MARIA NEIMARK GEFFEN

Department of Otorhinolaryngology
University of Pennsylvania
Stemmler G10. 3460 Hamilton Walk. Philadelphia PA 19104
http://www.hosting.upenn.edu/hearing

Tel: 215.898.0782
Fax: 215.898.9994
mgeffen@pennmedicine.upenn.edu

PROFESSIONAL EXPERIENCE

2023-present Professor, University of Pennsylvania
Department of Otorhinolaryngology, Department of Neuroscience, Department of Neurology

2018-2023 Associate Professor, University of Pennsylvania
Department of Otorhinolaryngology, Department of Neuroscience, Department of Neurology

2011-2018 Assistant Professor, University of Pennsylvania
Department of Otorhinolaryngology, Department of Neuroscience

2006-2010 Fellow, Rockefeller University
Center for Studies in Physics and Biology

EDUCATION

2006 Ph.D., Harvard University, Biophysics
Advisor: Prof. Markus Meister
Thesis: "Encoding of complex stimuli in early sensory systems".

2001 A.B., Princeton University, Molecular Biology, Certificates Biophysics and VisArts
Senior thesis advisor: Prof. John Hopfield
Thesis: "The mechanics of whisking: the first stage in the transduction of surface textures into neural signals".

Additional Training

2014, 2015 Penn STEM Faculty Pathways to Leadership course
2002 Riken Brain Science Institute Summer Program
2001 Woods Hole MBL Methods in Computational Neuroscience Summer Course

PUBLICATIONS

1. Angeloni, C.F., Mlynarski, W., Piasini, E., Williams, A.M., Wood, K.C., Garami, L., Hermundstad, A., Geffen, M.N. Dynamics of cortical contrast adaptation predict perception of signals in noise. *BioRXiv* 2021.08.11.455845; doi: https://doi.org/10.1101/2021.08.11.455845. *Nature Communications* (2023) 14: 4817; doi: https://doi.org/10.1038/s41467-023-40477-6 .

2. Williams, A.M., Ding, X., **Geffen, M.N.** Sound improves visual orientation coding in the primary visual cortex. BioRXiv bioRxiv 2021.08.03.454738; doi: https://doi.org/10.1101/2021.08.03.454738. Journal of Neuroscience (2023) 43 (16) 2885-2906; doi: https://doi.org/10.1523/JNEUROSCI.2444-21.2023.

3. Tobin, M., Sheth, J., Stiso, J., Bassett, D.S., **Geffen, M.N.** Localist versus distributed representation of sounds in the auditory cortex controlled by distinct inhibitory neuronal subtypes. BioRXiv (2023). 2023.02.01.526470; doi: https://doi.org/10.1101/2023.02.01.526470

4. Sheth, J., Collina, J., Piasini, E., Kording, K., Cohen, Y.E., **Geffen, M.N.** The interplay of uncertainty, relevance and learning influences auditory categorization. BioRXiv (2023) 2022.12.01.518777; doi: https://doi.org/10.1101/2022.12.01.518777

5. Lesicko, A.M.H., Angeloni, C., Blackwell, J.M., Di Biasi, M., **Geffen, M.N.** Cortico-fugal regulation of predictive coding. *eLife* (2022) doi: https://doi.org/10.7554/eLife.73289 11:e73289. BioRXiv 2021.04.12.439188; doi: https://doi.org/10.1101/2021.04.12.439188.

6. Lesicko, A.M.H., **Geffen, M.N.** Diverse functions of the auditory cortico-collicular pathway. Hearing Research (2022), 108488. doi: 10.1016/j.heares.2022.108488

7. Wood, K.C., Angeloni, C. F., Oxman, K., Clopath, C., **Geffen, M.N.** Neuronal activity in sensory cortex predicts the specificity of learning. BioRXiv 2020.06.02.128702; doi: https://doi.org/10.1101/2020.06.02.128702. *Nature Communications* (2022) 4;13(1):1167. doi https://doi.org/10.1038/s41467-022-28784-w

8. Seay, M.J., Natan, R.G., **Geffen, M.N**., and Buonomano, D.V. Differential Short-Term Plasticity of PV and SST Neurons Accounts for Adaptation and Facilitation of Cortical Neurons to Auditory Tones. Journal of Neuroscience, (2020) 40 (48) 9224-9235. doi https://doi.org/10.1523/JNEUROSCI.0686-20.2020

9. Park., Y., **Geffen, M.N.** A Circuit Model of the Auditory Cortex. BioRXiv 626358; doi: https://doi.org/10.1101/626358. PLoS Comput Biol (2020) 16(7): e1008016. doi https://doi.org/10.1371/journal.pcbi.1008016

10. Blackwell, J.M., Rao, W., De Biasi, M., **Geffen, M.N.** The role of feedback from the auditory cortex in shaping responses to sounds in inferior colliculus. BioRXiv 584334; doi: https://doi.org/10.1101/584334. eLife (2020); 9:e51890. doi https://doi.org/10.7554/eLife.51890

