Nachum Ulanovsky – CV

updated on 11 February, 2024

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

2024	Donders Lecture, Radboud University, Netherlands.
2023	Nobel Symposium, Stockholm – invited speaker.
2022	Elected as International Honorary Member – American Academy of Arts and Sciences
2022	Bruno Memorial Award – Israel Institute for Advanced Studies.
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 3rd 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 (*summa cum laude*).
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 (*magna cum laude*).

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

2023	Gily Ginosar: Nemko Prize in Cellular or Molecular Neuroscience, from the Society for Neuroscience (SfN) – awarded by SfN for the best Ph.D Thesis in Cellular or Molecular Neuroscience in 2022-2023.
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 & *Science* 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

Conference organizer (together with Yarden Cohen): Neural Basis of Natural Behaviors, Rehovot, Israel (2025).

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.

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.*

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, Columbia University, Indiana University, University of Zurich.
2024 UCL, University of Geneva, University of Amsterdam.

Invited Lectures in Conferences and Symposia

Hippocampal processing workshop, COSYNE conference, Salt Lake City, Utah (2007).

International Congress of Neuroethology, Vancouver (2007).

Workshop on Echolocation in Bats – Current Status and Perspectives, Blaubeuren, Germany (2007).

International School on Neural Nets – The Dynamic Brain, Erice, Sicily (2007).

'Navigation and the Hippocampus' international course, Lisbon, Portugal (2008).

'Neuro-Robotics' workshop, Jerusalem (2008).

Belfer Neuro-Dynamics Symposium, Technion (2009).

Spring Hippocampal Research Conference, Verona, Italy (2009).

International Summer School on Animal Navigation, Brisbane, Australia (2009).

34th Annual Winter Conference on the Neurobiology of Learning and Memory, Park City, Utah (2010).

15th International Bat Research Conference, Prague (2010).

Workshop on: Producing and perceiving complex acoustic signals, HHMI Janelia Farms campus (2011).

ASIC 2011 conference, Spain (2011).

ESA 2011 conference, Austin (2011).

ILAF-ESLAV-ECLAM joint meeting, Jerusalem (2011).

Ascona Meeting - The Assembly and Function of Neuronal Circuits, Ascona, Switzerland (2011).

"Neuronal Circuits: From structure to Function", Cold Spring Harbor (2012).

Bar-Ilan University Life Sciences Faculty Open Day (2012).

NERF/IMEC Neurotechnology Symposium "The neural basis of behavior", Leuven, Belgium (2012).

"Canonical Neural Computations" meeting, La Pietra, Florence, Italy (2012).

"Sensory Coding and Natural Environment" conference, IST, Vienna (2012).

Workshop on "multi-electrode systems and signal processing to study neuronal network", Marseilles, France (2012).

"Winter Conference on Neural Plasticity", Curaçao (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 (2013).

"The Hippocampus" workshop, UCL, UK (2013).

Spring Hippocampal Research Conference, Taormina, Sicily, Italy (2013).

14th International Multisensory Research Forum, Jerusalem (2013).

German-Israeli Inter-Academy Symposium on Stability and Plasticity of Neuronal Representations, Jerusalem (2013).

"Neurophysics of space, time and memory" workshop, UCSB (2014).

Computational and Systems Neuroscience (Cosyne) meeting, Salt Lake City, Utah (2014).

"Neural Networks in the Arctic" conference, Spitzbergen, Norway (2014).

Association for Psychological Science (APS) Convention, New York (2015).

Gordon Research Conference on Neuroethology, Lucca, Tuscany, Italy (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 (2015).

Grid-cells workshop at the Computational and Systems Neuroscience (Cosyne) meeting, Salt Lake City, Utah (2015).

“Hippocampal-Entorhinal Complexities” conference, Janelia Research Campus, USA (2015).

"Winter Conference on Neural Plasticity", Hawaii (2016).

