

PROFESSOR SHIMON EDELMAN, PHD

Work

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Education

TECHNION – ISRAEL INSTITUTE OF TECHNOLOGY Haifa, Israel
1978 — B.Sc., Electronics Engineering

THE WEIZMANN INSTITUTE OF SCIENCE Rehovot, Israel
1985 — M.Sc., Computer Science

THE WEIZMANN INSTITUTE OF SCIENCE Rehovot, Israel
1988 — Ph.D., Computer Science

Experience

ISRAEL DEFENSE FORCES 1978–1983
Military service (rank attained: major, reserve).

MASSACHUSETTS INSTITUTE OF TECHNOLOGY Cambridge, MA
1988–1990
Postdoctoral Fellow at the Center for Biological Information Processing.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY Cambridge, MA
Summer 1991
Postdoctoral Associate at the Center for Biological Information Processing.

BROWN UNIVERSITY Providence, RI
July 1991–July 1993
Visiting Assistant Professor (Research), Department of Cognitive and Linguistic Sciences.

THE WEIZMANN INSTITUTE OF SCIENCE Rehovot, Israel
1990–1992
Researcher, Department of Applied Mathematics and Computer Science.

THE WEIZMANN INSTITUTE OF SCIENCE Rehovot, Israel
1992–1998
Senior Researcher, Department of Applied Mathematics and Computer Science.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY Cambridge, MA
1996–1997
Visiting Scientist, Center for Biological and Computational Learning.

UNIVERSITY OF SUSSEX Brighton, UK
1997–1998
Reader in CS & AI, School of Cognitive and Computing Sciences.

UNIVERSITY OF SUSSEX
1998–1999

Brighton, UK

Professor, School of Cognitive and Computing Sciences.

CORNELL UNIVERSITY
1999–

Ithaca, USA

Professor, Department of Psychology.

**Cooperation
in
Progress**

Prof. N. Intrator, Tel Aviv University and Brown University
Computational models of feature extraction and dimensionality reduction

Prof. E. Ruppin and Prof. D. Horn, Tel Aviv University
Learning linguistic structures, and the evolution of language

Dr. F. Newell, Trinity College, Dublin
Visual structure representation

Dr. M. Giese and Dr. I. Thornton, Max Planck Institute for Biological Cybernetics, Tübingen
Visual motion representation

**Awards
and
Fellowships**

1985: Feinberg Graduate School of the Weizmann Institute – the Dean’s Award for Achievement.

1987: Aharon Katzir Fund (Weizmann Institute) and the Cold Spring Harbor Laboratory — grants for the participation in the Cold Spring Harbor course on Computational Neuroscience.

1988-1990: Chaim Weizmann Postdoctoral Fellowship

1990-1992: Koret Foundation Postdoctoral Fellowship

1992-1995: Yigal Alon Fellowship

1994-1998: Incumbent, Sir Charles Clore Career Development Chair

1996: Levinson Prize in Mathematics

**Research
Grants**

Agency	Function	Total Funds	Duration
BARD (US/Israel)	Co-PI	\$221,000	1992-95
Basic Research Foundation, Israel Academy of Science	PI	\$70,000	1991-94
German-Israeli Foundation	Co-PI	DM 339,000	1995-97
Ministry of Science (Israel)	PI	NIS 120,000	1995-97
EPSRC (UK)	PI	£ 118,245	1999-01 (declined)
ESRC (UK)	PI	£ 39,946	1999-00
Binational Science Foundation (US/Israel)	Co-PI	\$160,000	2002-05

**Administrative
Duties**

- Director of computing (1992-1996, Dept. of Applied Math & CS, Weizmann Institute)
- Sub-Dean for Graduate Affairs (1998-1999, School of Cognitive and Computing Sciences, University of Sussex)
- Co-Director, Cornell Cognitive Studies Program (2000–2001).

- Director, Cornell Cognitive Studies Program (2001–2004).

