

Date of birth: July 3, 1973
Citizenship: Israeli
Familial status: Married, 3 children
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Education

2004–2007 Post-doctoral fellow, University of Maryland – College Park, MD, USA.
1997–2004 Ph.D. in Neural Computation (*summa cum laude*), The Interdisciplinary Center for Neural Computation, Hebrew University of Jerusalem, Israel.
1989–1992 B.Sc. in Physics (*magna cum laude*), Tel-Aviv University, Israel.

Positions

2021–present Head, Center for Learning, Memory & Cognition – Weizmann Institute.
2018–present Full Professor: Department of Brain Sciences, Weizmann Institute of Science, Rehovot, Israel.
2014–2018 Associate Professor (tenured): Department of Neurobiology, Weizmann Institute of Science, Rehovot, Israel.
2008–2012 Founder and Head, Weizmann Institute Graduate Program in Brain Sciences.
2007–2014 Senior Scientist (tenure track, equiv. to Assistant Professor): Department of Neurobiology, Weizmann Institute of Science, Rehovot, Israel.

Honors and Awards

2022 Elected as International Honorary Member – American Academy of Arts and Sciences
2022 Keynote Speaker, FENS-Kavli Network of Excellence Annual Meeting, Barcelona.
2020 Incumbent of the Barbara and Morris Levinson Professorial Chair in Brain Research
2020 Galambos Lecture in Neuroscience, UCSD
2019 Special Lecture (Keynote) – Society for Neuroscience (SfN) Annual Meeting.
2019 Norbert Elsner Lecture, Göttingen Meeting of German Neuroscience Society.
2019 Keynote Speaker, ASAB 2019 - New Frontiers in Animal Behavior, Konstanz.
2019 Keynote Speaker, Bernstein Conference, Berlin.
2019 Students-Invited Keynote Speaker, NRSN Neuroscience Conference, Norway.
2019 Kavli Distinguished Lecture, NTNU, Trondheim, Norway.
2018 Kimmel Award for Innovative Investigation – a 1M\$ research prize.
2018 Ruth K. Broad Lecture, Duke University.
2018–2022 Elected Councilor, International Society for Neuroethology.
2017 André Deloro Prize – Adelis Foundation.
2017 Keynote Speaker, European Cognitive Neuropsychology meeting, Bressanone.

2017	Keynote Speaker, Jerusalem Brain Community – Annual Retreat.
2016	ERC consolidator grant.
2016	Magnes Lecture – Hebrew University of Jerusalem.
2015	SfN Young Investigator Award – Society for Neuroscience.
2015	Neurobiology of Learning and Memory Students-Invited Annual Lecture, MIT.
2014	Eliot Stellar Lecture, University of Pennsylvania.
2014	Keynote Speaker, Cosyne Meeting, Salt Lake City.
2013	Morris Levinson Prize in Biology – Weizmann Institute of Science.
2012	Bernard Katz Prize in Neuroscience – Alexander von Humboldt Foundation.
2012	Keynote Speaker, Multi-electrodes 3 rd annual meeting, Marseille.
2012	Krill Prize for Excellence in Scientific Research – Wolf Foundation.
2011	ERC starter grant.
2011	Sieratzki Prize for Advances in Neuroscience.
2011	Invited Faculty Member, Faculty of 1000 (F1000).
2011	Keynote Speaker, conference on "Measuring Behavior & Physiology", Israel.
2010	Keynote Speaker, Israel Society for Auditory Research annual meeting.
2004–2005	Hebrew University postdoctoral fellowship.
2004	Ph.D with honors (<i>summa cum laude</i>).
2003	Poster prize, International Conference on Auditory Cortex, Magdeburg.
2003	Katzir Foundation travel award.
2000	Pratt Foundation award for excellence in graduate research.
2000–2003	Horowitz Foundation predoctoral fellowship (a merit-based fellowship).
1997–2000	Hebrew University, full graduate scholarship and stipend.
1992	B.Sc. with honors (<i>magna cum laude</i>).

