

# CURRICULUM VITAE

Yael Hanein  
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## 1 Personal Details

**Residence address:** 90 Hadar st. Caesarea, Israel.

**Date and place of birth:** March 18, 1970, Kfar-Saba, Israel.

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## 2 Education

- Ph.D. Physics, The Weizmann Institute of Science, Rehovot, Israel (1996-1999). Thesis: The metal-insulator transition in two-dimensional gallium-arsenide based systems. Thesis advisor: Prof. Dan Shahar.
- M.Sc. Physics, The Weizmann Institute of Science, Rehovot, Israel (1993-1995). Thesis: A novel fabrication and characterization of quantum wires grown by molecular beam epitaxy on non-planar substrates. Thesis advisor: Prof. Mordehai Heiblum.
- B.Sc. Physics, Tel-Aviv University, Tel-Aviv, Israel (1990-1993).

## 3 Post-Graduate and Additional Academic Experience

- Postdoctoral research associate, Department of Physics, University of Washington, Seattle, WA (9/2002 - 9/2003). Research interests: Carbon nanotube electronic devices.
- Postdoctoral research associate, Department of Electrical Engineering, University of Washington, Seattle, WA (1/2000 - 2/2003) with Profs. Denice Denton and Karl Bohringer. Research interests: Silicon based electrodes for intracellular neuronal recording, micro-machined protein resistant coatings, and micro self-assembly for MEMS applications.
- Visiting student, Prof. Dan Tsui laboratory, Department of Electrical Engineering, Princeton University, Princeton, NJ (1997-1999). Research interests: Metal-insulator transitions in two-dimensional systems.

## 4 Academic and Professional Experience

- Full Professor of Electrical Engineering, Tel-Aviv University (10/2013 - present).
- CTO, X-trodes Inc., Israel (2019 - present).
- VP for Scientific Affairs, Nano Retina Inc., Israel (2009 - present).
- Associate Professor of Electrical Engineering, Tel-Aviv University (3/2009 - 10/2013).
- Senior Lecturer (with tenure), Iby and Aladar Fleischman Faculty of Engineering, School of Electrical Engineering; Department of Physical Electronics, Tel-Aviv University, Tel-Aviv (11/2006 - 2/2009).
- Lecturer, Iby and Aladar Fleischman Faculty of Engineering, School of Electrical Engineering; Department of Physical Electronics, Tel-Aviv University, Tel-Aviv (10/2003 - 11/2006)

## 5 Academic and Professional Awards

### 5.1 Awards and distinctions

- Senior Member, Academy of Inventors (NAI) (Elected 2019)
- Member, AcademiaNet (Elected 2017)
- Member (and the first head of the EC of), The Israel Young Academy (2012-2016)
- Member of the Global Young Academy (2010-2012), EC member (2010-2011).
- David Kulitz fellow, Tel-Aviv University (2004-2006)
- NSF CISE postdoctoral associateship (2000 - 2003)
- Levi Eshkol Scholarship, The Israeli Ministry of Science (1997-1999)
- Israeli Society of Crystal Growth student prize (1996)

### 5.2 Membership in Professional Societies

- American Physical Society (APS). Member since 1997.
- Institute of Electrical and Electronics Engineers (IEEE). Member since 2000. Senior member since 2008.

## 6 Professional Duties and Committees

- Editorial Board Member, Journal of Neural Engineering (2018 - present)
- Editorial Board Member of Neural Technology (specialty section of Frontiers in Neuroscience) (2018 - present)
- Editorial Board, Journal of Colloid and Interface Science (COLCOM) by Elsevier (2014 - present)
- Member of the Sinergia evaluation Commission, Swiss National Science Foundation (2016 - 2020)
- ERC consolidator grant panel member (2014)
- Horizon 2020 expert on the NMP committee (2014 - 2016)
- Executive committee head, Israel Young Academy, 2012-2014
- Executive committee member, Global Young Academy, 2010-2011
- Director, Tel-Aviv University Center for Nanoscience and Nanotechnology (2012 - 2020)
- Founding co-director, XIN, A joint Center of Tel Aviv and Tsinghua Universities (2014 - 2020)
- Tel-Aviv University Center for Nanoscience and Nanotechnology, Scientific Committee(2006 - 2020)
- Founding co-director, Tel-Aviv University micro & nano Central Characterization & Fabrication Facility (2007 - 2018)
- Tel-Aviv University, Faculty of engineering research committee (2007-2011)
- Tel-Aviv University, committee for research service improvement (2007-2010)

- Young mentor, IAP's third and fourth conferences for young scientists, World economic forum "summer Davos" (2010, 2011)
- Scientific Programme Committee, 8th International Meeting on Substrate-Integrated Microelectrode Arrays, July 1-4, 2014, Reutlingen, Germany
- Scientific Programme Committee, 8th International Meeting on Substrate-Integrated Microelectrode Arrays, July 10-12, 2012, Reutlingen, Germany
- Scientific Programme Committee, 7th International Meeting on Substrate-Integrated Microelectrode Arrays, June 29 to July 2, 2010, Reutlingen, Germany
- Technical program committee, MEMS 2010, Hong-Kong, China
- Technical program committee, Transducers 2009, Denver, CO, USA
- Technical program committee, Transducers 2007, Lyon, France
- Technical program committee, Transducers 2005, Seoul, Korea
- Technical program committee, Euro-sensors 2011, Athens, Greece
- Technical program committee, Euro-sensors 2009, Lausanne, Switzerland
- Technical program committee, Euro-sensors 2008, Dresden, Germany
- Organizing committee, Annual meeting of the Israeli Society for Medical and Biological Engineering, 2006
- Organizing committee; Israel vacuum society 25th annual meeting, 2006, Tel-Aviv
- International Advisory Board, 10th International Conference on Medical Applications of Novel Biomaterials and Nano-biotechnology, June 8-13, 2014, Montecatini Terme, Tuscany
- Co-organizer, a symposium on "Graphitic Materials" at the ACS National Meeting, 2009, Washington DC, USA

## 7 Past students

- Dr. Tamir Gabay, Ph.D. student 2003-2008, Carbon nanotube microelectrode array for neuronal patterning, recording and stimulation. (with Prof. Eshel Ben-Jacob)
- Dr. Assaf Ya'akovovitz, Ph.D. student 2008-2013, Sensitivity Enhancement of Microelectromechanical Sensors Using Carbon Nano Tubes (with Prof. Slava Krylov).
- Dr. Mark Shein, Ph.D. student 2008-2013, Information Processing in Clustered In-Vitro Neuronal Networks (with Prof. Eshel Ben-Jacob).
- Dr. Lilach Bareket, Ph.D. student 2009-2014, Plasma polymerized coatings for novel electrical and optoelectrical neuronal interfaces.
- Eyal Jakobs, M.Sc. 2003-2005, Smart gel based MEMS devices
- Daniel Kiesling, M.Sc. 2004-2006, (with Friedrich Alexander University, Germany)
- Nir Sopher, M.Sc. 2005-2007, PNT base devices
- Dr. Ze'ev Abrams, M.Sc. 2005-2007, Patterning Large Scale Electronic Networks of Carbon Nanotubes

- Dr. Raya Sorkin, M.Sc. 2005-2008, Neuronal cell adhesion and self-arrangement on high density Carbon Nanotubes.
- Orly Levi, M.Sc. 2006-2008, Model and analysis of carbon nanotube mechanics with the dissipative particle dynamics simulation method
- Dr. Alon Greenbaum, M.Sc. 2007-2009, One to one neuron-electrode interfacing.
- Moran Horesh, M.Sc. 2007-2009, Bio-sensors arrays for discriminative analysis.
- Asaf Shoval, M.Sc. 2007-2009, Electrical Performance of Carbon Nanotube Microelectrodes for Neuronal Recordings.
- Gabriel Karp, M.Sc. 2007-2009, of Carbon nanotubes into micron scale electro-mechanical devices.
- Nitzan Herzog, M.Sc. 2008-2011, Cross validation of calcium imaging and extra-cellular neuronal culture recordings
- Moshe David Pur, M.Sc. 2009-2012, All carbon nanotube flexible neuronal electrodes.
- Giora Beit Ya'akov. M.Sc. 2010-2012, Retinal stimulation with extra-cellular electrodes.
- Michal Eitan, M.Sc. 2011-2013, Nano-particles Trapping by Optically Induced Dielectrophoresis Enhanced by Nano-antennas
- Yoav Blau, M.Sc. 2012-2014, Towards MIM Based Dual-Vivaldi Nano Rectenna Arrays for Optical Rectification
- Yoni Kantarovsky, M.Sc. 2012-2014, Towards realizing Carbon Nanotube based Rectennas
- Lital Bar Dea, M.Sc. 2012-2014, Mechanical deformation of carbon nanotubes toward MEMS displacement sensing
- Gur Lubin, M. Sc. 2013-2015, Optical investigation of carbon nanotube - quantum rod nanocomposites for retinal prosthesis applications.
- Jacob Ben Dov, M.Sc. 2014-2016, Photoelectrical properties of carbon nanotube nano rod hybrids for retinal stimulation
- Yasmin Bar El, M.Sc. 2015-2017, Neuron-Glia Network Communication Under the Effect of Neuromodulators
- Dr. Inbal Friedler, Post-doc 2008-2011, with Prof. Koby Scheuer and Prof. Amir Boag.
- Dr. David Rand, Post-doc 2014-2016.