**Teaching
Experience**

- Visual perception and computer vision (Spring 1991)
- Topics in vision (Fall 1991)
- Models of brain function (Spring 1992)
- Computer vision (Fall 1992)
- Computational neuroscience of representation (Spring 1993)
- Computation in Systems of Receptive Fields (Spring 1994)
- Techniques in Computational and Biological Vision (Fall 1994)
- Features of Visual Representation (Spring 1995)
- Computer Vision (Fall 1995)
- Brains and Computation (Freshman Advisory Seminar at MIT; Fall 1996)
- Introduction to Cognitive Science (Fall 1997)
- Neural Networks (Spring 1998; Spring 1999)
- Computational Neuroscience (Spring 1998; Spring 1999)
- Advanced Computer Vision (Spring 1998)
- Formal Computational Skills (Autumn 1998)
- Issues in Cognitive Psychology (Cornell Psych 214; Fall 1999, Fall 2000)
- Modeling of Perception and Cognition (Cornell Psych 416; Spring 2000)
- Representation of Structure in Vision and Language (Cornell Psych 530 / Ling 530; Spring 2000, Spring 2002, Spring 2004)
- Topics in High-Level Vision (Cornell Psych 465 / CS 392; Spring 2001, Spring 2003, Spring 2005)
- Mind and Reality in Science Fiction (Cornell Psych 531; Spring 2003, Spring 2005)
- Cognitive Psychology (Cornell Psych 214 / 614 / 501; Fall 2001, Fall 2002, Fall 2003, Fall 2004)
- Neuroscience as the Quest for Perfect Self-Knowledge (Cornell Psych 531; Spring 2004)

**Graduate
Fields
(Cornell)**

- Psychology
- Computer Science
- Information Science
- Cognitive Studies

**Graduate
Students**

- Past:
 - Florin Cutzu (Weizmann Institute): psychophysics of object representation (graduated, August 1996).
 - Sharon Duvdevani-Bar (Weizmann Institute): computational models of object representation (graduated, December 1997).
 - Kalanit Grill-Spector (Weizmann Institute): functional brain imaging (joint supervision with Dr. R. Malach; graduated, July 1999).

- Tadashi Sugihara (RIKEN): neurophysiology of object representation in the monkey (joint supervision with Dr. K. Tanaka; graduated, 1998).
- Dan Tzur (Hebrew University): psycholinguistics of Hebrew morphology (joint supervision with Prof. S. Bentin; graduated, 2003).
- Current:
 - Zach Solan (Tel Aviv University); evolution of language, language acquisition (joint supervision with Profs. E. Ruppin and D. Horn).
 - Peter Brodsky (Cornell); artificial intelligence (joint supervision with Barbara Finlay).
 - Ben Sandbank (Tel Aviv University); computational linguistics.
 - Claudia Gilson (Cornell); psychophysics of visual scene representation.

**Service
to the
Community**

- Associate Editor, *Behavioral and Brain Sciences* (1999 –)
- Associate Editor, *Cognitive Science* (2001 –)
- External reviewer, EC COGVIS consortium (2002 – 2004)
- External reviewer, EC COGSYS program (2005)
- Program Chair, 9th Israeli Conference on AI and Computer Vision
- Session chair at: ARVO'95, ECVP'95, ARVO'96, CogSci'04.
- Member, program committee: 12th Intl. Conf. on Pattern Recognition (1994); 2nd Intl. Workshop on Automatic Face and Gesture Recognition (1996); 3rd Intl. Workshop on Automatic Face and Gesture Recognition (1998), 24th, 26th, 27th meetings of the Cognitive Science Society (2002, 2004, 2005).
- Member, Governing Board, Intl. Assoc. for Pattern Recognition (1992-1995)
- Ad-hoc referee for: *Nature*, *Nature Neuroscience*, *Science*, *PNAS*, *Vision Research*, *Biological Cybernetics*, *Intl. J. Computer Vision*, *Neural Networks*, *IEEE Trans. Patt. Anal. Mach. Intell.*, *Comp. Vision, Graphics and Image Proc.*, *Spatial Vision*, *Bull. Math. Biol.*, *Cognition*, *ICPR'94*, *ICCV'95*, *Neural Computation*, *Cognitive Psychology*, *Cognitive Science*, *J. Exp. Psychol.: Human Perception & Performance*, *Behavioral and Brain Sciences*, *Network: Computation in Neural Systems*, *Optics Communications*, *Perception*, *Neural Information Processing Systems (NIPS)*, *ICCV'98*, *Image and Vision Computing*, *IEEE Trans. Systems, Man & Cybern.*, *Quarterly Journal of Experimental Psychology*, NSF (including panel), EC 6th Framework (including panel), *ICANN98*, *AFOSR*, *Psychonomic Bulletin and Review*, Research Grants Council (Hong Kong), *Cognitive Systems Research*, US Army Research Office, *Psychological Science*, *Cognitive Science Society Conference*, *MIT Press*.

