Dmitry Rinberg

Associate Professor
NYU Neuroscience Institute
New York University Langone Medical Center

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Education:

1997 **Ph.D. in Physics**, Weizmann Institute of Science, Rehovot, Israel

1988 **B.Sc. & M.Sc. in Physics,** Moscow Institute of Steel & Alloys, Moscow, Russia.

Courses:

2001 "Neurobiology", Marine Biological Laboratory, Woods Hole, MA

1998 "Methods in Computational Neuroscience", Marine Biological Laboratory, Woods Hole, MA

Positions:

2012 - *Associate Professor of Physiology & Neuroscience*. NYU Neuroscience Institute, New York University Langone Medical Center, New York, NY

2012 - *Associate Professor of Neuroscience*. Center for Neural Science, New York University, New York, NY

2006 - 2012 *Lab Head*. Janelia Farm Research Campus, Howard Hughes Medical Institute, Ashburn, VA

2006 - *Affiliated Scientist*. Monell Chemical Senses Center, Philadelphia, PA

2002 – 2006 *Research Associate*. Monell Chemical Senses Center, Philadelphia, PA

2004 - 2006 *General Partner and Cofounder.* RP Metrix, Princeton, NJ

05-08 2002 *Grass Fellow*. Marine Biological Laboratory, Woods Hole, MA

2000 - 2002 *Postdoctoral Scientist*. Bell Laboratories, Lucent Technologies, Murray Hill, NJ

1997 - 2000 *Postdoctoral Scientist*. NEC Research Institute, Princeton, NJ

1991 - 1997 *Doctoral candidate*. Weizmann Institute of Science, Rehovot, Israel

1986 - 1990 *Researcher*. Institute of Metrological Service, Moscow, Russia

Honors & Awards:

2002 Grass Foundation fellowship

1991 - 1997 Feinberg Graduate School Ph.D. fellowship

1988 M.Sc. degree with High Honors, Moscow Institute of Steel & Alloys, Russia

1982 - 1988 Moscow Institute of Steel & Alloys advanced fellowship

Personal:

Languages: English, Hebrew, Russian

Nationality: US and Israel (dual citizenship)

Peer-reviewed publications:

(bold – senior or correspondent author, underscore – the first or equivalent author)

2017 • Wilson, C.D., G.O. Serrano, A.A. Koulakov, and **D. Rinberg**. *A Primacy Code for Odor Identity.* Nature Comm, *in press*

2015: • A. Resulaj and **D. Rinberg**. *Novel Behavioral Paradigm Reveals Lower Temporal Limits on Mouse Olfactory Decisions.* J. Neuroscience, 35, pp.11667–11673 (reviewed at Faculty 1000)

• Y.B. Sirotin, R. Shusterman, and **D. Rinberg**. *Neural Coding of Perceived Odor Intensity.* eNeuro 2(6).

2014: • J. Reisert, G.J. Golden, K. Matsumura, M. Smear, D. Rinberg, and A. Gelperin. *Comparing thoracic and intra-nasal pressure transients to monitor active odor sampling during odor-guided decision making in the mouse.* J. Neurosci. Methods, 221, pp.8–14

• H. Sanders, B.E. Kolterman, R. Shusterman, D. Rinberg, A. Koulakov, and J. Lisman. *A network that performs brute-force conversion of a temporal sequence to a spatial pattern: relevance to odor recognition.* Front Comput Neurosci, 8**,** 108

2013: • A. Dewan, R. Pacifico, R. Zhan, D. Rinberg, and T. Bozza. *Non-redundant coding of aversive odours in the main olfactory pathway.* Nature, 497, pp.486-489

• M. Smear, A. Resulaj, J. Zhang, T. Bozza, and **D. Rinberg**. *Multiple perceptible signals from a single olfactory glomerulus.* Nature Neuroscience, 16, pp.1687–1691 (reviewed at Faculty 1000)