11. Aizenberg, M., Rolon-Martinez S., Pham, T., Rao, W., Haas, J. S., **Geffen, M.N.** Projection from the amygdala to the thalamic reticular amplifies cortical sound responses. BioRXiv 623868; doi: https://doi.org/10.1101/623868. Cell Reports (2019) 28, 605–615. doi https://doi.org/10.1016/j.celrep.2019.06.050

12. Betzel, R.F., Wood, K.C., Angeloni, C.F., **Geffen, M.N.**, Bassett, D.S. Stability of spontaneous, correlated activity in mouse auditory cortex. BioRXiv 491936; doi: https://doi.org/10.1101/491936. PLoS Comp Biology (2019), 15(12): e1007360. doi https://doi.org/10.1371/journal.pcbi.1007360

13. Williams. A, **Geffen, M.N.** Birds of a different feather sing together. Nat Neuroscience (2019), 22(9):1381-1382. doi: https://doi.org/10.1038/s41593-019-0485-1

14. Gervain, J., **Geffen, M.N.** Efficient neural coding in auditory and speech perception. *Trends in Neurosciences*, (2019) 42(1) 56-65. doi: https://doi.org/10.1016/j.tins.2018.09.004

15. Briguglio, J.J., Aizenberg, M., Balasubramanian, V., **Geffen, M.N.** Cortical neural activity predicts sensory acuity under optogenetic manipulation. BioRXiv 119453; doi: https://doi.org/10.1101/119453. *J Neuroscience* (2018)*,* 38 (8) 2094-2105. doi: https://doi.org/10.1523/JNEUROSCI.2457-17.2017

16. Natan, R.G., Rao, W., **Geffen, M.N.** Cortical interneurons differentially shape frequency tuning following adaptation. BioRXiv 172338; doi: https://doi.org/10.1101/172338. *Cell Reports* (2017)*,* 21, 1–13. doi doi: https://doi.org/10.1016/j.celrep.2017.10.012

17. Angeloni, C, **Geffen, M.N.** Contextual modulation of sound processing in the auditory cortex. *Current Opinion in Neurobiology,* (2018) 49, 8–1. doi: https://doi.org/10.1016/j.conb.2017.10.012

18. Blackwell, J.M., **Geffen, M.N.** Progress and challenges for understanding the function of cortical microcircuits in auditory processing. *Nature Communications,* (2017) 8, 2165. doi: https://doi.org/10.1038/s41467-017-01755-2

19. Wood, K.C., Blackwell, J.M., **Geffen, M.N.** Cortical inhibitory interneurons control sensory processing. *Current Opinion in Neurobiology*, (2017), 46C, 200-207. doi: https://doi.org/10.1016/j.conb.2017.08.018

20. Natan, R.G., Carruthers, I.M., Mwilambwe-Tshilobo, L., **Geffen, M.N.** Gain Control in the Auditory Cortex Evoked by Changing Temporal Correlation of Sounds. *Cerebral Cortex* (2017), 27(3), 2385-2402. doi: https://doi.org/10.1093/cercor/bhw083

21. Gervain, J., Werker, J.F., Black, A., **Geffen, M.N.** The neural correlates of processing scale-invariant environmental sounds at birth. *NeuroImage* (2016), 133:144-150. doi: https://doi.org/10.1016/j.neuroimage.2016.03.001

22. Blackwell, J.M., Taillefumier, T.O., Natan, R.G., Carruthers, I.M., Magnasco, M.O., **Geffen, M.N.** Stable encoding of sounds over a broad range of statistical parameters in the auditory cortex. *European Journal of Neuroscience* (2016)*,* 43(6), 751–764. doi: https://doi.org/10.1111/ejn.13144

23. Aizenberg, M., Mwilambwe-Tshilobo, L., Briguglio, J.J., Natan, R.G., **Geffen, M.N.** Bi-directional regulation of innate and learned behaviors that rely on frequency discrimination by cortical inhibitory interneurons. *PLoS Biology* (2015), 13(12): e1002308. doi: https://doi.org/10.1371/journal.pbio.1002308

24. Natan, R.G., Briguglio, J.J., Mwilambwe-Tshilobo, L., Jones, S., Aizenberg, M., Goldberg, E.M., **Geffen, M.N.** Complementary control of sensory adaptation by two types of cortical interneurons. *eLife* 2015 (2015); 4: e09868. doi: https://doi.org/10.7554/eLife.09868

25. Carruthers, I.M., Laplagne, D.A., Jaegle, A., Briguglio, J.J., Mwilambwe-Tshilobo, L., Natan, R.G., **Geffen, M.N.** Emergence of invariant representation of vocalizations in the auditory cortex. *Journal of Neurophysiology* (2015), 114(5):2726-40. doi: https://doi.org/10.1152/jn.00095.2015