## 8 Publications

### 8.1 Book Chapters and Review Papers

- Moshe David-Pur, Mark Shein and Yael Hanein, Carbon Nanotube-Based Neurochips in Carbon Nanotubes: Methods and Protocols, edited by Marko Burghard and Kannan Balasubramanian, Carbon nanotube based neuro-chips, , Humana Press, USA, 2010.
- David Rand and Yael Hanein, Carbon nanotubes for neuron-electrode interface with improved mechanical performance, in Nanotechnology and Neuroscience: nano-electronic, photonic and mechanical neuronal interfacing. Edited by Massimo De Vittorio, John Assad, Luigi Martiradonna, Springer Science, New York - USA, 2014.

- Lilach Bareket and Yael Hanein, Carbon nanotube based micro electrode arrays for neuronal interfacing: Progress and prospects, *Frontiers in Neural Circuits*, Vol. 6, pp. 122, 2012.
- Lilach Bareket-Keren and Yael Hanein, Novel Interfaces for Light Directed Neuronal Stimulation: Advances and Challenges, *International Journal of Nanomedicine*, Vol. 2014:9, pp.65 - 83, 2014.

## 8.2 Journal Papers (students/staff of YH Lab are marked with an asterisk)

1. Y. Hanein, H. Shtrikman and U. Meirav, Very low density two-dimensional hole gas in an inverted GaAs/AlAs interface, *Applied Physics Letters*, Vol. 70, pp. 1426-1428, 1997.
2. D. Scheiner, Y. Hanein and M. Heiblum, Fabrication of quantum wires in thermally etched V-grooves by Molecular Beam Epitaxy, *Semiconductors Science and Technology*, Vol. 12, pp. 1046-1051, 1997.
3. Y. Hanein, U. Meirav, D. Shahar, C. C. Li, D. C. Tsui and H. Shtrikman, The metallic-like conductivity of a two-dimensional hole system, *Physical Review Letters*, Vol. 80, pp. 1288-1291, 1998.
4. Y. Hanein, H. Shtrikman and U. Meirav, Transport properties of a two-dimensional hole gas with density varied over a very wide range, *Physica E*, Vol. 2, pp. 498-501, 1998.
5. Y. Hanein, D. Shahar, J. Yoon, C. C. Li, D.C. Tsui and H. Shtrikman, Properties of the apparent metal-insulator transition in two-dimensional systems, *Physical Review B*, Vol. 58, pp. 7520-R7523, 1998.
6. Y. Hanein, D. Shahar, J. Yoon, C. C. Li, D. C. Tsui and H. Shtrikman, Observation of the metal-insulator transition in two-dimensional n-type GaAs, *Physical Review B*, Vol. 58, pp. R13338-R13340, 1998.
7. H. Shtrikman, Y. Hanein, A. Soibel and U. Meirav, Superior molecular beam epitaxy (MBE) growth on (N11)A GaAs, *Journal of Crystal Growth*, Vol. 201/202, pp. 221-225, 1999.
8. H. Shtrikman, Y. Hanein, A. Soibel and U. Meirav, (N11)A GaAs: A preferable platform for high quality GaAs/AlGaAs structures, *Microelectronics Journal*, Vol. 30, pp. 323-328, 1999.
9. Y. Hanein, N. Nenadovic, D. Shahar, Hadas Shtrikman, J. Yoon, C.C. Li and D.C. Tsui, Linking insulator-to-metal transitions at zero and finite magnetic fields, *Nature*, Vol. 400, pp. 735-737, 1999.
10. Y. Hanein, Y. V. Pan, B. D. Ratner, D. D. Denton, K. F. Bohringer, Micromachined non-fouling coatings for bio-MEMS applications, *Sensors and Actuators: B. Chemical*, Vol. 81, pp. 49-54, 2001.
11. Y. Hanein, K. F. Bohringer, R. Wyeth, and A. O. D. Willows, Towards MEMS Probes for Intracellular recording, *Sensors Update*, Vol. 10, pp. 47-74, 2002.
12. X. Xiong, Y. Hanein, J. Fang, Y. Wang, W. Wang, D. T. Schwartz, K. F. Bohringer, Controlled Multi-Batch Self-Assembly of Micro Devices, *ASME/IEEE Journal of Microelectromechanical Systems*, Vol. 12, pp.117-127, 2003.
13. Y. Hanein, C. G. J. Schabmueller, G. Holman, P. Lucke, D. D. Denton, K. F. Bohringer, High-aspect ratio submicrometer needles for intracellular applications, *IOP Journal of Micromechanics and Microengineering (JMM)*, Vol. 13, pp. S91, 2003.
14. J. Lienemann, A. Greiner, J. G. Korvink, X. Xiong, Y. Hanein, and K. F. Bohringer, Modeling, Simulation, and Experimentation of a Promising New Packaging Technology: Parallel Fluidic Self-Assembly of Microdevices, *Sensors Update*, Vol. 13, pp. 47-75, 2003.

15. J. Clemmens, H. Hess, R. Lipscomb, Y. Hanein, Karl F. Bohringer, Carolyn M. Matzke, George D. Bachand, Bruce C. Bunker, Viola Vogel, Mechanisms of microtubule guiding on microfabricated kinesin coated surfaces: Chemical and topographic surface patterns, *Langmuir*, Vol. 19, pp. 10967-10974, 2004.
16. I. Radu, Y. Hanein and D. H. Cobden, Oriented growth of single-wall carbon nanotubes using alumina patterns, *Nanotechnology*, Vol. 15, pp. 473-476, 2004.
17. Xuanhong Cheng, Yanbing Wang, Yael Hanein, Karl F. Bohringer and Buddy D. Ratner, Novel cell patterning using microheater controlled thermoresponsive plasma films, *Journal of Biomedical Materials Research*, Vol. 70A, pp. 159-168, 2004.
18. Tamir Gabay\*, Eyal Jakobs\*, Eshel Ben-Jacob, and Yael Hanein, Engineered self-organization of neural networks using CNT clusters, *Physica A*, Vol. 350, pp. 611-621, 2005.
19. R. Sorkin\*, T. Gabay\*, P. Blinder, D. Baranes, E. Ben-Jacob and Y. Hanein, Compact self-wiring in cultured neural networks, *Journal of Neural Engineering*, Vol. 3, pp. 95-101, 2006.
20. Eyal Jakobs\* and Yael Hanein, Micrometer scale gel patterns, *Colloids and Surfaces A: Physico-chemical and Engineering Aspects*, Vol. 290, pp. 33-40, 2006.
21. Z. R. Abrams\* and Y. Hanein, Tube-tube and tube-surface interactions in straight suspended carbon nanotube structures, *Journal of Physical Chemistry B*, Vol. 110(43), pp. 21419-21423, 2006.
22. Z. R. Abrams\*, Y. Lereah and Y. Hanein, Transmission electron microscope imaging of single-walled carbon nanotube interactions and mechanics on nitride grids, *Nanotechnology*, Vol. 17, pp. 4706-4712, 2006.
23. Z. R. Abrams\* and Y. Hanein, Radial deformation measurements of isolated pairs of single-walled carbon nanotubes, *Carbon*, Vol. 45, pp. 738-743, 2007.
24. Tamir Gabay\*, Moti Ben-David\*, Itshak Kalifa\*, Raya Sorkin\*, Ze'ev R. Abrams\*, Eshel Ben-Jacob and Yael Hanein, Electro-chemical and biological properties of carbon nanotube based multi-electrode arrays, *Nanotechnology*, Vol. 18, pp. 035201-035206, 2007.
25. Ze'ev R. Abrams\*, Zvi Ioffe, Alexander Tsukernik, Ori Cheshnovsky, and Yael Hanein, A Complete Scheme for Creating Large Scale Networks of Carbon Nanotubes, *Nano Letters*, Vol. 7, pp. 2666-2671, 2007.
26. N B Sopher\*, Z R Abrams\*, M Reches, E Gazit and Y Hanein, Integrating peptide nanotubes in micro-fabrication processes, *J. Micromech. Microeng.* Vol. 17, pp. 2360-2365, 2007.
27. Z R Abrams\*, D Szwarcman, Y Lereah, G Markovich, Y Hanein, Iron assisted growth of copper tipped multi-walled carbon nanotubes, *Nanotechnology*, Vol. 18, pp. 495602, 2007.
28. Orly Levy\*, David Kauzlarić, Ze'ev R. Abrams, Yael Hanein, Andreas Greiner and Jan G. Korvink, Dissipative particle dynamics model of carbon nanotubes, *Molecular Simulation*, Vol. 34, pp. 737-748, 2008.
29. E. Ben-Jacob and Y. Hanein, Carbon nanotube micro-electrodes for neuronal interfacing, *Journal of Materials Chemistry*, Vol. 18, pp. 5181-5186, 2008.
30. Mark Shein\*, Vladislav Volman, Nadav Raichman, Yael Hanein and Eshel Ben-Jacob, Management of synchronized network activity by highly active neurons, *Physical Biology*, Vol. 5, pp. 036008, 2008.

