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Education

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

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

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

Experience

CORNELL UNIVERSITY — Ithaca, USA
1999–
Professor, Department of Psychology.

KOREA UNIVERSITY — Seoul, South Korea
Jan–Dec 2009
Distinguished Professor (adjunct), Department of Brain and Cognitive Engineering.

UNIVERSITY OF SUSSEX — Brighton, UK
1998–1999
Professor, School of Cognitive and Computing Sciences.

UNIVERSITY OF SUSSEX — Brighton, UK
1997–1998
Reader in Computer Science & Artificial Intelligence, School of Cognitive and Computing Sciences.

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.

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

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

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

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

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

Publications[1]

Citation indices (as of November 2021)

- Total citations: over $16,300$
- h-index: 55
- i10-index: 135

Monographs:

M6 Edelman, S., *The Consciousness Revolutions*, Springer (under contract).

M5 Edelman, S., *Life, Death, and Other Inconvenient Truths*, MIT Press / Penguin / Random House (October 2020).

M4 Edelman, S., *Beginnings* (fiction), BookBaby, February 2014. Available electronically via Amazon (click here) and iTunes (here).

M3 Edelman, S., *The Happiness of Pursuit*, Basic Books, January 2012. (Italian tr. *La Felicità della Ricerca*, Codice Edizione, January 2013.)

- A Kirkus Reviews starred selection and "Must-Read" in new nonfiction.
- Covered in features and interviews: Salon, Huffington Post, WRFI radio (Ithaca, independent), Moment Magazine, The Times of India, Rossfire (Dave Ross's science program, syndicated), America Meditating (Sister Jenna's podcast program), Elle Canada, Venerdì di Repubblica (Italy), Radio3 Scienza (Italy), RAI 1 (Italian national TV), Nòva — Il Sole 24 ore (Italy), Newstalk (Ireland), Veronica Rueckert Show (Wisconsin Public Radio, an NPR affiliate), KERA-FM (Dallas, an NPR affiliate), John Batchelor Show (ABC Radio Network, nationally syndicated), The Roundtable (WAMC-FM Albany, an NPR affiliate).

[1] In reverse chronological order. Most of the papers are available online here:
http://shimon-edelman.github.io/archive.html

– Large-audience public talks: at the Rome Science Festival (Auditorio Parco della Musica, Rome), January 2013; at a Summer Cornell event (Statler Auditorium), July 2013.

M2 Edelman, S., *Computing the Mind: How the Mind Really Works*, Oxford University Press, August 2008.

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

Edited volumes:

E2 Edelman, S., T. Fekete, and N. Zach, *Being in Time: Dynamical Models of Phenomenal Experience* (edited volume), John Benjamins, *Advances in Consciousness Studies* (M. Stamenov, series editor), July 2012.

E1 Collins, C., M. H. Christiansen and S. Edelman, eds., *Language Universals*, Oxford University Press, March 2009.

Papers published or in press in refereed journals:

P100 Kolodny, O., R. Moyal. and S. Edelman, *A possible evolutionary function of phenomenal conscious experience of pain*, Neuroscience of Consciousness, 7(2):niab012 (2021).

P99 Onnis, L., G. Esposito, P. Venuti, and S. Edelman, *Parental speech to typical and atypical populations: a study on linguistic partial repetition*, Language Sciences 83:101311 (2021).

P98 Agarwal, A., and S. Edelman, *Functionally effective conscious AI without suffering*, Journal of Artificial Intelligence and Consciousness 7:39-50 (2020).

P97 Moyal, R., T. Fekete, and S. Edelman, *Dynamical Emergence Theory (DET): a computational account of phenomenal consciousness*, Minds and Machines 30:1-21 (2020).

P96 Wu, M.-H., D. Kleinschmidt, L. Emberson, D. Doko, S. Edelman, R. Jacobs, and R. Raizada, *Cortical transformation of stimulus-space in order to linearize a linearly inseparable task*, Journal of Cognitive Neuroscience 32:2342-2355 (2020).

P95 Moyal, R., and S. Edelman, *Dynamic computation in visual thalamocortical networks*, Entropy 21(5):500 (2019).

P94 Edelman, S., review of *The Strange Order of Things: Life, Feeling, and the Making of Cultures* by A. Damasio, Evolutionary Studies in Imaginative Culture, 2:2 (2018).