26. Mwilambwe-Tshilobo, L., Davis, A.J.O., Aizenberg, M., **Geffen, M.N.** Selective impairment in frequency discrimination in a mouse model of tinnitus. *PLoS ONE* (2015), 10(9): e0137749. doi: 10.1371/journal.pone.0137749

27. Gervain, J., Werker, J.F., **Geffen, M.N.** Category-specific processing of scale-invariant sounds in infancy. *PLoS ONE* (2014), 9(5): e96278. doi: https://doi.org/10.1371/journal.pone.0096278

28. Zaidi, Q., Victor, J.D., McDermott, J., **Geffen, M.N.**, Bensmaia, S., Cleland, T.A. Perceptual Spaces: Mathematical structures to neural mechanisms. *Journal of Neuroscience* (2013), 33(45), 17597-17602. doi: https://doi.org/10.1523/JNEUROSCI.3343-13.2013

29. Aizenberg, M., **Geffen, M.N.** Bidirectional effects of auditory aversive learning on sensory acuity are mediated by the auditory cortex (2013). *Nature Neuroscience*, 16, 994–996. doi: https://doi.org/10.1038/nn.3443

30. Carruthers, I.M., Natan, R.G., **Geffen, M.N.** Encoding of ultra-sonic vocalizations in the rat auditory cortex. *Journal of Neurophysiology* (2013), 109(7), 1912-1927. doi: https://doi.org/10.1152/jn.00483.2012

31. **Geffen, M.N.**, Gervain, J., Werker, J.F., Magnasco, M.O. Auditory perception of self-similarity in water sounds. *Frontiers in Integrative Neuroscience* (2011), 5:15. doi: https://doi.org/10.3389/fnint.2011.00015

32. **Geffen, M.N.**, Broome, B.M., Laurent, G., Meister, M. Neural encoding of rapidly fluctuating odors. *Neuron* (2009), 61(4), 570-586. doi: https://doi.org/10.1016/j.neuron.2009.01.021

33. **Geffen, M.N.**, de Vries, S.E.J., and Meister, M. Retinal ganglion cells can rapidly change polarity from Off to On. *PLoS Biology* (2007), 5(3), e65. doi: https://doi.org/10.1371/journal.pbio.0050065

34. Andermann, M.L., Ritt, J., **Neimark, M.A.**, Moore, C.I. Neural correlates of vibrissa resonance: band-pass and somatotopic representation of high-frequency stimuli. *Neuron* (2004), 42, 451-463. doi: 10.1016/s0896-6273(04)00198-9

35. **Neimark, M.A.**, Andermann, M.L., Hopfield, J.J. and Moore, C.I. Vibrissa resonance as a transduction mechanism for tactile encoding. *Journal of Neuroscience* (2003), 23(16), 6499-6509. doi: https://doi.org/10.1523/JNEUROSCI.23-16-06499.2003

HONORS AND AWARDS

2022	Keynote Speaker, Mid-western Auditory Conference
2022	Mentor, K99 Pathway to Independence Award
2021	Penn Fellow
2020	Mentor, Ruth L. Kirschstein National Research Service Award (NRSA)
2019	Mentor, Ruth L. Kirschstein National Research Service Award (NRSA)
2018	Keynote speaker, Sense2Synapse conference, NYC
2017	Mentor, Ruth L. Kirschstein National Research Service Award (NRSA)
2017	Keynote speaker, University of Southern California, Hearing and Communication Neuroscience Retreat
2017	Keynote speaker, University of Washington, Seattle – Allen Institute of Science symposium
2017	Mentor, Saul Winegrad Award for Outstanding Dissertation
2016	Young Investigator Award, Advances and Perspectives in Auditory Neuroscience
2015	Keynote speaker, Celebration of Women in Neuroscience, Society for Neuroscience Meeting
2014	Human Frontiers in Science Young Investigator Award
2014	Mentor, NARSAD Young Investigator Award
2011	Klingenstein Fellowship Award in Neuroscience
2011	Certificate of Appreciation from the Leadership Alliance
2009	Raymond and Beverly Sackler Fellowship in Physics and Biology
2008	Burroughs Wellcome Fund Career Award at the Scientific Interface
2007	Cell Press award for best poster at the Gordon Research Conference
2006	Rockefeller University Fellowship in Physics and Biology
2006	Rockefeller University Women in Science Fellowship
2003	Harvard University Biophysics Program recognition award
2002	HHMI Pre-doctoral Fellowship
2001	Fulbright Scholarship awarded (declined)
2000	Presidential Scholarship, Princeton University
1999	Martin A. Dale Award, Princeton University
1997	Cane Scholar, Princeton University

RESEARCH SUPPORT

Active Support

2-R01-DC014479 (Geffen)	NIH	$2,712,045	04/01/15-06/30/25

Circuit Mechanisms of Sound Processing and Detection in the Auditory Pathway

The goal of the proposed research is to identify the circuit-level mechanisms in the auditory cortex and anterior cingulate cortex that underlie auditory prediction and to test the way these mechanisms contribute to behavioral detection of regularity in sounds and its violation.