**Sponsored Invited Talks
(Conferences
and Workshops)**

- *Viewpoint dependence in object recognition*, Summer Atelier in Theoretical Neuroscience, The Neurosciences Institute, Rockefeller University, July 1990.
- *Representation, similarity, and the Chorus of Prototypes*, Workshop on Shape Representation in the Brain, Santa Fe Institute, Santa Fe, NM, August 1993.

- *Representation of structure in biological vision*, Intl. Workshop on Structural and Syntactic Pattern Recognition, Nahariya, Israel, October 1994.
- *Features of visual representation*, Japan-Israel Joint Meeting in Neurosciences, Eilat, Israel, December 1994.
- *A new look at the problem of representation in vision*, 7th Rosenön Workshop on Computer Vision, Dalarö, Sweden, August 1995.
- *Representation and similarity*, 5th Tohwa University symposium on higher brain function, Fukuoka, Japan, October 1995.
- *Similarity to reference shapes as a basis for shape representation*, 2nd ATR Symposium on Face Recognition, ATR Laboratories, Kyoto, Japan, January 1996.
- *Object recognition: more than remembrance of things past?*, Royal Society Discussion Meeting on Knowledge-based Vision, London, February 1997.
- *Learning to generalize across views in face recognition*, symposium on Formal Approaches to Facial Cognition, 30th Annual Meeting of the Society for Mathematical Psychology, Bloomington, Indiana, July 1997.
- *Learning as extraction of low-dimensional representations*, ATR Symposium on Machine Learning, ATR Laboratories, Kyoto, Japan, April 1998.
- *Core problems in high-level vision*, 5th International Symposium on Strategies toward Complex Systems, Graduate University of Advanced Studies, Tokyo, Japan, March 1999.
- *On the representation of structure*, International Symposium on Visual Object Recognition: Brain and Machines, Werner-Reimers-Foundation, Bad Homburg, Germany, May 1999.
- *Representation and recognition in vision*, William Lowe Bryan Memorial Lecture, Indiana University, Bloomington, IN, November 1999.
- *On the representation of structure*, Interdisciplinary meeting on cognitive functions of objects in perception and action, CNRS/CREA, Paris, France, June 2000.
- *(Coarse Coding of Shape Fragments) + (Retinotopy) = Representation of Structure*, 29th annual LOVE conference, Niagara Falls, Canada, February 2000.
- *On what it could mean to see*, Workshop on Computer Vision, University of Palermo, March 2001.
- *On what it could mean to see*, Stockholm Workshop on Computer Vision, Rosenön, Sweden, July 2001.
- *Probabilistic principles in unsupervised learning of visual structure*, Carnegie Mellon University colloquium, February 2002.
- *Probabilistic principles in unsupervised learning of visual structure*, Bodian Colloquium, Johns Hopkins University, March 2002.
- *Unsupervised learning of visual structure*, Second International Conference on Biologically Motivated Computer Vision, Max Planck Institute for Biological Cybernetics, Tübingen, November 2002.
- *On what it could mean to see, and what could be done about it*, Computation and Neural Systems Program colloquium, Caltech, March 2003.