Honors and Awards for my Ph.D students (*partial list*)

2022	Gily Ginosar: Capranica Prize, from the International Society for Neuroethology – awarded for the best paper in Neuroethology published in 2021.
2022	Tamir Eliav: Lee Segel Prize in Theoretical Biology.
2018	Arseny Finkelstein: FENS-Kavli Ph.D Thesis Prize – for the best Ph.D thesis in Europe in the field of Neuroscience in 2016-2018: awarded by the Federation of European Neuroscience Societies (FENS).
2018	Ayelet Sarel: Capranica Prize, from the International Society for Neuroethology – awarded for the best paper in Neuroethology published in 2017.
2015	Arseny Finkelstein: Capranica Prize, from the International Society for Neuroethology – awarded for the best paper in Neuroethology published in 2015.
2013	Michael Yartsev: Donald B. Lindsley Prize in Behavioral Neuroscience, from the Society for Neuroscience (SfN) – awarded by SfN for the best Ph.D Thesis in Behavioral Neuroscience in 2012-2013.
2013	Michael Yartsev: Eppendorf & <i>Science</i> Prize for Neurobiology, awarded for the best Ph.D thesis in Neurobiology.
2012	Michael Yartsev: Capranica Prize, from the International Society for Neuroethology – awarded for the best paper in Neuroethology published in 2011.

Academic activities

- Ad-hoc reviewer: *Nature*, *Science*, *Cell*, *Nature Neurosci.*, *Neuron*, *PNAS*, *Phys. Rev. Lett.*, *Nature Comm.*, *Science Adv.*, *PLoS Biol.*, *eLife*, *Curr. Biol.*, *J. Neurophysiol.*, *Hippocampus*, *Eur. J. Neurosci.*, *Neurocomputing*, *J. Comp. Physiol. A*, *J. Cog. Psychol.*, *PLoS Comp. Biol.*
- Conference organizer (together with Yarden Cohen): Neural Basis of Natural Behaviors, Rehovot, Israel (2024).
- Organizing Committee Member, Lakes Conference on Neural Coding, Seattle, WA, USA (2023).
- Conference organizer (together with Yossi Yovel and Cynthia Moss): Active Sensing: From Animals to Robots, Rehovot, Israel (2023).
- Director of FENS-Hertie Winter School on Navigation ('Neural Control of Behavior' series), University Center in Obergurgl, Austria (2017).
- Symposium organizer: "The Social Hippocampus", in the Spring Hippocampal Research Conference, Taormina, Sicily (2017).
- Issue co-Editor, *Current Opinion in Neurobiology* (February 2014 issue on "Neural Maps", co-editor together with David Fitzpatrick).
- Conference organizer (together with Misha Tsodyks and Alessandro Treves): SPACEBRAIN meeting, Jaffa, Israel (2014).
- Symposium organizer: "Neural codes for space in the mammalian brain", in 19th annual meeting of the Israel Society for Neuroscience, Eilat (2010).
- Symposium organizer: "Comparative aspects of spatial memory: from neurons to behavior", in 8th International Congress of Neuroethology, Vancouver (2007).
- Memberships: Society for Neuroscience; International Society for Neuroethology; Israel Society for Neuroscience.

Invited Seminars

- 2007 Johns Hopkins University, Rutgers University, HHMI Janelia Farm campus, University of Tübingen, Technion – Israel Institute of Technology, Hebrew University;
- 2008 Hebrew University, University of Haifa, Ben-Gurion University.
- 2009 Ben-Gurion University.
- 2010 Hebrew University, Tel-Aviv University, Bar-Ilan University.
- 2011 UT Austin, Ben-Gurion University, Hebrew University, Tel-Aviv University.
- 2012 HHMI Janelia Farm campus, ETH Zurich Institute for Neuroinformatics, Haifa University.
- 2013 Max Planck Institute of Brain Research Frankfurt, LMU Munich, Newcastle University, University of Arizona at Tucson, Technion – Israel Institute of Technology.
- 2014 Princeton University, Johns Hopkins University, Baylor College of Medicine, Boston University.
- 2015 CAESAR Bonn, Hebrew University, Ben-Gurion University, Ichilov Hospital, Vulcani Institute, Rockefeller University.
- 2016 University of Parma, Tel Aviv University.
- 2017 Salk Institute, Hebrew University, Technion, Ben-Gurion University.
- 2018 Columbia University, École Normale Supérieure Paris, IMP Vienna, Tel Aviv University.
- 2019 Harvard University, Janelia Research Campus, LMU Munich, University of Freiburg, CNRS Université Lyon, University of Haifa.
- 2020 UCSD, Hebrew University of Jerusalem, Ben Gurion University, Sheba Medical Center.