5R01DC015527 (Geffen) NIH $ 3,408,488 04/01/17-4/31/27
Neuronal circuits supporting learning-driven changes in auditory perception
The goal of the proposed research is to identify the circuits for auditory learning and perception. This is achieved by using a combination of electrophysiological, optogenetic and behavioral approaches in the mouse.

1R01NS113241 (Geffen) NIH $ 3,902,915 06/01/19-05/31/24
Neuronal circuits for context-driven bias in auditory categorization
The goal of this project is to identify the neuronal mechanisms for how contextual signals bias auditory categorization.

New Initiative Award (Geffen, Gottfried) $300,000 11/01/20-10/31/23
Charles E. Kaufman Foundation Neuronal circuits for auditory-olfactory integration

1R01AG068127-01A1 (Kelz/Proekt) 0.6 calendar 04/01/21-03/31/26
Personalized Anesthetic Pharmacology
The goal of the project is to investigate the age-dependent differences in response to anesthesia. Geffen's Role: Co-I

Collaborative Grant (Saalman) Templeton Foundation $635,664 04/01/21-04/01/24
Testing Global Neuronal Workspace (GNW) and Integrated Information (IIT) theories of consciousness in animal models. Geffen's role: Co-PI

R01 NS123054 (Platt) 5/1/22-4/30/26
Optimizing Optogenetics for Cell-type-specific Control in Freely-moving Primates
By developing new optogenetic expression and stimulation techniques for modulating precisely selected neural circuits, we plan to better study and develop translational therapies targeting the neural circuitry underlying a variety of neurological and psychiatric disorders in human populations. Geffen's Role: Co-I

Completed Support

1R01EB028162-02 (Kording) NIH $24,700 09/01/19-08/31/22
Quantifying causality for neuroscience, Geffen's role: Co-I, 0.5 CM
The goal of this project is to develop a set of computational techniques that allow neuroscientists to quantify how neurons causally influence one another.

Pilot Grant (Olsen) Templeton Foundation $57,500 04/01/20-12/01/20
Testing Global Neuronal Workspace (GNW) and Integrated Information (IIT) theories of consciousness in animal models. Geffen's role: Co-PI

Human Frontiers in Science Foundation Geffen (PI) $750,000 09/01/2014-08/31/2018
Development of brain mechanisms underlying speech preference in infants: is speech special?

Burroughs Wellcome Fund Career Award at the Scientific Interface Geffen (PI) $500,000 08/01/2008-08/31/2018
Perception and neural encoding of textured sounds.

NIH NIDCD R03DC013660-01 Geffen (PI) $480,000 12/01/2013-9/31/2017
The role of cortical interneurons in auditory processing and learning

Klingenstein Fellowship Award Geffen (PI) 07/01/2011-06/30/2014

Neural mechanisms of encoding of complex natural sounds

PA Lions Hearing Research Foundation Geffen(PI) $60,000 09/01/2016-08/31/2019
Central brain circuits of supporting discrimination of signals in noise

University of Pennsylvania CNC Geffen (PI) 07/01/2011-06/30/2012
The role of cortico-cortical connections of the mammalian sensory cortex in information processing

TEACHING

2018-2023	NGG 573. Systems and Integrative Neuroscience. Course Director.
2017	Harvard University, Methods in Biophysics. Guest Lecturer.
2016	Woods Hole Marine Biological Laboratory, Methods in Computational Neuroscience. Lecturer.
2016, 2017	NGG 573. Systems and Integrative Neuroscience. Modules on computational methods and on auditory processing. Lecturer.
2012-present	Organizer, Auditory Journal Club.
2012, 2015	NGG 573. Systems and Integrative Neuroscience. Lecturer (auditory processing).
2011, 2014	Department of Otorhinolaryngology, Grand Rounds. Lecturer.
2014	Instructor. International School in Quantitative Biology, Trieste, Italy (3 lectures)
2013-present	IGERT Perception journal club. Faculty moderator/Guest lecturer.
2012	ENG 305. Introduction to Physiology. Guest Lecturer.
2013, 2011	NGG 598. Advanced Systems Neuroscience. Lecturer (auditory processing).
2012, 2011	Summer Course in Computational Neuroscience, Guest Lecturer.
2012	Penn Institute for Research in Cognitive Science summer workshop. Guest Lecturer.
2011	NGG 577, Core IV. Neuroscience graduate group seminar. Course Director.
2011	Psychology 217. Visual Neuroscience, Guest Lecturer.