- *A Vision of Language*, NSF Workshop on Integrated Cognitive Science, October 2-3, 2003, Arlington, VA.
- *Unsupervised acquisition of context-sensitive recursive structure from language-like data*, Biology colloquium, CUNY, December 2003.
- *Rich Syntax from a Raw Corpus: Unsupervised Does It*, NIPS Workshop on Syntax, Semantics and Statistics, Whistler, BC, December 2003.
- *Computational principles for unsupervised learning in vision (and in language acquisition)*, Engineering colloquium, Brown University, March 2004.
- *Computational principles for unsupervised learning in vision*, special Psychology colloquium, Stanford University, March 2004.
- *Unsupervised statistical learning in vision: computational principles, biological evidence*, ECCV-2004 Workshop on Statistical Learning in Computer Vision, Prague, May 2004.
- *Object recognition and categorization: some lessons from psychophysics, neurobiology and computer vision*, CVPR-2004 Workshop on Generic Object Recognition, Washington, DC, June 2004.
- *Unsupervised learning of natural languages*, Johns Hopkins University, CLSP colloquium, October 2004.
- *Structured cognition: from vision to language, with a brief detour via motor control*, Machines and Locomotion series colloquium, Cornell University, March 2005.

List of Publications¹

Papers published or in press in refereed journals:

- P1 Edelman, S., and T. Flash, *A model of handwriting*, Biological Cybernetics, **57**, 25-36, 1987.
- P2 Edelman, S., *Line Connectivity Algorithms for an Asynchronous Pyramid Computer*, Computer Vision, Graphics and Image Processing, **40**, 169-187, 1987.
- P3 Edelman, S., and T. Poggio, *Integrating visual cues for object segmentation and recognition*, Optic News, **15**(5), 8-16, 1989.
- P4 Poggio, T., and S. Edelman, *A network that learns to recognize three-dimensional objects*, Nature, **343**, 263-266, Jan. 1990.
- P5 Edelman, S., S. Ullman and T. Flash, *Reading cursive handwriting by alignment of letter prototypes*, Intl. J. of Computer Vision, **5**, 303-331, 1990.
- P6 Edelman, S., and D. Weinshall, *A self-organizing multiple-view representation of 3D objects*, Biological Cybernetics, **64**, 209-219, 1991.
- P7 Edelman, S., and T. Poggio, *Models of object recognition*, Current Opinion in Neurobiology, **1**, 270-273, 1991.

¹Note: Many of the papers listed below are available online here: <http://kybele.psych.cornell.edu/~edelman/archive.html>

- P8 Edelman, S., and T. Poggio, *Bringing the Grandmother back into the picture: a memory-based view of object recognition*, Intl. J. of Pattern Recognition and Artificial Intelligence, **6**, 37-62, 1992.
- P9 Bülthoff, H. H., and S. Edelman, *Psychophysical support for a 2D view interpolation theory of object recognition*, Proc. Natl. Acad. Sci., **89**, 60-64, 1992.
- P10 Poggio, T., S. Edelman and M. Fahle, *Learning of visual modules from examples: a framework for understanding adaptive visual performance*, Computer Vision, Graphics and Image Processing: Image Understanding, **56**, 22-30, 1992.
- P11 Poggio, T., M. Fahle and S. Edelman, *Fast perceptual learning in visual hyperacuity*, Science **256**, 1018-1021, 1992.
- P12 Edelman, S., and H. H. Bülthoff, *Orientation dependence in the recognition of familiar and novel views of 3D objects*, Vision Research **32**, 2385-2400, 1992.
- P13 Edelman, S., *On learning to recognize 3D objects from examples*, IEEE Trans. Pattern Analysis and Machine Intelligence, **15**, 833-837, 1993.
- P14 Fahle, M., and S. Edelman, *Long-term learning in vernier acuity: influence of stimulus orientation, range and of feedback*, Vision Research **33**, 397-412, 1993.
- P15 Weiss, Y., S. Edelman and M. Fahle, *Models of perceptual learning in vernier hyperacuity*, Neural Computation **5**, 695-718, 1993.
- P16 Edelman, S., *Representing 3D objects by sets of activities of receptive fields*, Biological Cybernetics **70**, 37-45 1993.
- P17 Edelman, S., *Representation without reconstruction*, Computer Vision, Graphics and Image Processing: Image Understanding, **60**, 92-94, 1994.
- P18 Cutzu, F., and S. Edelman, *Canonical views in object representation and recognition*, Vision Research, **34**, 3037-3056, 1994.
- P19 Edelman, S., *Biological Constraints and the Representation of Structure in Vision and Language*, Psychology **5** (57), 1994.
- P20 H. H. Bülthoff, S. Edelman, and M. Tarr, *How are three-dimensional objects represented in the brain?*, Cerebral Cortex, **5**, 247-260, 1995.
- P21 Edelman, S., *Representation, Similarity, and the Chorus of Prototypes*, Minds and Machines, **5**, 45-68, 1995.
- P22 Edelman, S., *Class similarity and viewpoint invariance in the recognition of 3D objects*, Biol. Cybern., **72**, 207-220, 1995.
- P23 Edelman, S., *Representation of similarity in 3D object discrimination*, Neural Computation, **7**, 407-422, 1995.
- P24 Weiss, Y., and S. Edelman, *Representation of similarity as a goal of early visual processing*, Network: Computation in Neural Systems, **6**, 19-41, 1995.
- P25 Fahle, M., S. Edelman, and T. Poggio, *Fast perceptual learning in hyperacuity*, Vision Research, **35**, 3003-3013, 1995.