- 2021 Columbia University, Swarthmore College.
2022 Hebrew University ELSC.
2023 Princeton University, Indiana University.

Invited Lectures in Conferences and Symposia

- Hippocampal processing workshop, COSYNE conference, Salt Lake City, Utah; invited talk on: "Hippocampal cellular and network activity in freely-moving echolocating bats" (2007).
- International Congress of Neuroethology, Vancouver; invited talk on: "Cellular and network activity in the hippocampus of freely-moving echolocating bats" (2007).
- Workshop on Echolocation in Bats – Current Status and Perspectives, Blaubeuren, Germany; invited talk on: "Sonar signal frequency shifts in the presence of other bats" (2007).
- International School on Neural Nets – The Dynamic Brain, Erice, Sicily: Lecture 1: "Echolocating bats: spatial orientation using biological sonar"; Lecture 2: "Hippocampal neural activity in freely moving echolocating bats: spatial cognition, place cells and theta oscillation" (2007).
- 'Navigation and the Hippocampus' international course, Lisbon, Portugal; invited talk on: "Hippocampal spatial representation in freely-moving echolocating bats" (2008).
- 'Neuro-Robotics' workshop, Jerusalem; invited talk on: "Neural representation of space: from hippocampal place cells to GPS tracking of bats in the wild" (2008).
- Belfer Neuro-Dynamics Symposium, Technion; invited talk on: "Dynamics of spatial representation in the bat's hippocampus" (2009).
- Spring Hippocampal Research Conference, Verona, Italy; invited talk on: "Large scale map-like memory in a flying mammal: evidence from high resolution GPS tracking of fruit bats" (2009).
- International Summer School on Animal Navigation, Brisbane, Australia; invited talk on: "Bat navigation: from neurons to behavior" (2009).
- 34th Annual Winter Conference on the Neurobiology of Learning and Memory, Park City, Utah; invited talk on: "Hippocampal and entorhinal theta oscillations in bats" (2010).
- 15th International Bat Research Conference, Prague; invited talk on: "Large scale navigational map in a mammal" (2010).
- Workshop on: Producing and perceiving complex acoustic signals, HHMI Janelia Farms campus; invited talk on: "Optimal localization strategy in an active-sensing system" (2011).
- ASIC 2011 conference, Spain; invited talk on: "Spatial representation in bats: From neurons to behavior" (2011).
- ESA 2011 conference, Austin; invited talk on: "Large-scale navigational map in a flying mammal: Evidence from GPS tracking of Egyptian fruit bats" (2011).
- ILAF-ESLAV-ECLAM joint meeting, Jerusalem; invited talk on: "Neural representation of space: from hippocampal place cells to GPS tracking of bats in the wild" (2011).
- Ascona Meeting - The Assembly and Function of Neuronal Circuits, Ascona, Switzerland; invited talk: "Neural codes for space in the hippocampus and entorhinal cortex of bats" (2011).
- "Neuronal Circuits: From structure to Function", Cold Spring Harbor; invited talk: "Neural codes for 2-D and 3-D space in the hippocampus and entorhinal cortex of bats" (2012).
- Bar-Ilan University Life Sciences Faculty Open Day; Invited Plenary Lecture: "Neural Codes for 2-D and 3-D space in bats" (2012).

NERF/IMEC Neurotechnology Symposium "The neural basis of behavior", Leuven, Belgium; invited talk: "Neural Codes for 2-D and 3-D space in the hippocampal formation of bats" (2012).

