank Matrices. *Proceedings: Advances in Neural Information Processing Systems (NIPS)*, Vancouver, Dec 2010.

[B68] R. Kliper, H. Kayser, **D. Weinshall**, J. Anemüller and I. Nelken. Monaural Azimuth Localization Using Spectral Dynamics of Speech. *Proceedings: Interspeech*, Florence Italy, Aug 2011.

[B69] A. Rosenfeld and **D. Weinshall**, Extracting Foreground Masks towards Object Recognition. *Proceedings: IEEE 13th International Conference of Computer Vision (ICCV)*, Barcelona Spain, Nov 2011.

[B70] U. Shalit , **D. Weinshall** and G. Chechik, Modeling Musical Influence with Topic Models. *Proceedings: International Conference on Machine Learning (ICML)*, Atlanta GA, June 2013.

[B71] A. Zweig and **D. Weinshall**, Hierarchical Regularization Cascade for Joint Learning. *Proceedings: International Conference on Machine Learning (ICML)*, Atlanta GA, June 2013.

[B72] A. Zweig and **D. Weinshall**, Hierarchical Multi-Task Learning: a Cascade Approach Based on the Notion of Task Relatedness. *Theoretically Grounded Transfer Learning workshop, held at International Conference on Machine Learning (ICML)*, Atlanta GA, June 2013.

[B73] **D. Weinshall**, D. Hanukaev and G. Levi, LDA Topic Model with Soft Assignment of Descriptors to Words. *Proceedings: International Conference on Machine Learning (ICML)*, Atlanta GA, June 2013.

[B74] A. Golbert and **D. Weinshall**, Object Detection in Multi-view 3D Reconstruction Using Semantic and Geometric Context. *ISPRS Annals Volume II-3/W3 2013, CMRT13 - City Models, Roads and Traffic, pp. 97-102*, Antalya Turkey, Nov 2013.

[B75] Y. S. Resheff, S. Roticsy, R. Nathan and **D. Weinshall**, Matrix factorization approach to behavioral mode analysis from acceleration data. *Proceedings: IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, 19-21 Oct, 2015.

[B76] R. Kliper, S. Portuguese and **D. Weinshall**, Prosodic Analysis of Speech and the Underlying Mental State. *Proceedings: Pervasive Computing Paradigms for Mental Health (MindCare)*, Springer International Publishing, Sept 2015.

[B77] T. Tron, A. Peled, A. Grinsphoon and **D. Weinshall**, Automated Facial Expressions Analysis in Schizophrenia: a Continuous Dynamic Approach. *Proceedings: Pervasive Computing Paradigms for Mental Health (MindCare)*, Springer International Publishing, Sept 2015.

[B78] N. Vinokurov, D. Arkadir, E. Linetsky, H. Bergman and **D. Weinshall**, Quantifying Hypomimia in Parkinson Patients Using a Depth Camera. *Proceedings: Pervasive Computing Paradigms for Mental Health (MindCare)*, Springer International Publishing, Sept 2015.

[B79] M. Dyshel, D. Arkadir, H. Bergman and **D. Weinshall**, Quantifying Levodopa-Induced Dyskensia Using Depth Camera. *Proceedings: Third Workshop on Assistive Computer Vision and Robotics (ACVR)*, Santiago Chile, Dec 2015 .

[B80] T. Tron, A. Peled, A. Grinsphoon and **D. Weinshall**, Facial Expressions and Flat Affect in Schizophrenia, Automatic Analysis from Depth Camera Data. *Proceedings: IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI)*, pp. 220-223, Feb 2016.

[B81] T. Tron, A. Peled, A. Grinsphoon and **D. Weinshall**, Differentiating Facial Incongruity and Flatness in Schizophrenia using Structured Light Camera Data. *Proceedings: IEEE Annual International Conference of the Engineering in Medicine and Biology Society (EMBC)*, Aug 2016.

[B82] Y. S. Resheff and **D. Weinshall**, Optimized Linear Imputation. *Proceedings: 6th International Conference on Pattern Recognition Application and Methods (ICPRAM)*, Porto Portugal, Feb 2017.

[B83] D. Hadar, T. Tron and **D. Weinshall**, Implicit Media Tagging and Affect Prediction from RGB-D video of spontaneous facial expressions. *Proceedings: 12th IEEE International Conference on Automatic Face and Gesture Recognition (FG2017)*, Washington DC, May 2017.

[B84] Gad Cohen and **Daphna Weinshall**, Hidden Layers in Perceptual Learning. *Proceedings: IEEE Conf. on Computer Vision & Pattern Recognition (CVPR)*, Honolulu HI, July 2017; spotlight.

[B85] Haim Dubossarsky, **Daphna Weinshall** and Eitan Grossman, Outta control: Laws of semantic change and inherent biases in word representation models. *Proceedings: Conference on Empirical Methods in Natural Language Processing (EMNLP)*, Copenhagen Denmark, September 2017; Oral, honorable mention with an "Outstanding Paper" distinction.