P93 Edelman, S., *Identity, immortality, happiness: pick two*, Journal of Evolution and Technology, 28(1):1-17 (2018).

P92 Kolodny, O., and S. Edelman, *The evolution of the capacity for language: the ecological context and adaptive value of a process of cognitive hijacking*, Phil. Trans. R. Soc. B, 373:20170052 (2018).

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P90 Lotem, A., J. Y. Halpern, S. Edelman, and O. Kolodny, *The evolution of cognitive mechanisms in response to cultural innovations*, Proc. Natl. Acad. Sci., 114:7915-7922 (2017).

P89 Edelman, S., *Language and other complex behaviors: unifying characteristics, computational models, neural mechanisms*, Language Sciences, 62:91-123 (2017).

P88 Gao, Y., and S. Edelman, *Happiness as an intrinsic motivator in reinforcement learning*, Adaptive Behavior, 24:292-305 (2016).

P87 Fekete, T., C. van Leeuwen, and S. Edelman, *System, subsystem, hive: boundary problems in computational theories of consciousness*, Frontiers in Psychology 7:1041 (2016).

P86 Gao, Y., and S. Edelman, *Between Pleasure and Contentment: Evolutionary Dynamics of Some Possible Parameters of Happiness*, PLoS One, 11(5):e0153193 (2016).

P85 Shahbazi, R., R. Raizada, and S. Edelman, *Similarity, kernels, and the fundamental constraints on cognition*, Journal of Mathematical Psychology, 70:21-34 (2016).

P84 Kershenbaum, A., D. T. Blumstein, M. A. Roch, C. Akcay, G. Backus, M. Bee, K. Bohn, Y. Cao, G. Carter, C. Cäsar, M. Coen, S. DeRuiter, L. Doyle, S. Edelman, R. Ferrer-i-Cancho, T. M. Freeberg, E. C. Garland, M. Gustison, H. Harley, C. Huetz, M. Hughes, J. Hyland Bruno, A. Ilany, D. Jin, M. Johnson, C. Ju, J. Karnowski, B. Lohr, M. Manser, B. McCowan, E. Mercado, P. Narins, A. Piel, M. Rice, R. Salmi, K. Sasahara, L. Sayigh, Y. Shiu, C. Taylor, E. Vallejo, S. Waller, V. Zamora-Gutierrez, *Acoustic sequences in non-human animals: A tutorial review and prospectus*, Biological Reviews, 91(1):13-52 (2016).

P83 Kolodny, O., and S. Edelman, *The problem of multimodal concurrent serial order in behavior*, Neuroscience and Biobehavioral Reviews, 56:252-265 (2015).

P82 Kolodny, O., S. Edelman, and A. Lotem, *Evolution of protolinguistic abilities as a byproduct of learning to forage in structured environments*, Proc. R. Soc. Lond. B, 282:20150353 (2015).

P81 Menyhart, O., O. Kolodny, M. H. Goldstein, T. Devoogd, and S. Edelman, *Juvenile zebra finches learn the underlying statistical regularities in their father's song*, Frontiers in Psychology, 6:571 (2015).

P80 Edelman, S., *The minority report: some common assumptions to reconsider in the modeling of the brain and behavior*, Journal of Experimental and Theoretical AI (JETAI), 28:751-776 (2015).

P79 Kolodny, O., S. Edelman, and A. Lotem, *Evolved to adapt: A computational approach to animal innovation and creativity*, Current Zoology, 61:350-367 (2015).

P78 Kolodny, O., A. Lotem, and S. Edelman, *Learning a generative probabilistic grammar of experience: a process-level model of language acquisition*, Cognitive Science, 39:227-267 (2015).

P77 Edelman, S., *Varieties of perceptual truth and their possible evolutionary roots*, a commentary on Hoffman, D., M. Singh, and C. Prakash, *The interface theory of perception*, Psychonomic Bulletin & Review, 22:1519-1522 (2015).

P76 Edelman, S., *How to write a "How to Build a Brain" book* (a review of *How to Build a Brain*, C. Eliasmith, Oxford University Press, 2013), Trends in Cognitive Sciences, 18:118-119 (2014).

P75 Kolodny, O., S. Edelman, and A. Lotem, *Evolution of continuous learning of the structure of the environment*, Journal of the Royal Society Interface, 11:20131091 (2014).