31. Orly Liba\*, David Kauzlaric, Yael Hanein, Andreas Greiner and Jan G. Korvink, Investigation of the mechanical properties of bridged nanotube resonators by dissipative particle dynamics simulation, *International Journal for Multiscale Computational Engineering*, Vol. 6, pp. 1543-1649, 2008.
32. Sarit Anava, Alon Greenbaum\*, Eshel Ben Jacob, Yael Hanein and Amir Ayali, The regulative role of neurite mechanical tension in network development, *Biophysical Journal*, Vol.96, pp. 1661-1670, 2009.
33. Raya Sorkin\*, Alon Greenbaum\*, Moshe David-Pur\*, Sarit Anava, Amir Ayali, Eshel Ben-Jacob, and Yael Hanein, Process entanglement as a neuronal adhesion mechanism, *Nanotechnology*, Vol. 20, pp. 015101, 2009.
34. Mark Shein\*, Alon Greenbaum\*, Tamir Gabay\*, Raya Sorkin\*, Moshe David-Pur\*, Eshel Ben-Jacob and Yael Hanein, Engineered neuronal circuits shaped and interfaced with carbon nanotube microelectrode arrays, *Biomed Microdevices*, Vol. 11, pp. 495-501, 2009.
35. Asaf Shoval\*, Christopher Adams, Moshe David-Pur, Mark Shein, Yael Hanein and Evelyne Ser-nagor, Carbon nanotube electrodes for effective interfacing with retinal tissue, *Frontiers in Neuro-engineering*, Vol 2, pp. 4, 2009.
36. Gabriel A. Karp\*, Assaf Ya'akobovitz\*, Moshe David-Pur\*, Zvi Ioffe, Ori Cheshnovsky, Slava Krylov, and Yael Hanein, Integration of Suspended Carbon Nanotubes into Micro-Fabricated De-vices, *J. Micromech. Microeng.* Vol. 19, pp. 085021, 2009.
37. Alon Greenbaum\*, Sarit Anava, Amir Ayali, Mark Shein, Moshe David-Pur, Eshel Ben-Jacob and Yael Hanein, One to one neuron-electrode interfacing, *Journal of Neuroscience Methods*, Vol. 182, pp. 219-224, 2009.
38. Assaf Ya'akobovitz\*, Slava Krylov and Yael Hanein, Nanoscale displacement measurement of elec-trostatically actuated micro-devices using optical microscopy and digital image correlation, *Sensors and Actuators A: Physical* Vol. 162, pp. 1-7, 2010.
39. Yael Hanein, Carbon nanotube integration into MEMS devices, *Phys. Status Solidi B*, Vol. 247, pp. 1-6, 2010.
40. Mark Shein Idelson\*, Eshel Ben-Jacob, Yael Hanein, Innate synchronous oscillations in freely-organized small neuronal circuits, *PLoS One*, 5(12): e14443, 2010.
41. Yael Hanein, Oren Tadmor\*, Sarit Anava and Amir Ayali, Neuronal migration and network topology - under tension, *Neuroscience* Vol. 172, pp. 572-579, 2011.
42. Assaf Ya'akobovitz\*, Gabriel A. Karp\*, Yael Hanein and Slava Krylov, A MEMS nano-extensometer with integrated de-amplification mechanism, *Microsystem Technologies*, Vol. 17, pp. 337-345, 2011.
43. Moran Horesh\*, Nina Lidich, Shlomo Yitzchaik, Yael Hanein A Temperature-Differential Affinity Biosensor: Model and D-optimal Performance Limits, *IEEE Sensors*, Vol 11, pp. 2007-2015, 2011.
44. Assaf Ya'akobovitz\*, Slava Krylov, Yael Hanein, Large Deflections Mechanical Analysis of a Sus-pended Single Wall Carbon Nanotube Under Thermo-Electrical Loading, *Journal of Nanomaterials*, Vol. 2011, pp. 190360, 2011.
45. Nitzan Herzog\*, Mark Shein, Yael Hanein, Optical validation of in-vitro extra-cellular neuronal recordings, *Journal of Neural Engineering*, Vol. 8, pp. 056008, 2011.
46. Mark Shein-Idelson\*, Eshel Ben-Jacob, and Yael Hanein, Engineered neuronal circuits: A new platform for studying the role of modular topology, *Frontiers in Neuroengineering*, Vol. 4, 10, 2011.

47. Yuval Yifat, Zeev Iluz, Michal Eitan\*, Inbal Friedler\*, Yael Hanein, Amir Boag, and Jacob Scheuer, Quantifying the radiation efficiency of nano antennas, *Applied Physics Letters*, Vol. 100, pp. 111113, 2012.
48. Yuval Yifat, Zeev Iluz, Doron Bar-Lev, Michal Eitan\*, Yael Hanein, Amir Boag, Jacob Scheuer, High load-sensitivity in wideband infrared dual-Vivaldi nanoantennas, *Opt Lett.* 38(2), pp. 205-7, 2013. doi: 10.1364/OL.38.000205
49. Lilach Bareket\* and Yael Hanein, Carbon nanotube based micro electrode arrays for neuronal interfacing: Progress and prospects ,*Front Neural Circuits.* 6: 122, 2013. doi: 10.3389/fncir.2012.00122
50. Moshe David-Pur\*, Mark Shein\*, Lilach Bareket\*, Giora Beit-Ya'akov\*, Nizan Herzog\*, Yael Hanein, All-carbon-nanotube flexible neuronal electrodes, *Biomed Microdevices*, Vol. 16(1), pp. 43-53, 2014. doi: 10.1007/s10544-013-9804-6
51. Lilach Bareket-Keren\* and Yael Hanein, Novel Interfaces for Light Directed Neuronal Stimulation: Advances and Challenges, *Int J Nanomedicine*, Vol. 6, pp. 1:65-83, 2014. doi: 10.2147/IJN.S51193.
52. Vini Gautam, David Rand\*, Yael Hanein and K.S. Narayan, A polymer optoelectronic interface provides visual cues to a blind retina, *Advanced Materials*, 10.1002/adma.201304368, 2013.
53. Yuval Yifat, Michal Eitan\*, Zeev Iluz, Yael Hanein, Amir Boag, Jacob Scheuer, Highly efficient and broadband wide-angle Holography Using Patch-Dipole Nano-antenna Reflect arrays, *Nano Letters*, 14 (5), 2485-2490, 2014.
54. Gilad Wallach\*, Jules Lallouette, Nitzan Herzog\*, Maurizio De Pitta\*, Eshel Ben Jacob, Hugues Berry, and Yael Hanein, Glutamate Mediated Astrocytic Filtering of Neuronal Activity, *PLOS Computational Biology*, 2014, DOI: 10.1371/journal.pcbi.1003964.
55. Lilach Bareket\*, Nir Waiskopf, David Rand\*, Gur Lubin\*, Moshe David-Pur, Jacob Ben-Dov\*, Soumyendu Roy, Cyril Eleftheriou, Evelyne Sernagor, Ori Cheshnovsky, Uri Banin, Yael Hanein, Semiconductor Nanorod-Carbon Nanotube Biomimetic Films for Wire-Free Photo- Stimulation of Blind Retinas, *Nano Letters*, 14 (11), 6685-6692, DOI: 10.1021/nl5034304, 2014.
56. Nurit Atar\*, Eitan Grossman, Irina Gouzman, Asaf Bolker, Yael Hanein, Reinforced Carbon Nanotubes as Electrically Conducting and Flexible Films for Space Applications, *ACS Appl Mater Interfaces.* 26;6(22):20400-7, 2014.
57. Michal Eitan\*, Zeev Iluz, Yuval Yifat, Amir Boag, Yael Hanein, and Jacob Scheuer, Degeneracy breaking of Wood's anomaly for enhanced refractive index sensing, *ACS Photonics*, 2 (5), pp 615621, DOI: 10.1021/acsphotonics.5b00091, 2015.
58. Nurit Atar\*, Eitan Grossman, Irina Gouzman, Asaf Bolker, Vanessa J. Murray, Brooks C. Marshall, Min Qian, Timothy K. Minton, Yael Hanein, Atomic Oxygen Durable and Electrically-Conductive CNT POSS Polyimide Flexible Films for Space Applications, *ACS Appl. Mater. Interfaces*, DOI: 10.1021/acsami.5b02200, 2015.
59. Sivan Kanner, Marta Bisio, Gilad Cohen\*, Miri Goldin, Marieteresa Tedesco, Yael Hanein, Eshel Ben-Jacob, Ari Barzilai, Michela Chiappalone, Paolo Bonifazi, Design, Surface Treatment, Cellular Plating, and Culturing of Modular Neuronal Networks Composed of Functionally Inter-connected Circuits, *J. Vis. Exp.* (98), e52572, doi:10.3791/52572 (2015).
60. Assaf Ya'akovovitz\*, Lital Bardea\*, Yael Hanein and Slava Krylov, Three-dimensional dynamic behavior of suspended single wall carbon nanotubes, *International Journal of Mechanical Sciences*, Vol. 105, pp. 1-408, 2016.