- P26 Intrator, N., S. Edelman, and H. H. Bülthoff, *An integrated approach to the study of object features in visual recognition*, Network: Computation in Neural Systems, **6**, 603-618, 1995.
- P27 Lando, M., and S. Edelman, *Receptive field spaces and class-based generalization from a single view in face recognition*, Network: Computation in Neural Systems, **6**, 551-576, 1995.
- P28 Moses, Y., S. Ullman, and S. Edelman, *Generalization to novel images in upright and inverted faces*, Perception, **25**, 443-462, 1996.
- P29 Intrator, N., and S. Edelman, *How to make a low-dimensional representation suitable for diverse tasks*, Connection Science, **8**, 205-224, 1996.
- P30 Edelman, S., and S. Duvdevani-Bar *Similarity, connectionism, and the problem of representation in vision*, Neural Computation, **9**, 701-720, 1997.
- P31 Cutzu, F., and S. Edelman, *Faithful representation of similarities among 3D shapes in human vision*, Proc. Natl. Acad. Sci., **93**, 12046-12050, 1996.
- P32 Edelman, S., *Spanning the face space*, Journal of Biological Systems, **6**, 265-280, 1998.
- P33 Karov, Y., and S. Edelman, *Similarity-based word sense disambiguation*, Computational Linguistics, **24**, 41-59, 1998.
- P34 Edelman, S., and S. Duvdevani-Bar, *A model of visual recognition and categorization*, Phil. Trans. Royal Soc. (Lond.) **B-352**, number 1358, 1191-1202, 1997.
- P35 Edelman, S., *Representation is Representation of Similarities*, Behavior and Brain Sciences **21**, 449-498, 1998.
- P36 Intrator, N., and S. Edelman, *Learning low dimensional representations of visual objects with extensive use of prior knowledge*, Network: Computation in Neural Systems **8**, 259-281, 1997.
- P37 Cutzu, F., and S. Edelman, *Representation of object similarity in human vision: psychophysics and a computational model*, Vision Research **38**, 2229-2257, 1998.
- P38 Kamon, I., T. Flash, and S. Edelman, *Learning to grasp using visual information*, IEEE Trans. Systems, Man, and Cybernetics **28**, 266-276, 1998.
- P39 Intrator, N., and S. Edelman, *Competitive Learning in Biological and Artificial Neural Computation*, Trends in Cognitive Sciences **1**, 268-272, 1997.
- P40 Edelman, S., *Computational theories of object recognition*, Trends in Cognitive Sciences **1**, 296-304, 1997.
- P41 Sugihara, T., S. Edelman, and K. Tanaka, *Representation of objective similarity among three-dimensional shapes in the monkey*, Biological Cybernetics **78**, 1-7, 1998.
- P42 Grill-Spector, K., T. Kushnir, T. Hendler, S. Edelman, Y. Itzhak, and R. Malach, *A sequence of early object processing stages revealed by fMRI in human occipital lobe*, Human Brain Mapping **6**, 316-328, 1998.
- P43 O'Toole, A., S. Edelman, and H. H. Bülthoff, *Stimulus-specific effects in face recognition over changes in viewpoint*, Vision Research, **38**, 2351-2363, 1998.