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P58 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).

P57 Edelman, S., and B. Pedersen, review of *Linguistic Evolution through Language Acquisition* by T. Briscoe (Cambridge University Press, 2002), *Journal of Linguistics* 40(2):396-400 (2004).

P56 Edelman, S., and M. H. Christiansen, *How seriously should we take Minimalist syntax? A comment on Lasnik*, *Trends in Cognitive Sciences* 7:59-61 (2003).

P55 Edelman, S., and N. Intrator, *Towards structural systematicity in distributed, statically bound visual representations*, Cognitive Science 27:73-110 (2003).

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P53 Edelman, S., *Constraining the neural representation of the visual world*, Trends in Cognitive Sciences 6:125-131 (2002).

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P51 Edelman, S., and N. Intrator, *(Coarse Coding of Shape Fragments) + (Retinotopy) ≈ Representation of Structure*, Spatial Vision, 13:255-264 (2000).

P50 Edelman, S., *Brahe, looking for Kepler*, a review of "Neural Organization" by Arbib, Érdi, and Szentágothai, *Behavioral and Brain Sciences*, 23:538-540 (2000).

P49 Grill-Spector, K., T. Kushnir, S. Edelman, G. Avidan, Y. Itzchak, and R. Malach, *Differential processing of objects under various viewing conditions in the human lateral occipital complex*, Neuron, 24:187-203 (1999).

P48 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).

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P46 Grill-Spector, K., T. Kushnir, S. Edelman, Y. Itzchak and R. Malach, *Cue-invariant activation in object-related areas of the human occipital lobe*, Neuron 21:191-202 (1998).

P45 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 (1998).

P44 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).

P43 Grill-Spector, K., T. Kushnir, T. Hendler, S. Edelman, Y. Itzchak, and R. Malach, *A sequence of early object processing stages revealed by fMRI in human occipital lobe*, Human Brain Mapping 6:316-328 (1998).

P42 Sugihara, T., S. Edelman, and K. Tanaka, *Representation of objective similarity among three-dimensional shapes in the monkey*, Biological Cybernetics 78:1-7 (1998).

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P40 Intrator, N., and S. Edelman, *Competitive Learning in Biological and Artificial Neural Computation*, Trends in Cognitive Sciences 1:268-272 (1997).

P39 Kamon, I., T. Flash, and S. Edelman, *Learning to grasp using visual information*, IEEE Trans. Systems, Man, and Cybernetics 28:266-276 (1998).

P38 Cutzu, F., and S. Edelman, *Representation of object similarity in human vision: psychophysics and a computational model*, Vision Research 38:2229-2257 (1998).

P37 Edelman, S., *Representation is Representation of Similarities*, Behavioral 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).

P35 Edelman, S., and S. Duvdevani-Bar, *A model of visual recognition and categorization*, Phil. Trans. Royal Soc. (Lond.) B352(1358):1191-1202 (1997).

P34 Karov, Y., and S. Edelman, *Similarity-based word sense disambiguation*, Computational Linguistics, 24:41-59 (1998).

P33 Edelman, S., *Spanning the face space*, Journal of Biological Systems, 6:265-280 (1998).

P32 Cutzu, F., and S. Edelman, *Faithful representation of similarities among 3D shapes in human vision*, Proc. Natl. Acad. Sci., 93:12046-12050 (1996).

P31 Edelman, S., and S. Duvdevani-Bar *Similarity, connectionism, and the problem of representation in vision*, Neural Computation, 9:701-720 (1997).

P30 Intrator, N., and S. Edelman, *How to make a low-dimensional representation suitable for diverse tasks*, Connection Science, 8:205-224 (1996).

P29 Moses, Y., S. Ullman, and S. Edelman, *Generalization to novel images in upright and inverted faces*, Perception, 25:443-462 (1996).

P28 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).

P27 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).

P26 Fahle, M., S. Edelman, and T. Poggio, *Fast perceptual learning in hyperacuity*, Vision Research, 35:3003-3013 (1995).

P25 Weiss, Y., and S. Edelman, *Representation of similarity as a goal of early visual processing*, Network: Computation in Neural Systems, 6:19-41 (1995).

P24 Edelman, S., *Representation of similarity in 3D object discrimination*, Neural Computation, 7:407-422 (1995).