61. Lilach Bareket\*, Lilah Inzelberg\*, David Rand\*, Moshe David-Pur, David Rabinovich, Barak Brandes and Yael Hanein, Temporary-tattoo for long-term high fidelity biopotential recording, Temporary-tattoo for long-term high fidelity biopotential recordings. *Sci. Rep.* 6, 25727; doi: 10.1038/srep25727 (2016).
62. M Shein-Idelson\*, G Cohen\*, E Ben-Jacob and Y Hanein, Modularity Induced Gating and Delays in Neuronal Networks. *PLoS Comput Biol* 12(4): e1004883. doi:10.1371/journal.pcbi.1004883, 2016.
63. Cyril Eleftheriou, Jonas Zimmermann, Henrik Kjeldsen, Moshe David-Pur, Yael Hanein, Evelyne Sernagor, Carbon nanotube electrodes for retinal implants: a study of structural and functional integration over time, *Biomaterials*, 112:108-121, 2017.
64. Soumyendu Roy\*, Moshe David-Pur\*, Hanein Yael, Carbon nanotube growth inhibition in floating catalyst based chemical vapor deposition and its application in flexible circuit fabrication, *Carbon*, 116, 40-49, 2017.
65. Jugun Prakash Chinta, Nir Waiskopf, Gur Lubin\*, David Rand\*, Yael Hanein, Uri Banin, Shlomo Yitzchaik, Carbon nanotube and semiconductor nanorods hybrids: Preparation, characterization and evaluation of photocurrent generation, *Langmuir*, DOI: 10.1021/acs.langmuir.6b04599, 2017.
66. D Raz-Prag, G Beit-Yaakov\* and Y Hanein, Electrical stimulation of different retinal components and the effect of asymmetric pulses, *Journal of Neuroscience Methods*, doi: 10.1016/j.jneumeth.2017.07.028, 2017.
67. Soumyendu Roy\*, Moshe David Pur\*, Yael Hanein, Carbon Nanotube Based Ion Selective Sensors for Wearable Applications, *ACS Appl. Mater. Interfaces*, DOI: 10.1021/acsami.7b07346, 2017.
68. Lilah Inzelberg\*, David Rand\*, Stas Steinberg\*, Moshe David Pur\*, Yael Hanein, A Wearable High-Resolution Facial Electromyography for Long Term Recordings in Freely Behaving Humans, *Sci. Rep.*, doi:10.1038/s41598-018-20567-y, 2018.
69. David Rand\*, Marie Jakeov, Gur Lubin\*, Ieva V\*, Moshe David Pur\*, Vedran Derek, Tobias Cramer, Niyazi Serdar Sariciftci, Yael Hanein, Eric Daniel Gowacki, Direct electrical neurostimulation with organic pigment photocapacitors, *Advanced Materials*, 2018.
70. Yasmin Bar El\*, Sivan Kanner, Ari Barzilai, and Yael Hanein, Activity changes in neuron-astrocyte networks in culture under the effect of norepinephrine, *PLOS ONE*, 2018.
71. Yoav Blau\*, Michal Eitan\*, Victor Egorov, Amir Boag, Yael Hanein and Jacob Scheuer, In situ real-time beam monitoring with dielectric meta-holograms, *Optics Express*, 2018.
72. Lilah Inzelberg\*, Moshe David-Pur\*, Stefan Schliske, Stefan, Tobias Rodlmeier, Omer Granoviter\*, David Rand\*, Stanislav Steinberg\*, Gerardo Hernandez-Sosa, Yael Hanein, Printed Facial Skin Electrodes as Sensors of Emotional Affect, *Flexible and Printed Electronics*, 2018.
73. Shiran Shustak\*, Lilah Inzelberg\*, Stanislav Steinberg\*, David Rand\*, Moshe David-Pur\*, Inbar Hillel, Shlomit Katzav, Firas Fahoum, Maarten De Vos, Maarten, Anat Mirelman, Yael Hanein, Home monitoring of sleep stages with a temporary-tattoo EEG, EOG and EMG electrode array, *Journal of Neural Engineering*, 2019.
74. Lilah Inzelberg\* and Yael Hanein, Electrophysiology Meets Printed Electronics: The Beginning of a Beautiful Friendship, *Frontier in Neuroscience*, 2019.
75. Yoav Blau\*, Ofer Bar-On, Yael Hanein, Amir Boag, Jacob Scheuer, Pseudorandom physical unclonable functions: a new route for authentication, *Optic Express*, 2020.
76. Lilah Inzelberg\*, Moshe David-Pur\*, Eyal Gur, Yael Hanein, High-resolution electromyography-based mapping of spontaneous smiles, *Journal of Neural Engineering*, 2020.

77. Vedran erek, David Rand\*, Ludovico Migliaccio, Yael Hanein, Eric Daniel Glowacki, Untangling photofaradaic and photocapacitive effects in organic optoelectronic stimulation devices, *Frontiers in Bioengineering and Biotechnology, Nanobiotechnology*, 2020.
78. Monitoring sleep disorders at home: how can wearable electrode arrays help? Yael Hanein and Anat Mirelman, *Bioelectronics in Medicine*, 2020