2012: • H. Spors, D.F. Albeanu, V. Murthy, D. Rinberg, N. Uchida, M. Wachowiak, and R.W. Friedrich. Illuminating Vertebrate Olfactory Processing. J. Neuroscience, 32(41), pp.14102-14108

2011: • A. Koulakov, B.E. Kolterman, A. Enikolopov, and D. Rinberg. *In search of the structure of human olfactory space.* Frontiers in System Neuroscience, 5 (65), pp. 1-8

• R. Shusterman, M. Smear, A. Koulakov, and **D. Rinberg**. *Precise olfactory responses tile the sniff cycle.* Nature Neuroscience, 14 (8), pp.1039-1044 (reviewed at Faculty 1000)

• A. Koulakov and **D. Rinberg**. *Sparse incomplete representations: A novel role for olfactory granule cells.* Neuron, 72, 124-136

• M. Smear, R. Shusterman, R. O'Connor, T. Bozza, and **D. Rinberg**. *Perception of sniff phase in mouse olfaction.* Nature, 479, pp.397-400 (reviewed at Faculty 1000)

2008: • D.B. Katz, H. Matsunami, D. Rinberg, K. Scott, M. Wachowiak, and R.I. Wilson. *Receptors, Circuits, and Behaviors: New Directions in Chemical Senses*. J. Neuroscience, 28(46), pp.11802-11805

2007: • A. Koulakov, A. Gelperin, and **D. Rinberg**. *Olfactory coding with all-or-nothing glomeruli.* J. Neurophysiol., 98, pp.3134-3142

2006: • D. Rinberg, A. Koulakov, and A. Gelperin. *Sparse odor coding in behaving mice.* J. Neuroscience, 26(34), pp.8857-8865

• D. Rinberg, A. Koulakov, and A. Gelperin. *Speed accuracy tradeoff in olfaction.* Neuron, 51(3), pp.351-358

• D. Rinberg and A. Gelperin. *Olfactory neuronal dynamics in behaving animals*. Seminars in Cell and Development biology, 17(4), 454046

2005: • A. Koulakov, D. Rinberg, and D.N. Tsigankov. *How to find decision makers in neural circuits?* Biological Cybernetics, 93(6), pp.447-462

• D. Rinberg, C. Simonnet, and A. Groisman. *Pneumatic capillary gun for ballistic delivery of microparticles.* Appl. Phys. Lett. 87, p.014103

2003: • D. Rinberg and H. Davidowitz. *Wind Spectra and the response of the cercal system in the cockroach.* J. Comp. Physiol. A, 189(12), pp.867-876

2002: • D. Rinberg and H. Davidowitz *A stimulus generation system for studying wind sensation in the American Cockroach.* J. Neurosci. Methods, 121, pp.1-11

2001: • D. Rinberg and H. Davidowitz. *Multineuron response to wind stimuli in the American Cockroach.* Neurocomputing, 38-40(1-4), pp. 837-843

- D. Rinberg and M.L. Rappaport. *Fiber bolometer and emitter with negligible reflection for second measurements near the λ-point*. Cryogenics, 41(8), pp. 557-561
- D. Rinberg and V. Steinberg. *Parametric Generation of Second Sound in Superfluid Helium: Linear Stability and Nonlinear Dynamics.* Phys. Rev. B, 64, 054506

2000: • D. Rinberg and H. Davidowitz. *Do cockroaches "know" about fluid dynamics?* Nature, 405, p.756

1999: • D. Rinberg, H. Davidowitz, and N. Tishby. *Multi-electrode spike sorting by clustering transfer functions*. In Advances in Neural Information Processing Systems, 11, edited by M. S. Kearns, S. A. Solla, D. A. Cohn, eds., MIT Press

1998: • D. Rinberg, and V. Steinberg. *Acoustic Phase Conjugation in Superfluid Helium*. Phys. Rev. Lett., 81(26), pp. 5812-5815

1997: • D. Rinberg, V. Cherepanov, and V. Steinberg. *Universal broadening of frequency spectra in parametrically driven systems.* Phys. Rev. Lett., 78 (23) pp. 4383-4386