- P44 Edelman, S., K. Grill-Spector, T. Kushnir, and R. Malach, *Towards direct visualization of the internal shape representation space by fMRI*, *Psychobiology* (special issue on Cognitive Neuroscience of Object Representation and Recognition), **26**, 309-321, 1999.
- P45 Grill-Spector, K., T. Kushnir, S. Edelman, Y. Itzhak and R. Malach, *Cue-invariant activation in object-related areas of the human occipital lobe*, *Neuron* **21**, 191-202, 1998.
- P46 Edelman, S., H. H. Bühlhoff, and I. Bühlhoff, *Effects of parametric manipulation of inter-stimulus similarity on 3D object recognition*, *Spatial Vision* **12**, 107-123, 1999.
- P47 Duvdevani-Bar, S., and S. Edelman, *Visual recognition and categorization on the basis of similarities to multiple class prototypes*, *Intl. J. Computer Vision*, **33**, 1-18, 1999.
- P48 Grill-Spector, K., T. Kushnir, S. Edelman, G. Avidan, Y. Itzhak, and R. Malach, *Differential processing of objects under various viewing conditions in the human lateral occipital complex*, *Neuron*, **24**, 187-203, 1999.
- P49 Edelman, S., and N. Intrator, *(Coarse Coding of Shape Fragments) + (Retinotopy) \approx Representation of Structure*, *Spatial Vision*, **13**, 255-264, 2000.
- P50 Dill, M., and S. Edelman, *Imperfect invariance to object translation in the discrimination of complex shapes*, *Perception*, **30**, 707-724, 2001.
- P51 Edelman, S., *Constraining the neural representation of the visual world*, *Trends in Cognitive Sciences*, **6**, 125-131, 2002.
- P52 Edelman, S., and N. Intrator, *Towards structural systematicity in distributed, statically bound visual representations*, *Cognitive Science* **27**, 73-110, 2003.
- P53 Newell, F. N., D. Sheppard, S. Edelman, and K. Shapiro, *The interaction of shape- and location-based priming in object categorisation: evidence for a hybrid what+where representation stage*, *Vision Research* **45**, 2065-2080 (2005).
- P54 Solan, Z., D. Horn, E. Ruppin, and S. Edelman, *Unsupervised learning of natural languages*, *Proc. Natl. Acad. Sci.* **102**, 11629-11634 (2005).

Monographs:

- M1 Edelman, S., *Representation and Recognition in Vision*, MIT Press, June 1999.

Full-length refereed conference papers:

- C1 Edelman, S., and E. Shapiro, *Quadrees in Concurrent Prolog*, Proc. 14th IEEE Conference on Parallel Processing, Chicago, Ill., August 1985, 544-551.
- C2 Edelman, S., and S. Ullman, *Reading cursive script by computer: problems, solutions and lessons*, Proc. SPSE's 42nd Annual Conference, 179-182, Boston, MA, May 1989.
- C3 Edelman, S., and T. Poggio, *Representations in high-level vision: reassessing the inverse optics paradigm*, Proc. 1989 DARPA Image Understanding Workshop, 944-949.