P23 Edelman, S., *Class similarity and viewpoint invariance in the recognition of 3D objects*, Biol. Cybern., 72:207-220 (1995).

P22 Edelman, S., *Representation, Similarity, and the Chorus of Prototypes*, Minds and Machines, 5:45-68 (1995).

P21 Bülthoff, H. H., S. Edelman, and M. Tarr, *How are three-dimensional objects represented in the brain?*, Cerebral Cortex, 5:247-260 (1995).

P20 Edelman, S., *Biological Constraints and the Representation of Structure in Vision and Language*, Psycoloquy 5:57 (1994)

P19 Cutzu, F., and S. Edelman, *Canonical views in object representation and recognition*, Vision Research, 34:3037-3056 (1994).

P18 Edelman, S., *Representation without reconstruction*, Computer Vision, Graphics and Image Processing: Image Understanding, 60:92-94 (1994).

P17 Edelman, S., *Representing 3D objects by sets of activities of receptive fields*, Biological Cybernetics 70:37-45 (1993).

P16 Weiss, Y., S. Edelman and M. Fahle, *Models of perceptual learning in vernier hyperacuity*, Neural Computation 5:695-718 (1993).

P15 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).

P14 Edelman, S., *On learning to recognize 3D objects from examples*, IEEE Trans. Pattern Analysis and Machine Intelligence, 15:833-837 (1993).

P13 Edelman, S., *The illusion of reality*, a multiple book review, *The Mathematical Intelligencer*, 15(4):68-70 (1993).

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).

P11 Poggio, T., M. Fahle and S. Edelman, *Fast perceptual learning in visual hyperacuity*, Science 256:1018-1021 (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).

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).

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).

P7 Edelman, S., and T. Poggio, *Models of object recognition*, Current Opinion in Neurobiology, 1:270-273 (1991).

P6 Edelman, S., and D. Weinshall, *A self-organizing multiple-view representation of 3D objects*, Biological Cybernetics, 64:209-219 (1991).

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).

P4 Poggio, T., and S. Edelman, *A network that learns to recognize three-dimensional objects*, Nature, 343:263-266 (1990).

P3 Edelman, S., and T. Poggio, *Integrating visual cues for object segmentation and recognition*, Optic News, 15(5):8-16 (1989).

P2 Edelman, S., *Line Connectivity Algorithms for an Asynchronous Pyramid Computer*, Computer Vision, Graphics and Image Processing, 40:169-187 (1987).

P1 Edelman, S., and T. Flash, *A model of handwriting*, Biological Cybernetics, 57:25-36 (1987).

Full-length refereed conference papers:

C43 Moyal, R., and S. Edelman, *Dynamical emergence of phenomenal consciousness: an outline of a theory*, Proc. AAAI Spring Symposium "Towards Conscious AI Systems" (TOCAIS 19), Stanford University, March 2019.

C42 Sadovnik, A., Y.-I. Chiu, N. Snavely, S. Edelman, and T. Chen, *Image Description with a Goal: Building Efficient Discriminating Expressions for Images*, Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2012.

C41 Gao, Y., E. Nitzany, and S. Edelman, *Online learning of causal structure in a dynamic game situation*, Proc. 34th Cognitive Science Society Conference, Sapporo, Japan, July 2012.

C40 Onnis, L., H. R. Waterfall, and S. Edelman, *Global benefits of local learning*, Proc. 33rd Cognitive Science Society Conference, Boston, MA, July 2011.

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C38 Edelman, S., and Z. Solan, *Machine Translation Using Automatically Inferred Construction-based Correspondence and Language Models*, the 23rd Pacific Asia Conference on Language, Information, and Computation, Hong Kong, December 2009.

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C36 Berant, J., C. Caldwell-Harris, and S. Edelman, *Tracks in the Mind: Differential Entrenchment of Common and Rare Liturgical and Everyday Multiword Phrases in Religious and Secular Hebrew Speakers*, Proc. 30th Cognitive Science Society Conference, Washington, DC, July 2008.

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C33 Brodsky, P., H. Waterfall, and S. Edelman, *Characterizing Motherese: On the Computational Structure of Child-Directed Language*, Proc. 29th Cognitive Science Society Conference, Nashville, TN, August 2007.

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C31 Kunik, V., Z. Solan, S. Edelman, E. Ruppin, and D. Horn, *Motif Extraction and Protein Classification*, CSB-2005.