SERVICE

Conference organizer

2020-present	Organizer, E.A.R.S. monthly seminar series
2019-2024	Co-director, Cajal Course in Computational Neuroscience, Champalimaud, Portugal
2018, 2023	Organizer, Auditory SPLASH meeting, Philadelphia PA
2021	Diversity Committee member, CoSyNe, Lisbon, Portugal
2017	Co-director, eight week KITP workshop. Physics of Hearing, Santa Barbara, CA
2016	General chair, Computational and Systems Neuroscience conference (CoSyNe), Salt Lake City, UT. *CoSyNe is a 6-day long premier international meeting in the field of systems and computational neuroscience, attracting upward of 750 participants*.
2015	Program committee chair, CoSyNe
2013, 2012	Program committee member, CoSyNe
2010-2012	Working group at NIMBioS, Knoxville, TN, member
2009	Abstract reviewer, CoSyNe

Reviewer

Grant Proposals	NIH AUD research grant proposal review panel, permanent member 2018-2024 NIH NIDCD special emphasis review panel, 2018 Israel Science Foundation, 2017, 2018 NIH AUD research grant proposal review panel, 2017 NIH Brain Initiative research grant proposal review panel, 2017 NIH NIDCD Fellowship proposal review panel, 2015, 2016, 2017 Wellcome Trust, 2016, 2019, 2020 Leverhulme Foundation, 2016 NSF-NIH CRCNS review panel, 2013 Keck Foundation, 2011
Journals	*Nature, Nature Human Behavior, Nature Neuroscience, Journal of Neuroscience, Journal of Neurophysiology, Nature Communications, PNAS, PLoS Computational*

Biology (also reviewing editor), PLoS One, Cerebral Cortex, Current Biology, eLife (also reviewing editor).

Service at Penn

2023	Nominating Committee, Academic Senate, member
2023	Committee on Infrastructure, member
2022	Department of Otorhinolaryngology, Faculty Search Committee (2 searches)
2021-present	Computational Neuroscience Initiative, Co-director
2021	Department of Otorhinolaryngology, Tenure Review Committee
2021	Department of Neurology, Faculty Search Committee
2021	Department of Neuroscience, Faculty Mentoring Committee
2020	Department of Psychology GRE Working Group
2020	Department of Otorhinolaryngology Diversity/Equity committee, member
2020	Tenure review committee
2018- present	Computational Neuroscience Initiative seminar organizing committee, member
2017, 2018	MindCORE seminar organizing committee, member
2016	Interdisciplinary Mind/Brain seminar organizing committee, chair
2016	Department of Otorhinolaryngology fellow admissions, interviewer
2012	Department of Otorhinolaryngology resident admissions, interviewer
2015	Department of Otorhinolaryngology Faculty Search committee, member
2015	Neuroscience Graduate Group awards committee, member
2012-2014	Neuroscience Graduate Group admissions committee, member
2012, 2014	Penn CNC grant review committee, member

Service on editorial/advisory boards

2020-	Quanta magazine advisory board member. Advise a general science online magazine on neuroscience content.

Community Outreach

2014, 2015, 2016, 2017	Instructor, Series of workshops on neuroscience with NGG at Independence Charter School, Philadelphia PA.
2016	Discussion participant. Musical experimental performance. Philadelphia, PA
2015	Music Hackathon, New York, NY, presenter
2014, 2015, 2016, 2017	Philadelphia Science Festival, presenter
2014	Instructor, Workshop at Penn Children Center, Philadelphia, PA.

Professional organization memberships

2012-present	American Physiological Society, member
2010-present	Association for Research in Otolaryngology, member
2006-present	AAAS, member
2002-2003	Biophysical Society, member
2001-present	Society for Neuroscience, member

RECENT INVITED TALKS

2023	Association for Research in Otolaryngology, Orlando, FL
	Stony Brook University
	University of North Carolina, Chapel Hill
	University of Southern California, Los Angeles, CA
	New York University, New York, NY
	ODIN workshop, MIT, Cambridge, MA
	Neural Coding and Combinatorics workshop, ICERM, Brown University, Providence, RI
	EMBL Heidelberg, Germany
	Music and the Brain workshop, NIH, Bethesda, MD
2022	Midwestern Auditory Meeting, keynote address
	Pavlovian meeting