"Canonical Neural Computations" meeting, La Pietra, Florence, Italy; invited talk: "Neural Codes for 2-D and 3-D space in the hippocampal formation of bats" (2012).

"Sensory Coding and Natural Environment" conference, IST, Vienna; invited talk: "Neural Codes for 2-D and 3-D space in the hippocampal formation of bats" (2012).

Workshop on "multi-electrode systems and signal processing to study neuronal network", Marseilles, France; invited talk on "Neural Codes for 2-D and 3-D space in the hippocampal formation of bats" (2012).

"Winter Conference on Neural Plasticity", Curacao; invited talk: "Neural Codes for 2-D and 3-D space in the hippocampal formation of bats" (2013).

"Master Class" at the MPI for Brain Research and the International Max Planck Research School for Neural Circuits (2013).

"Space in the Brain: Cells, Circuits, Codes and Cognition" – Royal Society conference, Buckinghamshire, UK; invited talk: "Neural Codes for 2-D and 3-D space in the hippocampal formation of bats" (2013).

"The Hippocampus" workshop, UCL, UK; invited talk: "Neural Codes for 2-D and 3-D space in the hippocampal formation of bats" (2013).

Spring Hippocampal Research Conference, Taormina, Sicily, Italy; invited talk: "3D place cells in freely flying bats" (2013).

14th International Multisensory Research Forum, Jerusalem; invited talk: "Multi-sensory determinants of 3D spatial codes in the hippocampal formation of bats" (2013).

German-Israeli Inter-Academy Symposium on Stability and Plasticity of Neuronal Representations, Jerusalem; invited talk: "Neural Codes for 2-D and 3-D space in the hippocampal formation of bats" (2013).

"Neurophysics of space, time and memory" workshop, UCSB; invited talk: "Neural Codes for 2-D and 3-D space in the hippocampal formation of bats" (2014).

Computational and Systems Neuroscience (Cosyne) meeting, Salt Lake City, Utah; Invited Plenary Lecture: "Neural Codes for 2-D and 3-D space in the hippocampal formation of bats" (2014).

"Neural Networks in the Arctic" conference, Spitzbergen, Norway; invited talk: "Neural Codes for 2-D and 3-D space in the hippocampal formation of bats" (2014).

Association for Psychological Science (APS) Convention, New York; invited talk: "Spatial cognition in bats and rats: from hippocampal neural codes to long-distance navigation" (2015).

Gordon Research Conference on Neuroethology, Lucca, Tuscany, Italy; invited talk: "The representation of 3-D space in bats" (2015).

Marine Biological Laboratory (MBL), Woods Hole, MA: Teaching in the Neural Systems & Behavior course (2015).

Ascona Meeting - The Assembly and Function of Neuronal Circuits, Ascona, Switzerland; invited talk: "Neural codes for 2-D and 3-D space in the hippocampal formation of bats" (2015).

Grid-cells workshop at the Computational and Systems Neuroscience (Cosyne) meeting, Salt Lake City, Utah; invited talk: "Towards a neurobiology of natural navigation" (2015).

"Hippocampal-Entorhinal Complexities" conference, Janelia Research Campus, US; invited talk: "Neural basis of 3D goal-directed navigation in bats" (2015).

"Winter Conference on Neural Plasticity", Hawaii; invited talk: "Neural basis of 3D goal-directed navigation in bats" (2016).

International Titisee Conference: Building Tools for Quantifying Brain and Behavior; invited talk: "Neural basis of 3D goal-directed navigation in bats" (2016).

iNAV Interdisciplinary Navigation Symposium, Bad Gastein, Austria; invited talk: "Neural basis of 3D goal-directed navigation in bats" (2016).

Sense of Direction and the Cognitive Map – A Symposium Honoring James Ranck Jr., New York; invited talk: "Neural codes for 3D goal-directed navigation in bats" (2016).

Conference on "Space and Time in the Brain", Jerusalem; invited talk: "Neural codes for 3D goal-directed navigation in bats" (2016).

European Cognitive Neuropsychology meeting, Bressanone, Italy; invited keynote lecture on "Neural basis of 3D goal-directed navigation in the hippocampal formation of bats" (2017).