C30 Edelman, S., Z. Solan, E. Ruppin and D. Horn, *Learning syntactic constructions from raw corpora*, BU Conference on Language Development (BUCLD), November 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.

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.

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.

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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.

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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.

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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.

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A68 Moyal, R., and S. Edelman, *Reexamining the effects of structure and context on visual detection*, Proc. 21st Conference of the Association for Scientific Study of Consciousness, Beijing, June 2017.

A69 Edelman, S., *Immortality, happiness, and integral personality: why humans cannot have all three together*, Proc. 43rd Annual Meeting of the Society for Philosophy and Psychology, Baltimore, June 2017.

A70 Onnis, L., A. Truzzi, P. Venuti, A. Bentenuto, G. Esposito, and S. Edelman, *Statistical properties of speech directed to typically and non-typically developing toddlers*, AMLaP, Lancaster, UK, September 2017.

A71 Onnis, L., and S. Edelman, *Learning language with structured variation*, AMLaP, Lancaster, UK, September 2017.

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: 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
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[1]
ESRC (UK)	PI	£ 39,946	1999-00
Binational Science Foundation (US/Israel)	Co-PI	$160,000	2002-06
NIH R03	Co-PI	$50,000	2010-11[2]
NSF	Co-PI	$486,656	2012-15

[1] Given up, due to the move to Cornell. [2] ARRA.

University Service

- 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).
- Member, Cornell Computing and Information Science Council (2006–2007).

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 Advisor 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, Spring 2009, Spring 2011)
- Mind and Reality in Science Fiction (Cornell Psych 531; Spring 2003, Spring 2005, Spring 2016)
- Cognitive Psychology (Cornell Psych 214 / 614 / 501; Fall 2001, Fall 2002, Fall 2003, Fall 2004, Fall 2006, Fall 2007, Fall 2008, Spring 2010, Spring 2011, Spring 2012)
- Neuroscience as the Quest for Perfect Self-Knowledge (Cornell Psych 531; Spring 2004, Spring 2007, Spring 2008)
- Language Acquisition in Humans and Computers (Tel Aviv University Computer Science; Fall 2005; Cornell Psych 426; Spring 2007)
- Computation in the Brain (Cornell Psych 465, Spring 2008)
- Consciousness and Free Will (Cornell Psych 231, Spring 2009, Fall 2010, Fall 2011, Fall 2012, Fall 2014, Fall 2016)
- Computational Principles of Psychology (Korea University BRI 606, Fall 2009)
- Embodied Cognition (Cornell Psych 465, Spring 2010)
- Reinforcement Learning: Computational and Brain Aspects (Spring 2012)
- Computing the Mind (Escuela Regional en Tecnologías de la Información y Comunicaciones, Universidad Nacional de Asunción, Paraguay, Fall 2013)
- Imagination and Creativity (Cornell Psych 4320, Spring 2014)
- Brain, Behavior, and Computation (Cornell Psych 4320, Spring 2015)
- Language beyond Skinner and Chomsky (Cornell Psych 4320, Spring 2017)
- Computational Psychology (Cornell Psych 3140, Spring 2014, Spring 2015, Spring 2016, Spring 2017, Spring 2018; Spring 2019, Spring 2021; also at the Sagol School of Neuroscience, Tel Aviv University, Spring 2016)
- Psychology and Ethics of Hi-Tech (Cornell Psych 4320, Spring 2018)
- Inconvenient Truths (Cornell Psych 4320; Fall 2018, Spring 2019)
- Inequality, Power, and Happiness (Cornell Psych 4030; Fall 2013, Fall 2015, Fall 2017, Fall 2019)
- Practical Approaches to Saving the World (Cornell Psych 4320; Fall 2020)

Graduate Fields (Cornell)

- Psychology
- Computer Science
- Cognitive Science

Service to the Community

- Associate Editor, *Network: Computation in Neural Systems*; area of responsibility: the neurobiological foundations of consciousness in the brain and its simulation in machines (2021 –)
- Member, editorial board, *Journal of Artificial Intelligence and Consciousness* (2020 –)
- Associate Editor, *Behavioral and Brain Sciences* (1999 –)