- C4 Weinshall, D., S. Edelman and H. H. Bülthoff, *A self-organizing multiple-view representation of 3D objects*, Proc. 1989 Conf. on Neural Information Processing Systems (NIPS), D. Touretzky, ed., 274-281, Morgan Kaufman, 1990.
- C5 Edelman, S., D. Weinshall, H. Bülthoff and T. Poggio, *A model of the acquisition of object representations in human 3D visual recognition*, Proc. NATO Advanced Research Workshop on Robots and Biological Systems, P. Dario, G. Sandini and P. Aebischer, eds., 99-118, Springer, 1993.
- C6 Edelman, S., *Local qualitative shape from stereo without detailed correspondence*, Proc. AAAI-90 Workshop on Qualitative Vision, 101-105, Boston, 1990.
- C7 Edelman, S., and H. H. Bülthoff, *Generalization of object recognition in human vision across stimulus transformations and deformations*, Proc. 7th Israeli Conference on Artificial Intelligence and Computer Vision, 479-487, Tel-Aviv, 1990.
- C8 Intrator, N., J. I. Gold, H. H. Bülthoff and S. Edelman, *Three-dimensional object recognition using an unsupervised neural network: understanding the distinguishing features*, Proc. 1991 Conf. on Neural Information Processing Systems (NIPS-4), 460-467, J. Moody, R. Lipmann, S. Hanson, eds., Morgan Kaufman, 1992.
- C9 Edelman, S., D. Reisfeld and Y. Yeshurun, *Learning to recognize faces from examples*, Proc. 2nd European Conf. on Computer Vision, 787-791, G. Sandini, ed., Springer Verlag, 1992 (Lecture Notes in Computer Science, **588**).
- C10 Dornay, M., and S. Edelman, *Stability vs. speed in the articulated arm*, Proc. SICE'93 Conference, 1551-1556, Kanazawa, Japan, 1993.
- C11 Jungman, N., A. Levi, A. Aperlman, and S. Edelman, *Automatic classification of police mugshot album using principal component analysis*, Proc. SPIE-2243 (Conference on Applications of Artificial Neural Networks), 591-594, S. K. Rogers and D. W. Ruck, eds., Orlando, FL, March 1994.
- C12 Hel-Or, Y., and S. Edelman, *A new approach to qualitative stereo*, Proc. ICPR-94, 316-320, Oct. 1994, Jerusalem.
- C13 Grill Spector, K., S. Edelman, and R. Malach, *Anatomical origin and computational role of diversity in the response properties of cortical neurons*, Proc. 1994 Conf. on Neural Information Processing Systems (NIPS-7), 117-124, G. Tesauro, D. Touretzky, T. Leen, eds., MIT Press, 1995.
- C14 Kamon, I., T. Flash, and S. Edelman, *Learning to grasp using visual information*, Proc. Intl. Conf. on Robotics and Automation, Minneapolis, April 1996.
- C15 Edelman, S., F. Cutzu, and S. Duvdevani-Bar, *Similarity to reference shapes as a basis for shape representation*, in Proc. 18th Cognitive Science Society Meeting, 260-265, G. W. Cottrell, ed., La Jolla, July 1996.
- C16 Karov, Y., and S. Edelman, *Learning similarity-based word sense disambiguation from sparse data*, in Proc. 4th Intl. Workshop on Large Corpora, Copenhagen, August 1996.
- C17 O'Toole, A., and S. Edelman, *Face distinctiveness in recognition across viewpoint: An analysis of the statistical structure of face spaces*, Proc. 2nd Intl. Workshop on Face and Gesture Recognition, 10-15, October 1996.