Janelia Conference on "Neural Basis of Active Sensation and Navigation"; invited talk on: "Neural basis of 3D goal-directed navigation in bats" (2017).

Navigation workshop in memory of Rita Levi-Montalcini, European Brain Research Institute & Italian Academy of Sciences and Humanities, Rome; invited talk on "Neural codes for natural navigation in the hippocampal formation of bats" (2017).

Conference on "Vision in the Real World", Toronto; invited talk on "Neural codes for 3D goal-directed navigation in bats" (2017).

SfN Symposium on "Beyond place cells: Recent surprises from hippocampal neurophysiology", Washington DC; invited talk on "Spatial representations of self and others in the hippocampal formation of bats" (2017).

Conference on "Mechanisms of Animal Behavior" (Max Planck Society + Chinese Academy of Science), Shanghai, China; invited talk on "Neural codes for natural navigation in the hippocampal formation of bats" (2017).

Grid cells meeting, UCL, London; invited talk on "Neural codes for 3D space and long-distance navigation in the hippocampal formation of bats" (2018).

iNAV 2nd Interdisciplinary Navigation Symposium, Mont Tremblant, Canada; invited talk on "Neural codes for natural navigation in the hippocampal formation of bats" (2018).

FENS Forum - biannual meeting of the Federation of European Neuroscience Societies, Berlin, Germany; invited talk on "Neural codes for natural navigation in the hippocampal formation of bats" (2018).

Society for Social Neuroscience annual meeting, San Diego, USA; invited talk on "Social place-cells in the bat hippocampus" (2018).

FENS-Hertie Winter School on Neural Control of Instinctive and Innate Behavior, Obergurgl, Austria; invited talk on "Neural codes for natural navigation in the hippocampal formation of bats" (2019).

6th Workshop on Natural Environments, Tasks and Intelligence (NETI), Austin, USA; invited talk on "Neural codes for natural navigation in the hippocampal formation of bats" (2019).

Kavli Salon on "Space, time and the brain", Tabacón, Costa Rica; invited talk on "Space, time and spacetime in the bat hippocampal formation" (2019).

ASAB 2019 meeting on New Frontiers in the Study of Animal Behavior, Konstanz, Germany; invited plenary talk on "Neural codes for natural navigation in the bat brain" (2019).

RIKEN Center for Brain Science Summer Course, Japan; invited talk on "Neural codes for natural navigation in the hippocampal formation of bats" (2019).

Symposium on Artificial and Biological Cognition, Cambridge, UK; invited talk on "Neural codes for natural navigation in the hippocampal formation of bats" (2019).

Bernstein Conference, Berlin, Germany; invited Keynote lecture on “Neural codes for natural navigation in the hippocampal formation of bats” (2019).

NRSN Neuroscience Conference, Bergen, Norway; students-invited Keynote lecture on “Neural codes for natural navigation in the hippocampal formation of bats” (2019).

Society for Neuroscience (SfN) Annual Meeting, Chicago; Special Lecture (Keynote) on “Neural Codes for Natural Behaviors in Flying Bats” (2019).

Cosyne – workshop, Breckenridge, Colorado, USA; invited talk #1: “Neural codes for natural behaviors in flying bats” (2020).

Cosyne – workshop, Breckenridge, Colorado, USA; invited talk #2: “Locally-ordered representation of 3D space in the entorhinal cortex” (2020).

Israel Society for Neuroscience, symposium on “50 years of place cells”; invited talk (virtual) on “Neural codes for natural navigation in flying bats” (2021).

“The Adaptive Brain” conference; invited talk (virtual) on “Neural codes for natural behaviors in flying bats” (2021).

ESI SyNC Virtual Conference “The Natural Brain”, Ersnt Strüngmann Institute, Frankfurt, Germany; invited talk on “Neural codes for natural behaviors in flying bats” (2021).

First French Neuroethology Symposium (virtual); invited talk on “Neural codes for natural behaviors in flying bats” (2022).