- Specialty Chief Editor, *Frontiers in Theoretical and Philosophical Psychology* (2012 – 2013)
- Associate Editor, *Frontiers in Theoretical and Philosophical Psychology* (2010 – 2012)
- Member, Advisory Board, Versita de Gruyter Book Publishing Program in Linguistics (2010 –)
- Associate Editor, *Cognitive Science* (2001 – 2005)
- 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), meetings of the Cognitive Science Society (2002, 2004, 2005, 2007, 2008, 2009); Neural Information Processing Systems (2006), EACL workshop on Computational Linguistic Aspects of Grammatical Inference (2009), Association for Scientific Study of Consciousness annual conference (2013), 4th International Usage-Based Linguistics conference (2018)
- 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 panels and site visits), 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*, *Brain and Language*, *Cerebral Cortex*, US-Israel Binational Science Foundation (BSF), Prosody-2008, PLoS, *Trends in Cognitive Sciences*, *J. Theor. Biol.*, NSERC (Canada), Evolang-2007, *Journal of Vision*, *Journal of Child Language*, *Biolinguistics*, Evolang-2011, *Psychological Review*, GIF (German-Israeli Fund), ISF (Israel Science Foundation), *Language Sciences*, Phil. Trans. Royal Soc. B.

Sponsored Invited Talks

- *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.
- *Visions of language: through a mirage to an oasis*, Tel Aviv University, Excellence Program seminar, October 2005.
- *Visions of language: through a mirage to an oasis*, Tel Aviv University, Scientific Forum, December 2005.
- *Effective learning of high-precision, lexicalized grammars from raw corpus data*, Tel Aviv University, linguistics colloquium, December 2005.
- *A practical algorithm for learning construction grammars, and its implications*, Hebrew University, Interdisciplinary Program seminar, December 2005.
- *Rationalists do it by the rules; Empiricists do it to the rules*, keynote address at ICDL'06, June 2006.
- *Structure from statistics: the computational basis of the emergence and transmission of syntax*, international workshop on nascent languages, Bellagio Conference Center, Italy, October 2006.
- *Learning language: rationalists do it by the rules, empiricists do it to the rules*, invited talk at the 11th International Conference on Cognitive and Neural Systems, Boston, MA, May 2007.
- *Progress in unsupervised language acquisition*, invited talk at the 2007 Workshop on Psycho-Computational Approaches to Language Acquisition, Nashville, TN, August 2007.
- *On what it means to see and what we can do about it*, invited talk at a Santa Fe Institute workshop on *High-Level Perception and Low-Level Vision: Bridging the Semantic Gap*, Santa Fe, NM, October 2007.

- *Bootstrapping language with a little help from one's friends*, invited talk at the 2008 Summer Institute on Social Cognition, Institut des sciences cognitives, UQAM, Montreal, July 2008.
- *A scalable computational approach to grammar discovery from naturalistic corpus data*, invited talk at a symposium on Machine Learning of English from Corpora, IASCL XI Conference, Edinburgh, July 2008.
- *A New Vision of Language, or There and Back Again*, Computer Science special seminar, University of Birmingham, August 2008.
- *Computational Cognitive Linguistics, Episode IV: A New Hope*, Department of Psychology colloquium, Cornell University, September 2008.
- Invited talk at the Third Korea-Japan joint workshop on pattern recognition, Yonsei University, Seoul, November 2008.
- Psychology colloquium, Korea University, Seoul, November 2008.
- Psychology colloquium, Yonsei University, Seoul, October 2009.
- Invited participant in *Dynamic Coordination in the Brain: From Neurons to Mind*, Ernst Strüngmann Forum, Frankfurt, August 2009.
- *Rebooting Grammar Induction*, invited talk at the Cornell Grammar Induction Workshop, Ithaca, NY, May 2010.
- *Computing the mind, dynamically: some consequences of asking the right questions*, invited talk at the Cornell Symposium on Epistemology of Perception, Ithaca, NY, September 2010.
- *On evolution and learning in linguistic theory, or: Chomsky between Scylla and Charybdis*, invited talk at an international workshop of the Israel Science Foundation, *Learning, decision making and evolutionary theory: Can we bridge the gap?*, Kfar Blum, Israel, November 2010.
- Invited speaker in *Computer Vision and Human Perception — Future Trends*, a symposium in honor of Shimon Ullman, Weizmann Institute of Science, April 2012.
- Invited speaker and panelist in *Days of Happiness*, a Credo Bonum Foundation seminar held in Sofia, Bulgaria, June 2012.
- Invited speaker in *2012 Turing Memorial Institute on the Evolution of Consciousness*, Montreal, Canada, July 2012.
- Invited speaker and panelist at the *8th International Science Festival*, Rome, Italy, January 2013.
- *Learning a generative probabilistic grammar of experience*, Dept. of Psychology / Cognitive Science colloquium, Northwestern University, Evanston, IL, May 2013.
- *The Happiness of Pursuit*, public talk at the Cornell School of Continuing Education (Summer Cornell), July 2013.
- Invited speaker at the NSF workshop on animal communication, NIMBIOS / University of Tennessee, Knoxville, October 2013.
- Invited speaker (two colloquia) at the Kokoro Research Institute, Kyoto University, January 2014.