International Titisee Conference: Building Tools for Quantifying Brain and Behavior, Germany (2016).

iNAV Interdisciplinary Navigation Symposium, Bad Gastein, Austria (2016).

Sense of Direction and the Cognitive Map – A Symposium Honoring James Ranck Jr., New York (2016).

Conference on “Space and Time in the Brain”, Jerusalem (2016).

European Cognitive Neuropsychology meeting, Bressanone, Italy (2017).

Janelia Conference on “Neural Basis of Active Sensation and Navigation”, USA (2017).

Navigation workshop in memory of Rita Levi-Montalcini, European Brain Research Institute & Italian Academy of Sciences and Humanities, Rome (2017).

Conference on “Vision in the Real World”, Toronto (2017).

SfN Symposium on “Beyond place cells: Recent surprises from hippocampal neurophysiology”, Washington DC (2017).

Conference on “Mechanisms of Animal Behavior” – Max Planck Society & Chinese Academy of Science, Shanghai, China (2017).

Grid cells meeting, UCL, London (2018).

iNAV 2nd Interdisciplinary Navigation Symposium, Mont Tremblant, Canada (2018).

FENS Forum - biannual meeting of the Federation of European Neuroscience Societies, Berlin, Germany (2018).

Society for Social Neuroscience annual meeting, San Diego, USA (2018).

FENS-Hertie Winter School on Neural Control of Instinctive and Innate Behavior, Obergurgl, Austria (2019).

6th Workshop on Natural Environments, Tasks and Intelligence (NETI), Austin, USA (2019).

Kavli Salon on “Space, time and the brain”, Tabacón, Costa Rica (2019).

ASAB 2019 meeting on New Frontiers in the Study of Animal Behavior, Konstanz, Germany (2019).

RIKEN Center for Brain Science Summer Course, Japan (2019).

Symposium on Artificial and Biological Cognition, Cambridge, UK (2019).

Bernstein Conference, Berlin, Germany (2019).

NRSN Neuroscience Conference, Bergen, Norway; students-invited Keynote lecture (2019).

Society for Neuroscience (SfN) Annual Meeting, Chicago - Special Lecture (Keynote) (2019).

Cosyne – workshop, Breckenridge, Colorado, USA; invited talks in 2 workshops (2020).

Israel Society for Neuroscience, symposium on "50 years of place cells" (virtual) (2021).

"The Adaptive Brain" conference (virtual) (2021).

ESI SyNC Virtual Conference "The Natural Brain", Ersnt Strüngmann Institute, Frankfurt, Germany (2021).

First French Neuroethology Symposium (virtual) (2022).

Weizmann – Hungary Workshop on Brain Sciences (2022).

Workshop on Higher Cognitive Functions, Erice, Sicily (2022).

AREADNE Conference (Research on Encoding And Decoding of Neural Ensembles), Santorini, Greece (2022).

Symposium on "Neural codes across species", Tel Aviv (2022).

Annual Summer Interdisciplinary Program (ASIC), Queenstown, New Zealand (2022).

"The Future of Neuroscience" workshop – Max Planck Society, Berlin (2022).

International Neuropsychological Symposium (INS), Sardinia, Italy (2023).

Lakes Conference on Neural Coding, Seattle, WA, USA (2023).

Max Planck School of Cognition Academy (2023).

CogEvo conference, Rovereto, Italy (2023).

Bordeaux Brain Conference, Bordeaux, France (2023).

Nobel Symposium on "The Social Brain", Stockholm, Sweden (2023).

iNAV 5th Interdisciplinary Navigation Symposium, Cortina d'Amprezzo, Italy (2024).

KISN Workshop on Theories of neural computation in the era of large-scale recordings, Trondheim, Norway (2024).

Senri Life Sciences Symposium, Osaka, Japan (2024) - *postponed*.

CAJAL Training Course on Quantitative Approaches to Behavior, Lisbon (2024).

Ernst Srüngmann Forum on Navigation Research: Mapping the Future, Frankfurt (2024).