	LOOPs seminar
	University of Oregon
	FENS, Workshop on Inhibitory Neurons
2021	York University, Toronto
	University of Illinois in Urbana-Champaign
	Computational and Systems Neuroscience Workshop, Colorado
	University of Oxford, Oxford, UK
	Neuromatch meeting, global
2020	University of Michigan, Ann Arbor, Michigan
	Gordon Research Conference, California
	NEOMED, OH
2019	ARO mid-winter meeting
	Winter BRAIN meeting
	Harvard University, Program in Biophysics, Massachussetts
	Russian Higher School of Economics, Moscow, Russia
	CNRS, France
	Cold Spring Harbor Laboratory, New York
	Janelia HHMI Workshop, Virgina
	University of California, Los Angeles, California
2018	University of Maryland, Biology
	Marine Biological Laboratory, Woods Hole
	Auditory Cortex Gordon Research Conference, invited talk
	University of Pittsburgh, Department of Otolaryngology
	Yale University, Schwartz Center for Computational Neuroscience
	Duke University, Department of Neurobiology
	Columbia University Workshop on Brain Circuits, Memory and Computation
	Spain-US CRCNS workshop, Madrid, Spain
	Champalimaud Research Symposium, Lisbon, Portugal
	Cold Spring Harbor Laboratory Neocortex meeting
	CoSyNe workshop on synaptic plasticity
	Keynote speaker, Sense2Synapse conference, Rockefeller University, New York
	University College London
	University of Crete, Greece
2017	Keynote speaker, University of Washington, Seattle – Allen Institute of Science joint symposium on the brain
	Keynote speaker, University of Southern California, Hearing and Communication Neuroscience Retreat
	Computational and Systems Neuroscience meeting (COSYNE), invited talk
	University of Chicago, Neurobiology
	COSYNE workshop, invited talk
	Cold Spring Harbor Laboratory, Neurobiology
	John Hopkins University, Neurobiology
	Auditory Cortex meeting, Banff, Canada, invited talk
	Bioengineering Department, Penn
	Clinical Neurosciences Training Program, Penn
2016	Birdsong pre-SFN meeting
	Advanced and Perspectives in Auditory Neuroscience, Spotlight Young Investigator Seminar
	Massachusetts Eye and Ear Institute, Harvard University Medical School
	Duke University, Neurobiology
	Human Frontier in Science Program Meeting, Singapore
	Max Planck Institute for Brain Research, Frankfurt, Germany
	Federation of European Neuroscience Societies Forum, Copenhagen, Denmark
	Workshop on Unsolved Problems in Systems Neuroscience, Janelia Farm HHMI

	Imperial College, London
	University College London
	Universite Paris Descartes
	Rutgers University, Neurobiology
	Princeton University, Psychology Colloquium
2015	Keynote speaker, Celebration of Women in Neuroscience, Society for Neuroscience Meeting
	Food for Thought Lunch, University of Pennsylvania
	NYU, Center for Neural Science Colloquium
	University of Oregon, Neuroscience Colloquium
	Klingenstein-Simons Foundation Meeting, NYC
	Georgia Tech, Colloquium
	Emory University, Workshop
	University of Pennsylvania, Computational Neuroscience Initiative
2014	SISSA, Trieste
	University of Texas, Austin
	Hebrew University, Jerusalem, Workshop on Vocalizations
	University of Pennsylvania, Center for Cognitive Neuroscience
	University of Pennsylvania, Food for Thought Lunch
	UCL Ear Institute
	Harvard University Center for Brain Science
2013	University of Pennsylvania, Systems Lab Night
	Society for Neuroscience meeting, Platform presentation
	CoSyNe, Session Chair
	ARO Mid-Winter Meeting, Platform presentation
2012	Caltech
	Eastern Auditory Retreat, Baltimore
	CUNY, Initiative for Theoretical Science
	CoSyNe Workshop
2011	NSF/NIH CRCNS meeting, Princeton University
	NIMBiOS working group
	ARO Mid-Winter meeting, Platform presentation
2010	University of Pennsylvania, Mahoney Institute in Neurological Sciences
	Janelia Farm, Vibrissa meeting, Session chair

MENTORING

Faculty:

Post-doctoral Fellows: Mark Aizenberg, Ph.D. Weizmann Institute (2011 – 2017), Katherine Wood, Ph.D. UCL (2016 –); Linda Garami, Ph.D. Eotvos Lorand University (2017 – 2020); Melanie Tobin, Ph.D. Institut Curie (2018 – 2022), Alexandria Lesicko, Ph.D. UIUC (2018 –); Youngmin Park, Ph.D. University of Pittsburgh (2018 –2019); Natan Vogler, Ph.D. University of Pittsburgh (2020 –); Janaki Sheth (2020 -2023), Matilda Gibbons (2023 --).

Ph.D. students: Omer Zeliger, Neuroscience; Jared Collina, Neuroscience; Aaron Williams, M.D.-Ph.D. Neuroscience (graduated in 2021, now MD at Penn); Xiaomao Ding, Neuroscience; Solymar Rolon Martinez, Neuroscience; Chris Angeloni, Psychology (graduated in 2022, not postdoc at Northwestern); Jennifer Blackwell, Neuroscience (graduated in 2019, now IRACDA fellow at SUNY); John Briguglio, Physics (jointly supervised with Vijay Balasubramanian, graduated 2016, now postdoc at Janelia Farm HHMI); Ryan Natan, Neuroscience (graduated in 2016, Winegrad Award for Outstanding PhD thesis, now postdoc at Janelia Farm HHMI); Isaac Carruthers, Physics (graduated in 2015, now at Quant Consulting, NYC).