[B86] Talia Tron, Yehezkel S. Resheff, Mikhail Bazhmin, Abraham Peled and **Daphna Weinshall**, Real-time Schizophrenia Monitoring using Wearable Motion Sensitive Devices. *Proceedings: 7th EAI International Conference on Wireless Mobile Communication and Healthcare (MobiHealth)*, Vienna Austria, Nov 2017.

### Peer-Reviewed Conference Proceedings (abstracts)

[C1] E. L. Schwartz, A. Shaw and **D. Weinshall**, Flattening visual cortex at image resolution: quantitative computer reconstruction of the macaque ocular dominance column pattern. *Society for Neuroscience abstracts* p. 1043, November 1987.

[C2] **D. Weinshall** and E. L. Schwartz, A new method for measuring the visuotopic map function of striate cortex: validation with macaque data and possible extension to measurement of the human map. *Society for Neuroscience abstracts* p. 1043, November 1987.

[C3] **D. Weinshall**, The induced-effect and other psychophysical results as predicted by expressions of qualitative depth obtained from binocular disparities. *Asso. for Research in Vision and Ophthalmology, Annual meeting abstract issue*, May 1988.

[C4] D. Geiger and **D. Weinshall**, Labeling edges with a linear network: an integration of low-level vision modules. *proceedings of International Neural Networks Society* September 1988.

[C5] **D. Weinshall**, Seeing "ghost" solutions in stereo vision. *Asso. for Research in Vision and Ophthalmology, Annual meeting abstract issue*, April 1989.

[C6] S. Edelman, H. Bülthoff and **D. Weinshall**, Exploring representation of 3D objects for visual recognition. *Asso. for Research in Vision and Ophthalmology, Annual meeting abstract issue*, April 1989. NEC 0(1)

[C7] **D. Weinshall**, The perception of multiple surfaces in ambiguous random-dot stereograms. *12th European Conference on Visual Perception* September 1989.

[C8] S. Edelman, H. Bülthoff and **D. Weinshall**, Integrating information for visual recognition of 3D objects. *12th European Conference on Visual Perception* September 1989.

[C9] **D. Weinshall**, Direct computation of 3D shape and motion invariants. *Optical Society of America Annual meeting* October 1989.

[C10] H. Bülthoff, S. Edelman and **D. Weinshall**, Cue interaction in object recognition. *Optical Society of America Annual meeting* October 1989.

[C11] **D. Weinshall**, D. Geiger and T. Poggio, Labeling of surface discontinuities through the integration of vision modules. *Proceedings: The 16th convention of electrical and electronics engineers in Israel (IEEE)*, Tel-Aviv, March 1989.

[C12] S. Edelman and **D. Weinshall**, Qualitative shape perception in impoverished motion stimuli. *Asso. for Research in Vision and Ophthalmology, Annual meeting abstract issue*, April 1990.

[C13] **D. Weinshall**, Ambiguous correspondence in stereo and motion . *Asso. for Research in Vision and Ophthalmology, Annual meeting abstract issue*, April 1990.

[C14] **D. Weinshall** and S. Edelman, Shortcuts in the computation of structure from motion. *13th European Conference on Visual Perception* Paris, September 1990.

[C15] **D. Weinshall** and S. Barash, The role of eye movement in motion correspondence. *Asso. for Research in Vision and Ophthalmology, Annual meeting abstract issue*, April 1991.

[C16] **D. Weinshall**, The computation of multiple matching in stereo. *14th European Conference on Visual Perception* Vilnius, September 1991.

[C17] **D. Weinshall**, A computational study of the matching of doubly ambiguous stereograms. *Asso. for Research in Vision and Ophthalmology, Annual meeting abstract issue*, April 1992.

[C18] **D. Weinshall**, Model-Based Invariants for Learning 3D Shape, Representation and Recognition. *15th European Conference on Visual Perception* Pisa, September 1992.

[C19] **D. Weinshall** and M. Pavel, Random motion in $3D$ perceived as coherent motion. *16th European Conference on Visual Perception* Edinburgh, UK, August 1993.

[C20] M. Pavel and **D. Weinshall**, Structure from Motion: The Invariant Nature of 3D Representation. *Asso. for Research in Vision and Ophthalmology, Annual meeting abstract issue*, April 1994.

[C21] **D. Weinshall** and Y. Gdalyahu, Stability and likelihood of images may explain some variability in the recognition of different views of three dimensional objects. *Asso. for Research in Vision and Ophthalmology, Annual meeting abstract issue*, April 1994.

[C22] **D. Weinshall** and M. Pavel, The representation underlying structure from motion and grouping. *18th European Conference on Visual Perception* Tübingen, August 1995.

[C23] M. Pavel and **D. Weinshall**, On the non-rigid perception of looming. *Asso. for Research in Vision and Ophthalmology, Annual meeting abstract issue*, May 1997.