Weizmann – Hungary Workshop on Brain Sciences; invited talk on “Neural codes for natural behaviors in flying bats” (2022).

Workshop on Higher Cognitive Functions, Erice, Sicily; invited talk on “Space coding in bats” (2022).

AREADNE Conference (Research on Encoding And Decoding of Neural Ensembles), Santorini, Greece; invited talk on “Neural codes and replays of natural behaviors in flying bats” (2022).

Symposium on “Neural codes across species”, Tel Aviv; invited talk on “Neural codes for natural behaviors in flying bats” (2022).

Annual Summer Interdisciplinary Program (ASIC), Queenstown, New Zealand; invited talk on “Neural codes for natural behaviors in flying bats” (2022).

“The Future of Neuroscience” workshop – Max Planck Society, Berlin; invited talk on “Neural codes for natural behaviors in flying bats” (2022).

iNAV 5th Interdisciplinary Navigation Symposium, Cortina d’Amprezzo, Italy; invited talk on “Neural codes for natural navigation in the hippocampal formation of bats” (2023).

Lakes Conference on Neural Coding, Seattle, WA, USA; invited talk on “Neural codes for natural behaviors in flying bats” (2023).

Courses taught

2010–present "Introduction to Neuroscience: Systems neuroscience", Weizmann Institute (course coordinator).

2009–present "Introduction to Neuroscience: Behavioral neuroscience", Weizmann Institute (course coordinator).

- 2007–present "Systems Neuroscience Seminar", Weizmann Institute, reading seminar (course coordinator).
- 2017–present "Methods in Neuroscience", Weizmann Institute, laboratory course (taught with several other teachers).
- 2009–2016 "Introduction to Neuroscience: Cellular and synaptic physiology", Weizmann Institute (taught with several other teachers).
- 2007–2008 "Critical thinking in neuroscience: a guided reading seminar": graduate seminar, Weizmann Institute of Science (together with Rony Paz).

Students supervised

Yossi Yovel	Postdoc	2008 – 2010	(now: Full Professor, Tel Aviv University)
Mariana Melcón	Postdoc	2008 – 2010	(now: Head of Data Science, Fundación Cethus)
Dori Derdikman	Postdoc	2010 – 2011	(now: Associate Professor, Technion)
Wairimu Gatome	Postdoc	2010 – 2011	(now: Research Vet, Univ. Cambridge)
Inbar Saraf-Sinik	Postdoc	2012 – 2013	(now: Staff Scientist, Weizmann)
David Omer	Postdoc	2014 – 2019	(now: Assistant Professor, Hebrew University)
Saikat Ray	Postdoc	2018 – present	
Johnatan Aljadeff	Postdoc	2019 – 2020	(now: Assistant Professor, UCSD)
Michael Yartsev	Ph.D student	2008 – 2012	(now: Assistant Professor, UC Berkeley)
Alon Rubin	Ph.D student	2008 – 2013	(now: Staff Scientist, Weizmann)
Maya Geva-Sagiv	Ph.D student	2009 – 2016	
Arseny Finkelstein	Ph.D student	2010 – 2016	(now: Assistant Professor, Tel Aviv University)
Gily Ginosar	Ph.D student	2013 – 2022	
Tamir Eliav	Ph.D student	2013 – 2022	
Ayelet Sarel	Ph.D student	2014 – 2022	
Shir Maimon	Ph.D student	2016 – present	
Shaked Palgi	Ph.D student	2019 – present	
Itay Yona	M.Sc student	2021 – 2022	
Dan Blum	M.Sc student	2016 – 2018	

Previous employment

1992–1997 Israel Defense Forces: Technical and algorithmic R&D.