Gordon Research Conference on Modulation of Neural Circuits and Behavior, Switzerland (2025).

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: Associate 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	(now: DeepMind)
Dan Blum	M.Sc student	2016 – 2018	

Previous employment

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

Research Grants

2023–2029 European Research Council – Synergy grant (ERC-SyG), "Oxytocin-driven territorial mapping in the mammalian hippocampal formation" (OxytocINspace)
With David Omer, Dori Derdikman, Valery Grinevich, Angela Sirigu – subcontractor on € 1,000,000 (€ 10,000,000)

2023–2027 SFB grant from DFG (SFB #1372), "Magnetoreception and navigation in vertebrates". Renewal for 2nd period.
Multi-group grant (€ 8,000,000)

2023–2028 Israel Science Foundation (ISF #1829/23), "Hippocampal representation of very large spaces: Sparse coding in CA3 versus dense coding in CA1 – Insights from flying bats".
With Liora Las ($ 380,000)

2023–2025	Minerva Foundation, "Neural representation and memory reactivation of extremely large and complex spaces".	(€ 150,000)
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". *With Johnatan Aljadeff and Liora Las*	($ 1,000,000)
2019–2023	SFB grant from DFG (SFB #1372), "Magnetoreception and navigation in vertebrates". *Multi-group grant*	(€ 8,000,000)
2018–2023	Israel Science Foundation (ISF #1920/18), "Neurobiology of social-spatial cognition in the hippocampus: Insights from the bat". *With Liora Las*	($ 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". *With Yoram Gutfreund and Dori Derdikman*	($ 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". *With Yoram Gutfreund and Dori Derdikman*	($ 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". *With Lutz Wiegrebe and Björn Siemers.*	($ 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. Ginosar G, Aljadeff J, Las L, Derdikman D, Ulanovsky N, Are grid cells used for navigation? On local metrics, subjective spaces, and black holes, ***Neuron*** 111, 1858-1875 (2023).

2. Omer DB, Las L, Ulanovsky N, Contextual and pure time coding for self and other in the hippocampus, ***Nature Neurosci.*** 26, 285-294 (2023).

3. Agarwal A, Sarel A, Derdikman D, Ulanovsky N, Gutfreund Y, Spatial coding in the hippocampus and hyperpallium of flying owls, ***PNAS*** 120, e2212418120 (2023).

4. Ginosar G, Karpas ED, Weitzner I, Ulanovsky N, Dissociating two aspects of human 3D spatial perception by studying fighter pilots, ***Sci. Rep.*** 13, 11265 (2023).

5. Jacobsen B, Kleven H, Gatome W, Las L, Ulanovsky N, Witter MP, Organization of projections from the entorhinal cortex to the hippocampal formation of the Egyptian fruit bat Rousettus aegyptiacus, ***Hippocampus*** 33, 889-905 (2023).

6. 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).

7. 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).

8. 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).

9. Ben-Yishay E, Krivoruchko K, Ron S, Ulanovsky N, Derdikman D & Gutfreund Y, Directional tuning in the hippocampal formation of birds, ***Curr. Biol.*** 31, 2592-2602 (2021).

10. 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).

11. 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).

12. Omer DB, Maimon SR, Las L & Ulanovsky N, Social place-cells in the bat hippocampus, ***Science*** 359, 218-224 (2018).

13. Sarel A, Finkelstein A, Las L & Ulanovsky N, Vectorial representation of spatial goals in the hippocampus of bats, ***Science*** 355, 176-180 (2017).

14. 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).

15. Finkelstein A, Las L & Ulanovsky N, 3-D maps and compasses in the brain, ***Annu. Rev. Neurosci.*** 39, 171-196 (2016).

16. Rubin J, Ulanovsky N, Nelken I & Tishby N, The representation of prediction error in auditory cortex, ***PLoS Comput. Biol.*** 12, e1005058 (2016).

17. 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).

18. 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).

19. 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).