- *The role of similarity in object and scene representation*, Cognitive Science colloquium, the University at Buffalo, March 2014.
- *Learning generative probabilistic grammars for sequential behaviors*, colloquium at the RIKEN Brain Science Institute, Wako-shi, Saitama, Japan, May 2014.
- Invited participant in NII Shonan Meeting on *Deep Learning: Theory, Algorithms, and Applications*, Shonan Village Center, Japan, May 2014.
- *Design for a Brain?*, colloquium at the Sagol Neuroscience Program, Tel Aviv University, Israel, June 2014.
- *On DN, RL, and doing AI with the brain in mind*, computer science department colloquium, Cornell University, November 2014.
- Three colloquia at the Nanyang Technological University, Singapore, July 2015:
  - *Learning a generative probabilistic grammar of experience: a process-level model of language (and birdsong) acquisition*
  - *Happiness: evolutionary basis, cognitive mechanisms, social & personal dynamics*
  - *Modeling language and cognition*
- *Computational Vision, Behavior, and Experience*, invited plenary talk at APCV 2015 — Asia-Pacific Conference on Vision, Singapore, July 2015.
- *More difficult than it sounds: prospects for progress in linguistics*, invited plenary talk at the 2nd Conference on Usage-Based Linguistics, Tel Aviv, June 2016.
- *To understand vision, we must study real behavior, evolution, and the brain*, invited talk at *Sensing: from Minds to Machines*, an international research workshop of the Israel Science Foundation, Ben-Gurion University, Be'er Sheba, May-June 2016.
- *Happiness*, panelist at a Helix Center Symposium, New York Psychoanalytic Society, September 2016.
- *Verbal behavior without syntactic structures: language beyond Skinner and Chomsky*, brown bag colloquium, Dept. of Computer Science, Cornell University, November 2016.
- Two invited talks at *Human and Machine Learning*, a workshop at the Beijing Institute of Technology, August 2017:
  - *Learning and language: evolutionary background, behavioral characterics, computational processes, brain circuitry*
  - *Consciousness: what it is, who has it, what it is good for, and how it may be computed*
- *Fundamental constraints on the time course of perception and consciousness*, Bernstein Center for Computational Neuroscience, Berlin, August 2018.
- *Vision in the service of behavior*, invited talk at the *Flies, Men, and Machines* symposium in honor of H. H. Bülthoff, MPI for Biological Cybernetics, Tübingen, August 2018.
- *Verbal behavior without syntactic structures: language beyond Skinner and Chomsky*, Center for Minds, Brains, and Culture colloquium, Emory University, February 2019.

- *Dynamic Emergence Theory of conscious experience*, Center for Minds, Brains, and Culture lunch talk, Emory University, February 2019.
- Organizer (also presenter), NII Shonan Meeting on *Language as goal-directed sequential behavior*, Shonan Village Center, Japan, May 2019 (3.5 days; 28 international participants).
- *Preventable Unhappiness*, guest lecture in History 6.30, Dartmouth College, November 2019.
- *Practical Approaches to Saving the World*, Apotheosis Society, Cambridge University, May 2020.
- *Why Pain Hurts: An Evolutionary Computational Account*, Association for Mathematical Consciousness Science (AMCS) seminar series, July 2021.
- *Autodiagnosis and the Dynamical Emergence Theory of Basic Consciousness*, invited plenary talk at the Models of Consciousness 2 Conference of the Association for Mathematical Consciousness Science (AMCS), September 2021.