Research Grants

2021–2026 NIH R01 – National Institutes of Health (R01 NS121413), "Auditory-based navigation: attentional shifts rapidly modulate hippocampal codes".
With Cynthia Moss and Liora Las (\$ 2,400,000)

2021–2025	NSF-BSF: CRCNS – Collaborative Research in Computational Neuroscience (NSF #2112957), “Learning optimal spatial representations of naturalistic environments in the hippocampus of freely-flying bats – theory and experiments”. <i>With Johnatan Aljadeff and Liora Las</i>	(\$ 1,000,000)
2019–2023	SFB grant from DFG (SFB #1372), “Magnetoreception and navigation in vertebrates”. <i>Multi-group grant</i>	(€ 8,000,000)
2018–2023	Israel Science Foundation (ISF #1920/18), "Neurobiology of social-spatial cognition in the hippocampus: Insights from the bat". <i>With Liora Las</i>	(\$ 460,000)
2018–2022	Israel Science Foundation F.I.R.S.T – Bikura B - Full (ISF #2655/18), "Space coding in the avian hippocampal formation". <i>With Yoram Gutfreund and Dori Derdikman</i>	(\$ 300,000)
2016–2022	European Research Council (ERC-CoG), "Neural basis of natural navigation: Representation of goals, 3-D spaces and 1-km distances in the bat hippocampal formation – the role of experience". (NATURAL_BAT_NAV)	(€ 2,000,000)
2016–2018	Israel Science Foundation F.I.R.S.T – Bikura (ISF #2344/16), "Space coding in the avian hippocampal formation". <i>With Yoram Gutfreund and Dori Derdikman</i>	(\$ 150,000)
2016–2018	Minerva Foundation, "Vectorial representation of goals in the hippocampal formation: Insights from the bat".	(€ 150,000)
2013–2018	Israel Science Foundation (ISF #1019/13), "3-D and 2-D neural compasses in the hippocampal formation of bats".	(\$ 400,000)
2012–2016	European Research Council (ERC-StG), "Neural codes for space in complex multi-scale environments: Insights from the bat". (NEUROBAT)	(€ 1,500,000)
2011–2013	Minerva Foundation, "Mechanisms of grid formation in entorhinal cortex: Insights from the bat".	(€ 150,000)
2009–2012	Human Frontiers Science Program – Full Program Grant (HFSP #RGP0062/2009), "Listening through the looking glass: perception and neural encoding of mirror images in biosonar". <i>With Lutz Wiegrebe and Björn Siemers.</i>	(\$ 900,000)
2008–2012	Israel Science Foundation (ISF #1017/08), "Episodic memory versus spatial memory in mammalian hippocampus: electrophysiological studies in freely-behaving echolocating bats".	(\$ 250,000)
2008	Israel Science Foundation (ISF # 1614/08), "Electrophysiological equipment for the study of the neural basis of learning and memory".	(\$ 170,000)