Rotation Ph.D. students: Sneha Narasimhan, Neuroscience; Andrew Jaegle, Neuroscience; Aaron Williams, M.D.-Ph.D. Neuroscience; Cedric Xia, M.D.-Ph.D. Neuroscience; Kyra Schapiro, Neuroscience; Daniel Kalamarides, Neuroscience; Harang Ju, Neuroscience; Xiaomao Ding, Neuroscience; David Lozano, Neuroscience; Sophie Rogers, Neuroscience; Simon Bohn, Neuroscience; Tariq Cannonier, Neuroscience; Omer Zelinger, Neuroscience; Jafar Bhatti, Neuroscience; Camilo Andres Guevara Espitia, Neuroscience; Alisha Kodibagkar, Bioengineering.

Medical students: Adetokundo Obayemi (now resident in Otolaryngology at New York Presbyterian)
Undergraduate honors students: Jacinta Arnold ’23, Nitay Caspi '18, Sara Jones ’16 (now MD student at Johns Hopkins), Joshua Margolis ’14 (now at Amazon), Andrew Davis ’13 (now MD student at University of Pennsylvania), Liana Cheung ’12 (now MD student at University of Brisbane).
Undergraduate technicians/summer students: Andrew Chen ’17, Anh Nguyen ’15, Danielle Mohabir ’15, Lisa Liu ’14, General Lee (Case Western), Norbert Cruz (University of Puerto Rico).

Qualifying Exam Committee: Hongfei Ji, Bioengineering; Yue Ji, Neuroscience; Yunshu Fan, Neuroscience; Morgan Taylor, Neuroscience; Adam Gifford, Neuroscience; Matt Churgin, Bioengineering; John Burke, Neuroscience; Opeyemi Obami, Neuroscience; Adeeti Aggarwal, Neuroscience; Kevin Goff, Neuroscience (chair), Ari Benjamin (advisor: Konrad Kording), Barnes Januzzi (advisor: Nicole Rust); Katrina Hacker (advisor: Nicole Rust); Samuel Wechsler (advisor: Vikas Bhandawat, Drexel); Guan-en Graham (advisor: Kasia Bieszczad, Rutgers); Zoe Dobler, UCLA; Sophie Rogers, Penn NGG.

Thesis Committee: Morgan Taylor (advisor: Diego Contreras); Alex Keinarth (advisor: Vijay Balasubramanian); Patrick McClanahan (advisor: Chris Fang-Yen); Adeeti Aggarwal (advisor: Max Kelz); Elelbin Ortiz (advisor: Michael Granato); Matt Schaff (advisor: Yale Cohen); Kevin Goff (advisor: Ethan Goldberg); Guan-En Graham (Rutgers Neuroscience, advisor: Kasia Bieszcad); Harang Ju (advisor: Dani Bassett); Ari Benjamin (advisor: Konrad Kording); Brenna Shortal (advisor: Alex Proekt); Samuel Wechsler (advisor: Vikas Bhandawat, Drexel); Sophie Rogers (advisor: Gregory Corder); Sarah Ferrigno (advisor: Marc Fuccillo).

Ph.D. external examiner: Stephane Deny, Institut de la Vision, Paris VI; Sanchari Gosh, CSHL; Sebastian Ceballo, CNRS.

PRESS INTERVIEWS: Brain Matters (http://brainpodcast.com/page/3), 2014

WHYY feature story on the Pulse (http://www.newsworks.org/index.php/local/the-pulse/70702-ear-researcher-looks-at-how-your-brain-gets-meaning-from-sound), 2014

Burroughs Welcome Fund Focus in Sound interview (http://www.bwfund.org/newsroom/awardee-profiles/focus-sound-maria-geffen), 2014

Behind the CV, 2019, MindCORE: https://youtu.be/iX-iuBnI9Wg

CONFERENCE PRESENTATIONS

Chris Angeloni, Wiktor Młynarski, Eugenio Piasini, Aaron Williams, Katherine Wood, Linda Garami, Ann Hermundstad and Maria Geffen. (2021) Cortical efficient coding dynamics shape behavioral performance. APAN. SFN.

Alexandria Lesicko, Christopher Angeloni, Jennifer Blackwell, Mariella De Biasi and Maria Geffen. (2021) Cortico-fugal modulation of predictive coding. APAN, SFN.

Melanie Tobin, Janaki Sheth, Katherine Wood and Maria Geffen. (2021) Differential function of distinct inhibitory neuronal types in cortical networks. APAN, SFN.

Nathan Vogler, Tyler Ling, Alister Virkler, Violet Tu, Jay Gottfried and Maria Geffen. (2021) Olfactory modulation of cortical responses to sounds. APAN, SFN.

J. SHETH, J. COLLINA, K. P. KORDING, Y. E. COHEN, M. N. GEFFEN. (2021) The interplay between uncertainty and relevance in sound categorization. SFN.