[C24] Z. Liu and **D. Weinshall**, Perceptual learning transfers — learning is getting faster. *Abstracts of the Psychonomic Society* Philadelphia, Nov 1997.

[C25] Z. Liu and **D. Weinshall**, New Modes of Generalization in Perceptual Learning. *Asso. for Research in Vision and Ophthalmology, Annual meeting abstract issue*, May 1998.

[C26] A. Sorkin, A. Peled and **D. Weinshall**, The Use of Virtual Reality for Integrative Multimodal Testing, and Application in Schizophrenia. *Proceedings: Israel Society for Neuroscience, Annual Meeting*, Eilat, Dec 2003.

[C27] R. Hammer, T. Hertz, S. Hochstein and **D. Weinshall**, Category learning from positive and negative pairwise relations. *European Conference on Visual Perception* (oral presentation), St. Petersburg Russia, August 2006.

[C28] A. Sorkin, A. Peled and **D. Weinshall**, Detection of inconsistent audio-visual events in virtual reality. *European Conference on Visual Perception* (poster presentation), St. Petersburg Russia, August 2006.

[C29] R. Hammer, G. Diesendruck, **D. Weinshall** and S. Hochstein, The development of category learning strategies. *European Conference on Visual Perception* (oral presentation), Arezzo Italy, August 2007. Perception, 2007, volume 36, supplement, pages 175.

[C30] R. Hammer, A. Brechmann, F. Ohl, G. Diesendruck, **D. Weinshall** and S. Hochstein, Differential Learning Processes for Categorization. *Vision Sciences Society 8th Annual Meeting* (oral presentation), May 2008.

[C31] R. Hammer, A. Brechmann, F. W. Ohl, **D. Weinshall** and S. Hochstein, Differential category learning processes: The neural basis of learning by comparison. *Soc. Neurosci. Abstr. 503.7*, October 2009.

## Book Edited

[D1] D. Weinshall, J. Anemüller, and L. van Gool (Eds.), *Detection and Identification of Rare Audio-visual Cues*, Studies in Computational Intelligence 384, by Springer-Verlag Berlin Heidelberg 2011.

## Book Chapters

[E1] T. Poggio, J. Little, E. Gamble, W. Gillett, D. Geiger, **D. Weinshall**, M. Villalba, N. Larson, T. Cass, H. Bülthoff, M. Drumheller, P. Oppenheimer, W. Yang, A. Hurlbert, D. Beymer and P. The MIT vision machine. *In P.H. Winston and S.A. Shellard, editors, Artificial Intelligence at MIT Expanding frontiers*, Vol 2, 492–529, MIT Press, Cambridge, MA, 1990.

[E2] S. Edelman and **D. Weinshall**, Computational vision: a critical review. *In R. J. Watt, editor, Pattern Recognition by Man and Machine, Vision and Visual Dysfunction*, Vol 14, chapter 4, 30–49, The Macmillan Press Ltd, 1991.

[E3] T. Poggio and **D. Weinshall**, The MIT Vision Machine: progress in the integration of vision modules. *To appear in R. Chellappa and A. Jain, editors, Markov Random Fields: Theory and Applications*, Academic Press Inc, Orlando, FL, 1992.

[E4] **D. Weinshall**, Model-based invariants for $3D$ vision. *In: Applications of invariance in computer vision, Lecture Notes in Computer Science 825, Eds J. L. Mundy, A. Zisserman and D. Forsyth*, Springer-Verlag, July 1994.

[E5] **D. Weinshall** and J. Malik, Review of Computational Models in Stereopsis. *In T. V. Papathomas ed., Early Vision and Beyond*, MIT Press, Cambridge MA, 1996.

[E6] S. Edelman and **D. Weinshall**, Computational approaches to shape constancy. *In V. Walsh and J. Kulikowski eds, Perceptual Constancies: why things look as they do*, Cambridge University Press, 1998.

### Dissertations

[F1] **Weinshall, D.** A Solution to the prisoner's dilemma in a series of stochastic games with possible application to the evolution of social behavior. *Master thesis, Department of Mathematics and Computer Science, Tel-Aviv University.* Resulting Publications: [A4].

[F2] **Weinshall, D.** The Evolution of Sexual Reproduction - a Mathematical Model. *Doctoral thesis, Department of Mathematics and Computer Science, Tel-Aviv University.* Resulting Publications: [A1][A2][A3].

### Technical Reports

[G1] V. Tsedaka and **D. Weinshall**, Data Modeling with Gaussian Mixture Based Clustering. Hebrew University, Leibniz Center for Research in Computer Science, TR 2004-27, 2004.

[G2] **D. Weinshall**, Secure Authentication Schemes suitable for an Associative Memory. Hebrew University, Leibniz Center for Research in Computer Science, TR 2004-30, 2004.

[G3] L. Zamir and **D. Weinshall**, Feature Selection in Distance Learning from Small Sample, Used for Image Classification. Hebrew University, Leibniz Center for Research in Computer Science, TR 2007-47, 2007.