1996: • D. Rinberg, V. Cherepanov, and V. Steinberg. *Parametric generation of second sound by first sound in superfluid helium*. Phys. Rev. Lett., 76 (12), pp. 2105-2108

1993: • H. Nielsen, S.V. Kravchenko, V.M. Pudalov, and D.A. Rinberg. *On negative dielectric permittivity in the Quantum Hall regime*. Physica B, 184 (1-4), pp. 323-326

1990: • S.V. Kravchenko, V.M. Pudalov, D.A. Rinberg, and S.G. Semenchinsky. *Direct observation of the influence of the electron-electron interaction on the chemical potential of a 2D electron gas.* Phys. Lett. A, 146 (9), pp. 535-537

- S.V. Kravchenko, B.K. Medvedev, V.G. Mokerov, V.M. Pudalov, D.A. Rinberg, and S.G. Semenchinsky. *On the Phase Diagrams of Magnetoconductivity for 2D Electron System.* Surf. Science, 229, pp.63-66
- S.V. Kravchenko, V.M. Pudalov, D.A. Rinberg, and S.G. Semenchinsky. *Evidence for influence of electron-electron interactions on chemical potential of a 2-dimensional electron gas.* Phys. Rev. B, 46 (6), pp. 3741-3744

1988: • B.K. Medvedev, V.G. Mokerov, V.M. Pudalov, D.A. Rinberg, S.G. Semenchinsky, and Y.V. Slepnev. *Transition between dissipationless and dissipative states at GaAs - $Al_xGa_{1-x}As$ heterostructures in the Quantum Hall effect.* JETP Lett., 47 (1), pp. 71-74

- S.V. Kravchenko, B.K. Medvedev, V.G. Mokerov, V.M. Pudalov, D.A. Rinberg, and S.G. Semenchinsky. *Phase diagrams of magnetoconductivity for 2D electron system*. JETP Lett., 48 (6), pp. 388-391

Other publications:

- R. Shusterman, Y.B. Sirotin, M.C. Smear, Y. Ahmadian, D. Rinberg. *Sniff invariant odor coding.* BioArxiv, *https://www.biorxiv.org/content/early/2017/08/09/174417*
- E.M. Arneodo, K.B. Penikis, N. Rabinowitz, A. Cichy, J. Zhang, T. Bozza, and D. Rinberg. *Stimulus Dependent Diversity And Stereotypy In The Output Of An Olfactory Functional Unit.* BioArxiv, https://www.biorxiv.org/content/early/2017/05/03/133561
- C.D. Wilson, G.O. Serrano, A.A. Koulakov, and D. Rinberg. *Concentration invariant odor coding*. BioArxiv, https://www.biorxiv.org/content/early/2017/04/06/125039
- S. Devore and D. Rinberg. *Dark matter of the bulb.* Nature Neuroscience **17,** 485–487 (2014).
- D. Rinberg, W. Bialek, N. Tishby, and H. Davidowitz. *Spike sorting in the frequency domain with overlap detection.* e-archive - arXiv:physics/0306056, *http://arxiv.org/abs /physics/0306056* (2003).

Patents:

D. Rinberg, E. Shor. T. Bozza. *Bio-electronic nose*. PCT-US17/39066. Filed June 23 2017

D. Rinberg, T. Bozza, C. Wilson, E.R. Schreiter, L.L. Looger, B.F. Fosque. *Identification of olfactory receptors sensitive to different odorants.* Filed August 2014

D. Rinberg and A. Groisman, *Pneumatic capillary gun for ballistic delivery of microscopic particles into tissue,* US utility application No. PCT/US06/05151 filed in 2006

Invited Seminars and Lectures (• departmental seminars/colloquia, * invited conference presentations)

2017: * Workshop "*Brain & Roses - 2017"*, Hebrew University, Jerusalem, Israel
* Workshop "*Neural Coding, Computation and Dynamics*", Capbreton, France
* Conference on *Frontiers in Olfaction*, ICTP, Trieste, Italy
• Institute of Neuroscience, University of Oregon, Eugene, OR
* Janelia Conference, HHMI, "Neural Basis of Active Senstion and Navigation". Ashburn, VA
• Department of Physiology, Yale University, New Haven, CT
• Colloquium, QBio Program, UCSD, San Diego, CA