### **8.3 Extended Papers in Conference Proceedings (students under the mentorship of YH are marked with an asterisk)**

1. Y. Hanein, U. Meirav, D. Shahar, C. C. Li, D. C. Tsui and H. Shtrikman, The metallic-like conductivity of a two-dimensional hole system, *Proceedings of the 24th International conference on the physics of semiconductors*, (CD-ROM), 1998.
2. Y. V. Pan, Y. Hanein, D. Leach-Scampavia K.F. Bohringer, B. D. Ratner, D. D. Denton. A precision technology for controlling protein adsorption and cell Adhesion in bioMEMS, *Proceedings of the IEEE Workshop on Micro Electro Mechanical Systems (MEMS)*, pp. 435-438, 2001.
3. Xiaorong Xiong, Y. Hanein, Weihua Wang, Daniel T. Schwartz and Karl F. Bohringer, Controlled part-to-substrate micro-assembly via electrochemical modulation of surface energy, *Proceedings of the International Conference on solid-state Sensors and Actuators, Transducers*, pp. 1040-1043, 2001.
4. Y. Hanein, U. Lang, J. Theobald, R. Wyeth, K. F. Bohringer, T. Daniel, D.D. Denton and A. O. D. Willows, Intracellular recording with high aspect ratio MEMS neuronal probes, *Proceedings of the International Conference on solid-state Sensors and Actuators, Transducers*, pp. 386-389, 2001.
5. Karl F. Bohringer, Yael Hanein, Daniel Schwartz, Weihua Wang, Xiaorong Xiong, Multi-batch micro-selfassembly via controlled capillary forces, *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, Vol. 3, pp. 1335-1342, 2001.
6. Andreas Greiner, Jan Lienemann, Jan G. Korvink, Xiaorong Xiong, Yael Hanein, and Karl F. Bohringer, Capillary forces in micro-fluidic self-assembly, *Proceedings of the 5th International Conference on Modeling and Simulation of Microsystems*, pp. 198 - 201, 2002.
7. G. Holman, Y. Hanein, R.C. Wyeth, A.O.D. Willows, D. D. Denton, and K.F. Bohringer, Silicon micro-needles with flexible interconnections, *Proceedings of the Second Annual International IEEE-EMBS Special Topic Conference on Microtechnologies in Medicine and Biology*, pp. 255-260, 2002.
8. R. C. Lipscomb, J. Clemmens, Y. Hanein, M. R. Holl, V. Vogel, B. D. Ratner, D. D. Denton and K. F. Bohringer, Controlled microtubules transport on patterned non-fouling surfaces, *Proceedings of the Second Annual International IEEE-EMBS Special Topic Conference on Microtechnologies in Medicine and Biology*, pp. 21-26, 2002.
9. Y. Wang, X. Cheng, Y. Hanein, A. Shastry, D. D. Denton, B. D. Ratner, and K. F. Bohringer, Protein patterning with programmable surface chemistry chips, *Proceedings of the Sixth International Symposium on Micro Total Analysis System (uTAS)*, pp. 482-484, 2002.
10. Xiaorong Xiong, Yael Hanein, Jiandong Fang, Daniel T. Schwartz and Karl F. Bohringer, Multi-batch self-assembly for microsystem integration, *Proceeding of the International Workshop on Microfactories* pp. 25-28, 2002 .
11. C. G. J. Schabmueller, Y. Hanein, G. Holman, and K. F. Bohringer, High-aspect ratio sub-micrometer needles for intracellular applications, *Proceedings of Micromechanics Europe*, pp. 35-38, 2002.

12. Y. Wang, X. Cheng, Y. Hanein, A. Shastry, D. D. Denton, B. D. Ratner, K. F. Bohringer, Cell and Protein Patterning on Programmable Chemistry Surface, the International Conference on solid-state Sensors and Actuators, Transducers, 2003.
13. Buddy D. Ratner, Xuanhong Cheng, Yanbing Wang, Yael Hanein, and Karl F. Bohringer, Temperature-Responsive Polymeric Surface Modifications by Plasma Polymerization: Cell and Protein Interactions, the annual meeting of the ACS, 2003.
14. T. Gabay\*, E. Jakobs\*, E. Ben-Jacob, Y. Hanein, Engineering neural networks using carbon nanotube templates, eleventh international conference on composites/nano engineering (ICCE - 11), 2004.
15. Itshak Kalifa\*, Meital Reches, Lihi Abramovich, Nir Sopher\*, Ehud Gazit, and Yael Hanein, Towards micro-machined peptide nanotube based devices, Proceeding of the the 13th International Conference on Solid-State Sensors and Actuators (Transducers'05), Seoul, Korea, pp. 1509-1512, 2005.
16. Eyal Jakobs\*, and Y. Hanein, Micrometer scale gel patterns, Proceeding of the 13th International Conference on Solid-State Sensors and Actuators (Transducers'05), Seoul, Korea, pp. 1412-1415, 2005.
17. Tamir Gabay\*, Eyal Jakobs\*, Eshel Ben-Jacob, and Yael Hanein, Carbon nanotube electrodes for neuronal patterning and recording, Proceeding of the 13th International Conference on Solid-State Sensors and Actuators (Transducers'05), Seoul, Korea, pp. 1226-1229, 2005.
18. N. B. Sopher\*, M. Reches, M. D. Kiessling\*, E. Gazit and Y. Hanein, Nanotube based nano-fluidic channels, Eurosensors 2006, September 17-20, 2006 Goteborg, Sweden
19. Z.R. Abrams\*, Y. Hanein, Imprinting straight, long, carbon nanotube networks, Eurosensors 2006, September 17-20, 2006 Goteborg, Sweden
20. R. Sorkin\*, T. Gabay\*, E. Ben-Jacob and Y. Hanein, Novel micro-fabricated engineered neural networks for bio-sensing applications, Eurosensors 2006, September 17-20, 2006 Goteborg, Sweden
21. T. Gabay\*, M. Ben-David\*, I. Kalifa\*, Z. R. Abrams\*, R. Sorkin\*, E. Ben-Jacob and Y. Hanein, Carbon nanotube microelectrode array, Proceeding of the the 14th International Conference on Solid-State Sensors and Actuators (Transducers'07), Lyon, France.
22. Jan Gerrit Korvink, Orly Levy\*, Yael Hanein, David Kauzlaric, and Andreas Greiner, Reduced molecular model for the mechanics of carbon nanotubes, Proceedings of the Third Asian-Pacific Congress on Computational Mechanics (APCOM'07) and the Eleventh International Conference on the Enhancement and Promotion of Computational Methods in Engineering and Science (EPMESC XI), Kyoto, Japan, December 3-6, 2007.
23. M. David-Pur M\*, C. Adams C, E. Sernagor, R. Sorkin\*, A. Greenbaum\*, M. Shein\*, E. Ben-Jacob E, and Y. Hanein, Carbon Nanotube Based MEA for Retinal Interfacing Applications, MEA-Meeting 2008, July 8-11, Reutlingen, Germany.
24. A. Greenbaum\*, M. Shein\*, M. David-Pur\*, S. Anava, Eshel B. Jacob, A. Ayali, and Y. Hanein, Electrical interfacing with engineered neuronal circuits, Eurosensors XXII, Dresden, Germany 7-10 September 2008.
25. G. A. Karp\*, A. Yaakovovitz\*, S. Krylov, Y. Hanein, CNT integration procedure into MEMS devices, Eurosensors XXII, Dresden, Germany, 7-10 September 2008.
26. Y. Hanein, M. David-Pur\*, S. Ben-Valid, S. Yitzchaik, Very low impedance mico/nano electrodes, Eurosensors XXII, Dresden, Germany, 7-10 September 2008.

27. Assaf Ya'akovovitz\*, Gabriel Karp\*, Moshe David-Pur\*, Yael Hanein, Slava Krylov Carbon nanotube self-assembled high frequency resonator, MEMS 2010, Hong-Kong, China, 24-28 January 2010.
28. Nitzan Herzog\*, Mark Shein, Yael Hanein, Accurate validation of extra-cellular neuronal recordings in culture, MEA 2010, June 29 - July 2, 2010, Reutlingen, Germany
29. Mark Shein Idelson\*, Eshel Ben-Jacob and Yael Hanein, Collective Activation in Clustered Neuronal Assemblies of Variable Size and Topology, MEA 2010, June 29 - July 2, 2010, Reutlingen, Germany.
30. Nitzan Herzog\*, Gilad Wallach\*, Mark Shein-Idelson\*, Yael Hanein, MEA electrodes record and stimulate distinctly different neuronal populations, Collective Activation in Clustered Neuronal Assemblies of Variable Size and Topology, MEA 2012, July 10 - July 13, 2012, Reutlingen, Germany.
31. Giora Beit-Yaakov\*, Dorit Raz-Prag, Yael Hanein, Highly non-localized retinal activation verified with MEA and Ca imaging techniques, Collective Activation in Clustered Neuronal Assemblies of Variable Size and Topology, MEA 2012, July 10 - July 13, 2012, Reutlingen, Germany.
32. Mark Shein-Idelson\*, Eshel Ben-Jacob, Yael Hanein, Modular topology introduces gating in neuronal networks through excitation-inhibition balance, Collective Activation in Clustered Neuronal Assemblies of Variable Size and Topology, MEA 2012, July 10 - July 13, 2012, Reutlingen, Germany.
33. Cyril G. Eleftheriou, Yael Hanein, Evelyne Sernagor, Towards the development of carbon nanotube-based retinal implant technology: Electrophysiological and ultrastructural evidence of coupling at the biohybrid interface, MEA 2012, July 10 - July 13, 2012, Reutlingen, Germany.
34. Exploring for the Glymphatic System in cultured neuron-glia networks: Yasmin Bar El et al., Mapping the effect of norepinephrine on network dynamics, Proceedings of the MEA Meeting 2016, June 28 - July 1, 2016, Reutlingen, Germany.
35. Lilah Inzelberg, Moshe David Pur, Stanislav Steinberg, David Rand, Maroun Farah, Yael Hanein, Wireless electronic-tattoo for long-term high fidelity facial muscle recordings, Proceedings of the Human Interface Sensors and Electronics", SPIE Defense + Security Conference, Anaheim, Ca, USA on April 9-13, 2017.