- C18 Edelman, S., and N. Intrator, *Learning as formation of low-dimensional representation spaces*, in Proc. 19th Cognitive Science Society Meeting, J. Elman, ed., Stanford, CA, August 1997.
- C19 Edelman, S., and S. Duvdevani-Bar, *Similarity-based viewspace interpolation and the categorization of 3D objects*, in Proc. Edinburgh Workshop on Similarity and Categorization, 75-81, November 1997.
- C20 Duvdevani-Bar, S., S. Edelman, A. J. Howell and H. Buxton, *A similarity-based method for the generalization of face recognition over pose and expression*, Proc. FG'98 Conference, 118-123, April 1998.
- C21 Edelman, S., and N. Intrator, *A productive, systematic framework for the representation of visual structure*, Proc. 2000 Conf. on Neural Information Processing Systems (NIPS-13), 10-16, T. K. Leen, T. G. Dietterich and V. Tresp, eds., MIT Press, 2001.
- C22 Richardson, D. C., S. Edelman, A. Naples and M. J. Spivey, *Language is Spatial: Experimental Evidence for Image Schemas of Concrete and Abstract Verbs*, in Proc. 23rd Cognitive Science Society Meeting, Edinburgh, August 2001.
- C23 Edelman, S., H. Yang, B. P. Hiles and N. Intrator, *Probabilistic principles in unsupervised learning of visual structure: human data and a model*, Proc. 2001 Conf. on Neural Information Processing Systems (NIPS-14), S. Becker, ed., MIT Press, 2002.
- C24 Solan, Z., E. Ruppin, D. Horn and S. Edelman, *Automatic acquisition and efficient representation of syntactic structures*, Proc. 2002 Conf. on Neural Information Processing Systems (NIPS-15), S. Thrun, ed., MIT Press, 2003.
- C25 Solan, Z., D. Horn, E. Ruppin and S. Edelman, *Unsupervised Efficient Learning and Representation of Language Structure*, Proc. 25th Cognitive Science Society Conference, Boston, MA, July 2003.
- C26 Edelman, S., *A New Vision of Language* [extended abstract], Proc. 25th Cognitive Science Society Conference, Boston, MA, July 2003.
- C27 Solan, Z., D. Horn, E. Ruppin and S. Edelman, *Unsupervised context sensitive language acquisition from a large corpus*, Proc. 2003 Conf. on Neural Information Processing Systems (NIPS-16), L. Saul, ed., MIT Press, 2004.
- C28 Edelman, S., Solan, Z., D. Horn, E. Ruppin, *Bridging computational, formal and psycholinguistic approaches to language*, Proc. 26th Cognitive Science Society Conference, Chicago, IL, August 2004.
- C29 Pedersen, B., Z. Solan, E. Ruppin, D. Horn and S. Edelman, *Some Tests of an Unsupervised Model of Language Acquisition*, Proc. COLING Workshop on Psychocomputational Models of Language Acquisition, Geneva, August 2004.
- C30 Edelman, S., Z. Solan, E. Ruppin and D. Horn, *Learning syntactic constructions from raw corpora*, BU Conference on Language Development, November 2004.

Other papers:

- O1 Edelman, S., *The illusion of reality*, a multiple book review, *The Mathematical Intelligencer*, **15**, 68-70, 1993.

- O2 Edelman, S., *Artificial Intelligence*, in the *Hebrew Encyclopaedia*, suppl. vol. 3, 1993 (in Hebrew).
- O3 Edelman, S., *How representation works is more important than what representations are*, a commentary on D. Amit, “The Hebbian paradigm reintegrated: Local reverberations as internal representations”, *Behavioral and Brain Sciences*, **18**, 630-631, 1995.
- O4 Edelman, S., *Things are what they seem*, a commentary on P. Schyns, R. Goldstone, and P. Thibaut, “The development of features in object concepts”, *Behavioral and Brain Sciences*, **21**, 25, 1998.
- O5 Edelman, S., *No reconstruction, no impenetrability (at least not much)*, a commentary on Z. Pylyshyn, “Is vision continuous with cognition? The case for cognitive impenetrability of visual perception”, *Behavioral and Brain Sciences*, 1999.
- O6 Edelman, S., E. M. Breen, *On the virtues of going all the way*, a commentary on Barsalou, “Perceptual Symbol Systems”, *Behavioral and Brain Sciences*, 1999.
- O7 Edelman, S., *Brahe, looking for Kepler*, a review of “Neural Organization” (Arbib et al.), *Behavioral and Brain Sciences*, 2000.
- O8 Edelman, S., and L. M. Vaina, *David Marr*, a biography, in the International Encyclopaedia of the Social and Behavioral Sciences, Pergamon Press.
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