2016: * BRAIN Initiative PI meeting – 2016, Bethesda, MD
* CRCNS Conference - 2016, Paris, France
* International Conference on System Biology - 2016, Barcelona, Spain
* Workshop "*Brain & Roses - 2016"*, Alicia Foundation, Spain
* International Symposium on Olfaction and Taste, 2016, Yokohama, Japan
• Department of Biology, NJIT/Rutgers, Newark, NJ
• Firmenich, Princeton, NJ

2015: • Center for Brain Science, Harvard University, Boston, MA
• Monell Chemical Senses Center, Philadelphia, PA
• Center for Theoretical Neuroscience, Columbia University, New York, NY
* Workshop "*Deconstructing the Sense of Smell*". The Kalvi Institute for Theoretical Physics, University California Santa Barbara, CA
* Cosyne workshop "*Perturbations in perceptual behavior*". Snowbird, UT
• Brain Research Center, Weizmann Institute of Science. Rehovot, Israel
• Center of Neural Computation, Hebrew University. Jerusalem, Israel
• Rambam Medical School, Technion. Haifa, Israel

2014: • Center for Genomic Regulation, Barcelona, Spain
• Champalimaud Center of Unknown. Lisbon, Portugal
• Department of Neurobiology and Behavior, Stony Brook University. Stony Brook, NY
• Center for Studies in Physics and Biology, The Rockefeller University. New York, NY
* Workshop "*Olfaction Beyond Boundaries: Towards General Principles of Olfaction*". Cold Spring Harbor Laboratory, Cold Spring Harbor, NY
* Conference *"Theory and Biology*". Simon Foundation. New York, NY
* New York University – Weizmann Institute of Science Conference. "*Frontiers in Brain and Cognition*". New York, NY
• Department of Biology, The City College of New York, New York, NY
• Physics Department, New York University, New York, NY

2013: * Keynote lecture. ELSC-BLBT Joint workshop *"Neuroscience meets Neurotechnology*". Jerusalem, Israel.
• Center for Developmental Neuroscience, The College of Staten Island, Staten Island, NY
• Department of Cell Biology and Neuroscience, University of California Riverside, Riverside, CA
* Conference "*Odor Spaces".* Hannover, Germany
* CNS workshop *"New developments in decoding the encoding of chemical senses*".Paris, France.
* Workshop "*Sensory Systems and Coding"*. Mathematical Biological Institute, the Ohio State University, Columbus, OH.
• *Swartz Seminar*. Department of Neurobiology, Yale University School of Medicine. New Haven, CT

* Janelia Farm Conference *"The Neural Basis of Vibrissa-Based Tactile Sensation*". Ashburn, VA
* JPG symposium *"Sense to Synapse*". Columbia University, New York, NY

` • Department of Neurobiology and Anatomy, Brain Institute, University of Utah. Salt Lake City, UT
• Cold Spring Harbor Laboratory. Cold Spring Harbor, NY

2012: * Symposium *"New directions in behavioral and systems neuroscience*". Center for Neuroscience, Boston University, Boston, MA
* SfN-2012 mini Symposium *"Illuminating Vertebrate Olfactory Processing*". New Orleans, LA
• Neuroscience and Cognitive Science Program, University of Maryland, College Park, MD
* AChems-2012, Symposium "*The role of respiration in olfactory and flavor proces*sing". Long Beach, CA
• Neuroscience Program, Brandeis University. Waltham, MA
• Department of Psychology, University of Pennsylvania. Philadelphia, PA
• Department of Neurobiology, Northwester University, Evanston, IL
• NERF, Leuven University and IMEC, Leuven, Belgium