## 9 Invited Conference Talks, Keynote Presentations and Colloquia

1. From the magnetic-field-driven transitions to the zero-field transition in two-dimensions, XVIIIth Moriond Workshop, January 1999, Les Arcs, France.
2. The metal, the insulator and the transitions in 2D hole systems in GaAs, 11th Trieste Mini-workshop on Strong Correlations, July 1999, ICTP, Trieste, Italy.
3. Electrochemical surface modulation for micro self-assembly applications, Gordon Research Conference on Electrodeposition, August 2002, Colby-Sawyer College, New London, NH, USA.
4. Engineering neural networks using carbon nanotube templates, 11th International Conference on Composites/nano Engineering (ICCE - 11), August 2004, Hilton Head, SC, USA.
5. Carbon nanotube electrodes for engineering and recording of cultured neural networks, Biomaterials and Medical Devices 2005: Science, Technology and Business, November 17, 2005, Tel-Aviv, Israel.
6. Carbon nanotube based neuro-chips for engineering and recording of cultured neural networks, Bio Interfaces Engineering Workshop, 29-30 November 2005, Ispra, Italy.

7. Engineering neural networks with carbon nanotube templates, Israel Chemical Society Annual Meeting, February 27-28, 2006, Tel Aviv, Israel.
8. Compact self-wired cultured neural networks, From Solid State to BioPhysics III, June 24 to July 1, 2006, Dubrovnik, Croatia.
9. The Bio-Nano Interface, The Minerva Research Center for Microscale and Nanoscale Particles and Films as Tailored Biomaterial Interfaces, February 8, 2007, Bar-Ilan University, Israel.
10. Carbon nanotube based electrodes for neuronal patterning and recording, International Conference on Emerging Mechanical Technology - Macro to Nano (EMTM2N-2007), February 16-19, 2007 BITS, Pilani, India.
11. Carbon nanotube based neurochip, Tel Aviv Symposium in Chemical Physics on Chemistry and Physics of Bio-Nano Systems, June 7, 2007, Tel-Aviv.
12. Interfacing with cultured neural networks using carbon nanotubes, Franco-Israeli Trends in soft matter, biophysics and microfluidics, October 7-10, 2007 Domaine de Francon, Biarritz, France.
13. Engineering neural networks, From Principles to Applications, Complex Networks in Biology and Engineering, Tel Aviv University, October 24-25, 2007.
14. Self-assembly and self-wiring of engineered biological and electrical networks, Monthly Seminar Series of the Russell Berrie Nanotechnology Institute (RBNI), The Technion, Israel Institute of Technology, December 19, 2007.
15. Neurons, carbon nanotubes and everything in between, Physics colloquium, Technion, March 27, 2008.
16. Carbon Nanotube Micro-electrodes for Neuronal Interfacing, US AFRL-Israeli Bio/Nanotechnology for Materials Workshop, March 24-25, 2008, San Francisco, CA.
17. Nanotechnology and nano-circuits, Keynote, Motorola Israel, Technology Day Symposium, June 4, 2008 (Keynote).
18. Carbon nanotubes based neurochips, Binational Korean-Israeli "Cells on chips" workshop, September 22-24, 2008, Seoul, Korea.
19. Carbon nanotubes based neurochip, Chinese Israeli nano workshop, October 28-29, 2008, Beijing, China.
20. Nanotubes, neurons and everything in between, nano Israel 2009, March 30-31, 2009, Jerusalem, Israel.
21. Carbon nanotubes as a mechanical and electrical neuronal interface, International school on neural electronics hybrids, March 15-20, 2009, Jerusalem, Israel.
22. Carbon nanotube based multi electrode arrays for neuronal interfacing, 1st International Conference on Neuroprosthetic Devices, March 19th and 20th, 2009, National Chiao Tung University, Hsinchu, Taiwan.
23. "Gentlemen, we can rebuild him": Towards neuro-prosthetic nano devices, The HUJI nanocenter annual workshop, June 29-30, 2009 (Keynote).
24. Nanotechnology for retinal implant applications, The annual meeting of the Israel ophthalmological society, July 1, 2009, Tel-Aviv.

25. Carbon nanotube as an interface material for neuronal recording and stimulation applications, Symposium on "Graphitic Materials", the Fall ACS National Meeting, 16-20 August 2009, Washington DC.
26. Carbon nanotube based neuro-sensors, Israel vacuum society meeting, October 15 2009, Herzelia, Israel.
27. Brain chips with self-organized neurons, 2nd Korea-Israel Workshop on Cells and Molecules, Chips and sensors: innovative platforms for interfacing biology, October 26, 2009, Jerusalem, Israel.
28. Carbon nanotube integration into micro-fabricated devices, nanoRF Workshop, November 27 2009, EPFL, Lausanne.
29. Carbon nanotubes as a biomaterial, 14th Israel Materials Engineering Conference (IMEC-14), Tel-Aviv University, December 13-14, 2009, Tel-Aviv, Israel.
30. Self-assembled Carbon nanotube Structures and Devices, International Winter school on Electronic Properties of Novel Materials: Molecular Nanostructures, March 6-13, 2010, Kirchberg/Tirol, Austria.
31. The Regulative Role of Neurite Mechanical Tension in Developing Neural Networks, From Solid State to BioPhysics V: From Physics to Life Sciences, June 12 - 19, 2010, Dubrovnik, Croatia.
32. Carbon nanotube self-assembly and Devices, the International Workshop LASERION 2010 on Microfabrication, nanostructured materials and biotechnology, July 7-10, 2010, Schloss Ringberg, Germany.
33. What can 20 neurons do? Science Foo Camp, July 30-August 1, Googleplex, Mountain View, CA.
34. Innate oscillations and signal propagation in engineered neuronal circuits, Frontiers in Neuroengineering, September 5-9, 2010, Monte Verita, Ascona, Switzerland.
35. Breaking the Wall of Blindness; How Neuro Engineering can Relink Brain and Body, Falling Walls Conference, November 7-8, 2010, Berlin, Germany.
36. Carbon nanotube based devices for neuronal interfacing applications, US AFRL-Israeli Bio/Nanotechnology for Materials Workshop, 2010, 2-3 December, Boston, MA.
37. Oscillations and signal propagation in engineered neuronal circuits, 6th FISEB/ILANIT, February 7-10, 2011, Eilat, Israel.
38. Carbon nanotube based devices for neuronal interfacing applications, Bio North seminar on Neurotechnology, March 31, 2011, Neeman Institute, Haifa, Israel
39. How many neurons does it take to change a lightbulb?, Colloquium Celebrating the Foundation of the Peter Grunberg Institute, April 7 - 8, 2011, Julich, Germany.
40. Optical validation of MEA recordings, The 2nd Israeli MEA User Meeting, Tel-Aviv University, Tel-Aviv, May 31, 2011.
41. Carbon Nanotube Based Devices for Neuronal Interfacing Applications, First French-Israeli Meeting on Nanotechnology dedicated to Life Science, Tel-Aviv , November 20-21, 2011.
42. All Carbon nanotube electrodes for neural applications, Israel-China meeting on Nanotechnology, March 28-29, 2012.
43. All-Carbon-Nanotube Flexible Electrodes for Retinal Recording and Stimulation, E-MRS 2012 FALL MEETING, Warsaw University of Technology, September 17-21, 2012.