20. Rubin A, Yartsev MM & Ulanovsky N, Encoding of head direction by hippocampal place cells in bats, ***J. Neurosci.*** 34, 1067-1080 (2014).

21. Yartsev MM & Ulanovsky N, Representation of three-dimensional space in the hippocampus of flying bats, ***Science*** 340, 367-372 (2013).

22. Yartsev MM, Witter MP & Ulanovsky N, Grid cells without theta oscillations in the entorhinal cortex of bats, ***Nature*** 479, 103-107 (2011).

23. 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).

24. Yovel Y, Falk B, Moss CF & Ulanovsky N, Active control of acoustic field-of-view in a biosonar system, ***PLoS Biol.*** 9, e1001150 (2011).

25. Yovel Y, Geva-Sagiv M & Ulanovsky N, Click-based echolocation in bats: not so primitive after all, ***JCP A*** 197, 515-530 (2011).

26. Ulanovsky N & Moss CF, Dynamics of hippocampal spatial representation in echolocating bats, ***Hippocampus*** 21, 150-161 (2011).

27. Yovel Y, Falk B, Moss CF & Ulanovsky N, Optimal localization by pointing off-axis, ***Science*** 327, 701-704 (2010).

28. Ulanovsky N & Moss CF, What the bat's voice tells the bat's brain, ***PNAS*** 105, 8491-8498 (2008).

29. Ulanovsky N & Moss CF, Hippocampal cellular and network activity in freely moving echolocating bats, ***Nature Neurosci.*** 10, 224-233 (2007).

30. Nelken I & Ulanovsky N, Mismatch negativity and stimulus-specific adaptation in animal models, ***J. Psychophysiol.*** 21, 214-223 (2007).

31. Gillam EH, Ulanovsky N (*equal contribution) & McCracken GF, Rapid jamming avoidance in biosonar, ***Proc. Biol. Sci.*** 274, 651-660 (2007).

32. 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).

33. Ulanovsky N, Las L, Farkas D & Nelken I, Multiple time scales of adaptation in auditory cortex neurons, ***J. Neurosci.*** 24, 10440-10453 (2004).

34. Ulanovsky N, Fenton MB, Tsoar A & Korine C, Dynamics of jamming avoidance in echolocating bats, ***Proc. Biol. Sci.*** 271, 1467-1475 (2004).

35. Nelken I, Fishbach A, Las L, Ulanovsky N & Farkas D, Primary auditory cortex of cats: feature detection or something else? ***Biol. Cybern.*** 89, 397-406 (2003).

36. Ulanovsky N, Las L & Nelken I, Processing of low-probability sounds by cortical neurons, ***Nature Neurosci.*** 6, 391-398 (2003).

News & Views / Opinions

1. Kleinfeld D, Deschênes M & Ulanovsky N, Whisking, sniffing and the hippocampal θ-rhythm: a tale of two oscillators, ***PLoS Biol.*** 14, e1002385 (2016).

2. Ulanovsky N, Neuroscience: How is three-dimensional space encoded in the brain? ***Curr. Biol.*** 21, 886-888 (2011).

Books

Ulanovsky N, Natural neuroscience: towards a systems neuroscience of natural behaviors (MIT Press, 2024 – *in press*).

Eilam-Altstädter R, Las L, Witter MP & Ulanovsky N, Stereotaxic brain atlas of the Egyptian fruit bat (Elsevier - Academic Press, 2021).

Book Chapters

1. Yovel Y & **Ulanovsky N**, Bat navigation. *In:* "Learning and Memory: A Comprehensive Reference, 2nd Ed.", edited by J. H. Byrne, pp.333-345, Academic Press: Amsterdam (2017).

2. Las L & **Ulanovsky N**, Hippocampal neurophysiology across species. *In:* "Space, Time and Memory in the Hippocampal Formation", edited by D. Derdikman and J. J. Knierim, pp. 431-461, Springer: Vienna (2014).

Abstracts

More than 150 conference abstracts have been presented by my lab members at international conferences.