2011: * *Barrels XXIV meeting*. John Hopkins University, Baltimore, MD
• Department of Biological Sciences, Carnegie Mellon University. Pittsburgh, PA
• Neuroscience Institute, New York University. New York, NY
• Neuroscience Department, Columbia University. New York, NY
• Department of Biology, Stanford University. Stanford, CA
* *Sloan-Swartz annual meeting*. Janelia Farm. Ashburn, VA
* Conference "*Olfaction: from Receptors to Behavior*". Jerusalem, Israel
• Center for Mind, Brain and Behavior, Rockefeller University. New York, NY

2010: • Neurobiology Program, University of Washington. Seattle, WA
* Janelia Farm Conference *"Bottom-Up and Top-Down Approaches to Understanding Circuit Processing: Meeting in the Middle"*. Ashburn, VA
* Janelia Farm Conference *"Genetic Manipulation of Neuronal Activity*". Ashburn, VA
• Department of Zoology, Cambridge University. Cambridge, UK
• University College London, London, UK
* Gordon Research Conference *"Sensory Coding in Natural Environment".* Bates College, MN
* Janelia Farm Conference "*Form and Function in Olfaction*". Ashburn, VA
• Center of Neural Computation, Hebrew University. Jerusalem, Israel
• Brain Research Center, Weizmann Institute of Science. Rehovot, Israel
• Monell Chemical Senses Center, Philadelphia, PA
• Department of Physiology and Biophysics, University of Colorado. Denver, CO
* Cosyne workshop *"Early Olfactory Circuits in Insects and Rodents"*. Snowbird, UT
• Skirball Jacob Bleibtrau Institute, New York University. New York, NY

2008: * *APS-2008*. Chicago, IL
• Pierce Institute, Yale University, New Haven, CT
* *SfN-2008*, Mini-Symposium. Washington, DC

2006: • Krasnow Institute of Advance Study, George Mason University, Fairfax, VA
• Bioengineering Department, University of Pennsylvania. Philadelphia, PA
• Brain Center, Brown University. Providence, RI
• Center of Neural Computation, Hebrew University. Jerusalem, Israel
• Brain Research Center, Weizmann Institute of Science. Rehovot, Israel

2005: * Cosyne-2005 workshop "*Active Sensation"*. Snowbird, UT

2002: • Department of Physics, Utah University, Salt Lake City, UT

2000: • Courant Institute, New York University, New York, NY
• Department of Physics, Rutgers University, New Brunswick, NJ
• Department of Zoology, Cambridge University, Cambridge, UK

Professional activities:

Conference/workshop organizer:

02.2017 Co-organizer of workshop at Cosyne-2017: *Relevant information: in search of a causal link between neural responses and behavior.*

05.2010 Co-organizer of workshop at Janelia Farm: *Challenges in Extracellular Electrophysiology: Data Extraction*

04.2008 Co-organizer of conference at Janelia Farm: *Using In-vivo Physiology to Understand Neural Circuits in Genetic Systems*

03.2005 Co-organizer of workshop at Cosyne-2005 Conference: *Computational Olfaction: behavior, networks, neurons*

Teaching:

2012 - Faculty lecturer at "System Neuroscience Course", NYU Neuroscience Ph.D. Program

07.2016 Faculty lecture at the course "Neurotechnology for Analysis of Neural Dynamics", Princeton University, Princeton, NJ

08.2011 Faculty at the course "Methods in Computational Neuroscience", Marine Biological Laboratory, Woods Hole, MA

Panel and ad hoc reviewer for funding agencies: Intramural Laboratories at NIHCD, German Research Foundation, National Science Foundation, Israel Science Foundation, Human Frontier Science Program

Ad hoc reviewer for journals: Nature Neuroscience, Nature Reviews Neuroscience, Nature Communications, Neuron, PNAS, Cell Reports, Current Biology, PLOS Biology, Trends in Neuroscience, eLife, eNeuro, J. Neuroscience, J. Neurophysiology, J. Physiology, J. Neuroscience Methods, Chemical Senses, PLOS One.

Membership: Society for Neuroscience, Association for Chemoreception Sciences