44. Neuronal stimulation - Lessons from Ca imaging studies, 4th ICNPD congress, University of Freiburg, Germany, November 19-20 2012.
45. Carbon nanotubes in neuro applications, The India-Israel meeting on materials and nanoscience, Bangalore, India, January 30 - February 5, 2013.
46. All-Carbon-Nanotube Flexible Electrodes for Retinal Recording and Stimulation, Symposium on Nanostructured Materials, Rzeszow, Poland, May 21-22, 2013.
47. All-Carbon-Nanotube Flexible Electrodes for Retinal Recording and Stimulation, IEEE SENSORS 2013, Baltimore, Maryland USA, 3-6 November 2013.
48. All Carbon nanotube flexible electrodes for retinal recording and stimulation, Nanobionics Symposium, Melbourne, Australia, 14th-15th November 2013.
49. Nanotechnology in the Service of Neuro-Engineering , 3rd International Conference on Medical Bionics Engineering Solutions for Neural Disorders, Phillip Island, Australia, 17-20 November 2013.
50. Engineered neural networks: ordered enough to know better, Karolinska Institute, Stockholm Sweden in honor of Torsten Wiesel, December 2, 2013.
51. Delivering visual information to blind retinas, Physics colloquium, Tel Aviv University, December 29, 2013.
52. Artificial Solar Retina, Solve for X, CordeValle in San Martin, California, February 5-7, 2014.
53. Monitoring neuron astrocyte interactions in networks, 5th France Israel Binational Neuroscience conference, Sde Boker, Israel, 10-14 February, 2014.
54. All carbon nanotube electrodes for neuronal interfacing, Israel-Greece meeting on Nanotechnology, Bionanotechnology , Weizmann Institute of Science, October 19-23, 2014.
55. Engineered neuronal circuits: Experimental bottom-up neuroscience, Italy-Israel conference on Complex Systems, Tel Aviv University, December 1-2, 2014.
56. Nano Materials for Retinal Recording and Stimulation, A joint workshop of the EC ITNs SYMONE and MOLESCO, Hotel Bellevue, Engelberg, Switzerland, February 8-11, 2015.
57. Nano Materials for Retinal Recording and Stimulation, International meeting on Bioelectronics BioEl, Kirchberg in Tirol, Austria, March 12-19, 2016.
58. Joint workshop of the Israeli and German young academies, Berlin, June 2016.
59. IDEAS Los Angeles, June 2016.
60. France-Israel Neuroscience, Neurology and Psychiatry Society FINNePS, Marseille, France, July 10-15 2016.
61. Modularity Induced Gating and Delays in Neuronal Networks, From Synapses and Circuits to Brain-Inspired Technologies, a joint workshop of the Israel Academy of Sciences and Humanities and the Academy of Sciences Leopoldina, Jerusalem, November 28-30, 2016.
62. Do you see the point? From sight restoration to psychological evaluation using nanotechnology, ERC 10th anniversary, Brussels, March 21, 2017.
63. Nano Interfaces for brain machine technologies, Nanoscience and Nanotechnology at Interfaces (NaNaInt) international conference, Israel Institute for Advanced Studies (IIAS), Jerusalem, April 2-5, 2017.

64. Wearable Technology for Long-Term High Fidelity Electrophysiology, Bioelectronics Symposium (ABS), Asilomar Conference Grounds in Pacific Grove, CA, September 17-20, 2017.
65. Bringing neurons to light with nano materials, 2nd Annual Wallenberg Center for Molecular Medicine, WCMM, Symposium, Linkoping University, Linkoping, Sweden, December 7-8, 2017.
66. Soft Electrodes for Brain Machine Interfacing, Neuroelectronic Interfaces, Gordon Research Conference, Beyond Feasibility - Bridging the Gap in Neuroelectronic Interfaces, Galveston, TX, US, March 25 - 30, 2018.
67. Soft Electronic Devices in Neuro-technology, 1st International Conference on Nanotechnologies and Bionanoscience NanoBio 2018, Heraklion, Crete, Greece on 24-28 September 2018.
68. Printed EEG and EMG electronic-tattoos for neurological applications (and their use in clinical studies), The 3rd Israel - Taiwan life sciences conference on Translational Medicine, 14-15th, 2018, Taipei, Taiwan.
69. A Wearable High-Resolution Electromyography for Long Term Recordings in Freely Behaving Humans, Workshop on Engineering Bioelectronic Interfaces, Juelich Germany (February 08, 2019).
70. Printed EEG and EMG electronic-tattoos for neurological applications, 2019 E-MRS Spring Meeting, Nice, France ( May 29-31, 2019).
71. Skin Compatible Electronics, Huawei Future Device Summit 2019, Helsinki, Finland (June 13, 2019).
72. Electrical and opto-electrical neuro-stimulation, Molecular Electro-Opto-Spintronics, Mainz, Germany: October 15th - 18th 2019.
73. Soft Electronic Devices for High Resolution Neuro-Technology, Light-Matter Interactions at the Interface with Living Cells, Tissues and Organisms at MRS Fall 2019

## 10 Invited Seminars

1. The apparent metal-insulator transition in two-dimensional systems, Condensed matter physics seminar, Hebrew University, Jerusalem, Israel (1997).
2. The apparent metal-insulator transition in two-dimensional systems, Condensed matter physics seminar, Weizmann Institute, Rehovot, Israel (1997).
3. The apparent metal-insulator transition in two-dimensional systems, Condensed matter physics seminar, Technion, Haifa, Israel (June, 1998).
4. The apparent metal-insulator transition in two-dimensional systems, Condensed matter seminar, City College of New-York, New-York, New-York, USA (November, 1998).
5. The metal, the insulator and the transitions in 2D hole systems in GaAs, CAM Seminar, University of Washington, Seattle, WA, USA (March 1999).
6. Micromachined Neural Implants, Sensors and Sensor Systems Seminar, Department of Electrical Engineering, University of Washington, (October 3, 2000).
7. Towards Micro-Machined Intracellular Neural Implants, Hebrew University, Jerusalem, Israel, (January 30, 2001).
8. Micro-Machined Intracellular Neural Implants (Condensed Matter Physics Seminar), Weizmann Institute, Rehovot, Israel, (January 31, 2001).



9. Towards Micro-Machined Intracellular Neural Implants, Tel-Aviv University, Tel-Aviv, Israel, (February 1, 2001).
10. Surface Chemistry Based MEMS, Friday Harbor Laboratories, Friday Harbor, WA, USA (May 14, 2001).
11. Surface modification techniques for MEMS applications, Physics department, Stanford University, Palo-Alto, CA, USA (November 2001).
12. Surface modification techniques for MEMS applications, Tel-Aviv University, Department of electrical engineering, Tel-Aviv, Israel (February, 2002).
13. MEMS Modules for MLSC Applications, MLSC CEGS Seminar, University of Washington, Seattle, WA, USA (April 3, 2002).
14. Surface modification and self-assembly in MEMS and EMS applications, Hebrew University (November 16, 2003).
15. Surface modification and self-assembly in MEMS and NEMS applications, Material science seminar, Tel-Aviv University (January 11, 2004).
16. Engineered self-organization of neural networks, Institute for Microsystem Technology, University of Freiburg (July 2004).
17. Engineered self-organization of neural networks, Nanotech seminar, University of Texas, Dallas, USA (August 9, 2004).
18. Engineered self-organization of neural networks, Material science seminar, Tel-Aviv University (November 18, 2004).
19. Micro and nano fabricated interfaces for neural networks, Physical chemistry seminar, TAU (March 31, 2005).
20. Micro and nano fabricated interfaces for neural networks, Joint Research Center, Ispra, Italy (April 29, 2005).
21. Micro and nano fabricated interfaces for real (and not so real) neural networks, Max Planck Institute, Golm, Germany (August 31, 2005).
22. Interfacing Carbon Nanotubes with Neuronal Systems, Nanoseminar, Hebrew University (January 8, 2006).
23. Engineering cultured neural networks, Condensed matter physics seminar, Bar-Ilan University (January 12, 2006).
24. Compact self-wired cultured neural networks, The institute of neuroscience, University of New Castle (October 18, 2006).
25. Compact self-wired cultured neural networks, Biological and Soft Systems, Cavendish Laboratory at the University of Cambridge (October 20, 2006).
26. Carbon nanotube electrodes, Materials engineering seminar, Technion, (21 December, 2006).
27. Compact self-wired cultured neural networks, Condensed Matter Physics seminar, Tel-Aviv University (June 25, 2007).
28. Engineering neural networks, The Department of Molecular Micro-biology and Biotechnology, TAU, (December 11, 2007).