Nachum Ulanovsky – List of Publications

Peer-reviewed Articles

1. Sarel A, Palgi S, Blum D, Aljadeff J, Las L & Ulanovsky N, Natural switches in behaviour rapidly modulate hippocampal coding, *Nature* 609, 119-127 (2022).
2. Ginosar G, Aljadeff J, Burak Y, Sompolinsky H, Las L & Ulanovsky N, Locally ordered representation of 3D space in the entorhinal cortex, *Nature* 596, 404-409 (2021).
3. Eliav T, Maimon SR, Aljadeff J, Tsodyks M, Ginosar G, Las L & Ulanovsky N, Multiscale representation of very large environments in the hippocampus of flying bats, *Science* 372, eabg4020 (2021).
4. Ben-Yishay E, Krivoruchko K, Ron S, Ulanovsky N, Derdikman D & Gutfreund Y, Directional tuning in the hippocampal formation of birds, *Curr. Biol.* 31, 1-11 (2021).
5. Eliav T, Geva-Sagiv M, Yartsev MM, Finkelstein A, Rubin A, Las L & Ulanovsky N, Nonoscillatory phase coding and synchronization in the bat hippocampal formation, *Cell* 175, 1119-1130 (2018).
6. Finkelstein A, Ulanovsky N, Tsodyks M & Aljadeff J, Optimal dynamic coding by mixed-dimensionality neurons in the head-direction system of bats, *Nature Commun.* 9, 3590 (2018).
7. Omer DB, Maimon SR, Las L & Ulanovsky N, Social place-cells in the bat hippocampus, *Science* 359, 218-224 (2018).
8. Sarel A, Finkelstein A, Las L & Ulanovsky N, Vectorial representation of spatial goals in the hippocampus of bats, *Science* 355, 176-180 (2017).
9. Geva-Sagiv M, Romani S, Las L & Ulanovsky N, Hippocampal global remapping for different sensory modalities in flying bats, *Nature Neurosci.* 19, 952-958 (2016).
10. Finkelstein A, Las L & Ulanovsky N, 3-D maps and compasses in the brain, *Annu. Rev. Neurosci.* 39, 171-196 (2016).
11. Rubin J, Ulanovsky N, Nelken I & Tishby N, The representation of prediction error in auditory cortex, *PLoS Comput. Biol.* 12, e1005058 (2016).
12. Geva-Sagiv M, Yovel Y, Las L & Ulanovsky N, Spatial cognition in bats and rats: from sensory acquisition to multiscale maps and navigation, *Nature Rev. Neurosci.* 16, 94-108 (2015).
13. Finkelstein A, Derdikman D, Rubin A, Foerster JN, Las L & Ulanovsky N, Three-dimensional head-direction coding in the bat brain, *Nature* 517, 159-164 (2015).
14. Bar NS, Skogestad S, Marçal JM, Ulanovsky N & Yovel Y, A sensori-motor control model of animal flight explains why bats fly differently in light versus dark, *PLoS Biol.* 13, e1002046 (2015).
15. Rubin A, Yartsev MM & Ulanovsky N, Encoding of head direction by hippocampal place cells in bats, *J. Neurosci.* 34, 1067-1080 (2014).
16. Yartsev MM & Ulanovsky N, Representation of three-dimensional space in the hippocampus of flying bats, *Science* 340, 367-372 (2013).

17. Yartsev MM, Witter MP & Ulanovsky N, Grid cells without theta oscillations in the entorhinal cortex of bats, *Nature* 479, 103-107 (2011).
18. Tsoar A, Nathan R, Bartan Y, Dell'Omo G, Vyssotski AL & Ulanovsky N, Large-scale navigational map in a mammal, *PNAS* 108, e718-724 (2011).
19. Yovel Y, Falk B, Moss CF & Ulanovsky N, Active control of acoustic field-of-view in a biosonar system, *PLoS Biol.* 9, e1001150 (2011).
20. Yovel Y, Geva-Sagiv M & Ulanovsky N, Click-based echolocation in bats: not so primitive after all, *JCP A* 197, 515-530 (2011).
21. Ulanovsky N & Moss CF, Dynamics of hippocampal spatial representation in echolocating bats, *Hippocampus* 21, 150-161 (2011).
22. Yovel Y, Falk B, Moss CF & Ulanovsky N, Optimal localization by pointing off-axis, *Science* 327, 701-704 (2010).
23. Ulanovsky N & Moss CF, What the bat's voice tells the bat's brain, *PNAS* 105, 8491-8498 (2008).
24. Ulanovsky N & Moss CF, Hippocampal cellular and network activity in freely moving echolocating bats, *Nature Neurosci.* 10, 224-233 (2007).
25. Nelken I & Ulanovsky N, Mismatch negativity and stimulus-specific adaptation in animal models, *J. Psychophysiol.* 21, 214-223 (2007).
26. Gillam EH, Ulanovsky N (*equal contribution) & McCracken GF, Rapid jamming avoidance in biosonar, *Proc. Biol. Sci.* 274, 651-660 (2007).
27. Moshitch D, Las L, Ulanovsky N, Bar-Yosef O & Nelken I, Responses of neurons in primary auditory cortex (A1) to pure tones in the halothane-anesthetized cat, *J. Neurophysiol.* 95, 3756-3769 (2006).
28. Ulanovsky N, Las L, Farkas D & Nelken I, Multiple time scales of adaptation in auditory cortex neurons, *J. Neurosci.* 24, 10440-10453 (2004).
29. Ulanovsky N, Fenton MB, Tsoar A & Korine C, Dynamics of jamming avoidance in echolocating bats, *Proc. Biol. Sci.* 271, 1467-1475 (2004).
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