29. Engineering neural networks, Biophysics seminar, Bar-Ilan University (November 22, 2007).
30. Engineering neural networks, The Department of Molecular Microbiology and Biotechnology, TAU, (January 1, 2008).
31. Self-Assembly of Biological and Electrical Networks, Materials and Interfaces seminar, Weizmann Institute of Science (February 13, 2008).
32. Towards a Bionic Eye: Carbon Nanotube Based Micro Electrode Arrays for Retinal Interfacing Applications, Seoul National University(SNU)engineering school (September 25, 2008).
33. Mechanics of carbon nanotube structures and devices, Tel-Aviv University, Mechanical engineering seminar, (January 5, 2009).
34. Carbon nanotubes based neurochips, Ben-Gurion University, nano seminar, (February 11, 2009).
35. Carbon nanotube based devices for neuronal interfacing applications, Graduate research school on Electronic properties of carbon based nanostructures, University of Regensburg (January 21, 2011).
36. Carbon nanotubes, neurons and everything in between, Peter Grunberg Institute, Julich, Germany (April 6, 2011)
37. Carbon nanotube based devices for neuronal interfacing applications, Applied/Medical Physics seminar, Tel-Aviv University (May 18, 2011)
38. Carbon nanotube based devices for neuronal interfacing applications, Suzhou institute of nano-tech and nano-bionics, CAS, Suzhou, China (September 19, 2011)
39. Programmable Engineered Neural Networks on Chip, Physical Chemistry seminar - Tel Aviv University, Tel Aviv (December 1, 2011)
40. Retinal implants - Science or fiction? Department of Ophthalmology seminar, Hadassah - Hebrew University Medical Center (April 18, 2012)
41. Engineered neural networks on chip, Institute of Neuroscience, Newcastle University (25 September 2012)
42. Engineered neuronal circuits: Experimental bottom-up neuroscience, Joint soft matter and life sciences seminar, University of Freiburg (January 27, 2013)
43. Engineered neuronal circuits: Experimental bottom-up neuroscience, Faculty of Engineering, Bar-Ilan University, Israel (March 14, 2013)
44. From studying sea slugs to Bionic vision: science, fiction and funding, NOBLESSE lecture at Institute of Physical Chemistry, Warsaw, Poland (September 24, 2013)
45. Carbon nanotube based devices for neuronal interfacing applications, Condensed Matter Seminars, Rutgers University, NJ, USA (Nov 7, 2013)
46. All-Carbon-Nanotube Flexible Electrodes for Retinal Recording and Stimulation, Imperial College, London, (February 3, 2014)
47. Nanotube and Nanotube/Quantum-Dot Electrodes for Retinal Recording and Stimulation, LAAS CNRS, Toulouse, France (December 17, 2014).
48. Nanomaterial based Electrodes for Retinal Recording and Stimulation, Ichilov Hospital(March 22,2015).

49. Nano Materials for Retinal Recording and Stimulation, Johannes Kepler University, Linz, Austria (July 7, 2015).
50. Nano Materials for Retinal Recording and Stimulation, UCL, London, UK (July 9, 2015).
51. Nano Materials for Brain-Machine Technologies, Nanoseminar at the Hebrew University, Jerusalem (January 17, 2016).
52. Temporary-tattoo for long-term high fidelity bio-potential recordings, BME Seminar, Tel Aviv University (November 13, 2016).
53. Wearable technology for long-term high fidelity electrophysiology, Tsinghua University, Beijing, China (June 6, 2018).
54. Printed EEG and EMG electronic-tattoos for neurological applications, EPFL CNP seminar, Geneva, Switzerland (December 18, 2018).
55. Wearable high resolution electrophysiology for recording freely behaving humans, ELSC Seminar, HUJI, Jerusalem Israel (April 2, 2019)

## 11 Patents

- Rectifying antenna device with nanostructure diode, Yael Hanein, Amir Boag, Jacob Scheuer, Inbal Friedler, US Patent No. 9018616
- Photo-electrical Devices for Stimulating neurons, Evelyne Sernagor, Uri Banin, Shlomo Yitchaik, Ori Cheshnovsky, Yael Hanein, US Patent No. 8774936
- Antenna system and uses thereof, Ze'ev Iluz, Amir Boag, Yael Hanein, Jacob Scheuer Patent Application No. 20140138546
- System for and method of positioning cells and determining cellular activity thereof, Ben Jacob Eshel, Segev Ronen, Baruchi Itay, Hulata Eyal, Shapira Yoash, Hanein Yael, Gabay Tamir, US Patent No. 8594762
- Nanotube network and method of fabricating the same, Ze'ev Abrams, Yael Hanein, Miron Hazani, Ori Cheshnovsky, Zvi Ioffe, US Patent No. 8413704
- Apparatus and methods for binding molecules and cells, Ratner Buddy D, Cheng Xuanhong, Bohringer Karl, Wang Yanbing, Hanein Yael, Shastry Ashutosh, US Patent No. 7442515

## 12 External Research Funds

- Israel Science Foundation(PI)  
Amount: 168,000 USD  
Date: 1.10.2004-1.10.2008  
Title: Interfacing Carbon nanotubes with neuronal systems
- Israel science foundation (PI)  
Amount: 308,000 USD (with matching)  
Date: 1.10.2004-1.10.2005  
Title: A system for cell positioning on MEMS devices

- Israel science foundation (Co-PI with Dr. Yoram Selzer and Prof. Slava Krylov)  
Amount: 400,000 USD (with matching)  
Date: 1.10.2005-1.10.2006  
Title: Plasma Enhanced Chemical Vapor Deposition (PECVD) Tool
- German Israeli foundation (Young Researcher Award, PI)  
Amount: 33,000 Euro  
Date: 1.1.2005-31.12.2005
- Ministry of Industry, Trade and Labor (Nofar program, PI)  
Amount: 78,000 USD  
Date: 1.4.2007-31.3.2008  
Title: Carbon nanotube networks
- RAFAEL (PI, with Dr. Slava Krylov)  
Amount: 154,000 USD  
Date: 1.10.2008-31.9.2011  
Title: Carbon nanotube MEMS
- MAFAT (PI, with Prof. Amir Boag and Prof. Koby Scheuer)  
Amount: 560,000 USD  
Date: 1.10.2008-30.9.2012  
Title: Carbon nanotube processes for IR
- Ministry of Industry, Trade and Labor (MAGNET program, PI)  
Amount: 230,000 USD  
Date: 1.5.2009-30.4.20012  
Title: Nanotubes Empowerment Solutions (NES)
- The Wolfson Family Charitable Trust (co-PI)  
Amount: 96,000 USD  
Date: 1.10.2009-30.9.2011  
Title: nano Rectenna
- Israel Science Foundation(PI)  
Amount: 200,000 USD  
Date: 1.10.2010-1.10.2014  
Title: Micro-devices for electro-mechanical investigation of neurons
- Biotechnology and Biological Sciences Research Council (collaborator with Dr. Evelyne Sernagor (co-PI))  
Amount: 117,000 GBP  
Date: 1.6.2011-31.5.2011  
Title: Towards the development of novel retinal implants: electrical and photo-stimulation of dys-trophic retinas with carbon nanotube electrodes
- Ministry of Industry, Trade and Labor (PI, Kamin program)  
Amount: 110,000 NIS  
Date: 1.11.2011-30.10.20013  
Title: Rectifying nano antenna
- Ministry of Science (PI)  
Amount: 523,000 USD  
Date: 1.11.2011-30.10.20014  
Title: Nano-materials for optical activation of cells

- Ministry of Science (PI)  
Amount: 78,000 NIS  
Date: 1.12.2011-30.11.20013  
Title: Astrocytic regulation of neuronal activity
- Israel National Nano Initiative (co-PI with Oded Shoseyov (PI) et al.)  
Amount: 180,000 USD  
Date: 1.3.2012-28.2.2017  
Title: Hybrid Nanomaterials and Formulations for Functional Coatings and Printed Devices
- European Research Council (ERC) (PI)  
Amount: 1,500,000 EUR  
Date: 1.9.2012-30.8.2018  
Title: Functional nanomaterials for Neuronal Interfacing Applications
- Israel Strategic Alternative Energy Foundation (I-SAEF) (co-PI, with Koby Scheuer (PI) and Amir Boag)  
Amount: 200,000 USD  
Date: 1.10.2013-30.9.2015  
Title: Nano retina
- Ministry of Economy (BSMT) (PI)  
Amount: 1,170,000 NIS  
Date: 1.7.2013-30.6.2018  
Title: Brain Technologies
- Lirot foundation (PI)  
Amount: 96,525 USD  
Date: 1.8.2015-30.7.2017  
Title: In Vivo Evaluation of High Resolution Nano Material Based Visual Prosthesis
- Teva Pharmaceutical Industries Ltd., NNE program (Co-PI)  
Amount: 200,000 USD  
Date: 1.9.2016-30.8.2018  
Title: A skin device for electrophysiological assessment of sleep quality in individuals at risk of developing Parkinson's Disease
- Israel Science Foundation (PI)  
Amount: 1,200,000 NIS  
Date: 1.10.2017-1.10.2021  
Title: Electronic skin technology for long term and wireless electrophysiological recordings
- Israel Ministry of Economy (co-PI)  
Amount: 600,000 NIS  
Date: 1.1.2018-31.12.2020  
Title: NanoEdge: Nano-based wearable electronics for mental disorder diagnosis and functional restoration: Production technologies and devices
- Zimin Fund (co-PI)  
Amount: 150,000 USD  
Date: 1.5.2018-29.4.2020  
Title: Individualized closed loop sensorized virtual reality for behavioral change