Williams, A., Geffen, M.N. (2020) Sound improves neural encoding of stimulus direction in mouse V1. APAN.

Wood, K.C, Angeloni, C.F., Oxman, K., Clopath, C., Geffen, M.N. (2020) Neuronal activity in sensory cortex predicts the specificity of learning. APAN.

Ding, X., Wood, K.C., Geffen, M.N. (2020) Representations of complex sounds in AC are modulated by temporal context. APAN

Garami, L., Angeloni, C.F., Ding, X., Geffen, M.N. (2020) Predictable Stimulus Encoding in Auditory Cortex. Advances and Perspectives in Auditory Neuroscience

Lesicko, A., Geffen, M.N. (2020) The auditory cortex regulates deviance detection in the inferior colliculus of awake mice. Advances and Perspectives in Auditory Neuroscience

Angeloni, C.F., Wood, K.C., Garami, L., Geffen, M.N. (2020) Efficient coding in auditory cortex determines target detection behavior. Advances and Perspectives in Auditory Neuroscience

Tobin, M., Wood, K.C., Stiso, J., Bassett, D., Geffen, M.N. (2020) Role of interneurons in populations' neural coding and network properties in auditory cortex. Advances and Perspectives in Auditory Neuroscience

Rolón-Martínez, S., Geffen, M. N. (2020) Role of inhibitory neuron types of the TRN in auditory processing. Advances and Perspectives in Auditory Neuroscience

Rolón-Martínez, S., Geffen, Maria N. (2020) Role of inhibitory interneuron types of the TRN on auditory processing. 37. Gordon Research Seminar and Conference on Thalamocortical Interactions, Ventura Beach, 2020.

Tobin, M., Wood, K.C., Ding, X., Geffen, M.N., (2019) Role of interneurons in populations' neural coding in auditory cortex. Workshop "The Operating Regime of Neural Circuits as a Determinant for Computations", Janelia Research Campus, VA 2019

Angeloni, C.F., Ding,X., Geffen, M.N. (2019) Differential roles of somatostatin and parvalbumin-positive interneurons in contrast gain control. Society for Neuroscience meeting, Chicago, IL 574.20

Tobin, M., Wood, K., Ding, X., Geffen, M.N. (2019) Role of interneurons in populations' neural coding in auditory cortex. Society for Neuroscience meeting, Chicago, IL 574.28

Wood, K.C., Betzel, R., Bassett, D.S., Geffen, M.N. Activity in auditory cortex predicts specificity of fear learning. Advances and Perspectives in Auditory Neurophysiology, Chicago, IL 2019

Blackwell, J., Rao, W., Ridolphi-Starr, D., Geffen, M.N. Cortical excitatory and inhibitory neurons differentially affect collicular responses to sound. 394.03. Society for Neuroscience meeting, San Diego, CA 2018.

Garami, L., Angeloni, C., Wood, K.C., Geffen, M.N. Neurons in auditory cortex are sensitive to frequency pattern violation. 394.11. Society for Neuroscience meeting, San Diego, CA 2018.

Rolón-Martínez, S., Aizenberg, M., Geffen, M. N. Amygdala-TRN projections amplify tone-evoked activity in auditory thalamus and cortex. 573.25. *Platform presentation.* Society for Neuroscience meeting, San Diego, CA 2018.

Wood, K., Betzel, R., Bassett, D. S., Geffen, M. N. Reorganization of cortical population neuronal activity following auditory fear conditioning. 574.05. Society for Neuroscience meeting, San Diego, CA 2018.

Angeloni, C.F., Geffen, M.N. Increased cortical gain facilitates the detection of targets in noise. 766.21. Society for Neuroscience meeting, San Diego, CA 2018.

Wood, K.C., Bassett, D.S., Geffen, M.N. Reorganization of cortical population neuronal activity following auditory fear conditioning. Computational and Systems Neuroscience meeting, Denver, CO, 2018.

Rolon-Martinez, S., Aizenberg, M., Geffen, M.N. Amygdala-TRN projections amplify tone-evoked activity in auditory thalamus and cortex. Computational and Systems Neuroscience meeting, Denver, CO, 2018.

Wood, K.C., Betzel, R.F., Angeloni, C.F., Aizenberg, N., Bassett, D.S., Geffen, M.N. Auditory fear conditioning drives changes in frequency representation and functional organization of neuronal populations in the auditory cortex. Society for Neuroscience meeting, Washington, D.C. 2017. Also poster presentation at Advances and Perspectives in Auditory Neurophysiology, Washington, D.C. 2017.

Betzel, R.F., Wood, K.C., Angeloni, C.F., Geffen, M.N., Bassett, D.S. Meso-scale structure and quotidian variation of neuronal networks estimated from two-photon imaging of mouse auditory cortex. Society for Neuroscience meeting, Washington, D.C. 2017.

Angeloni, C., Aizenberg, M., Geffen, M.N. Robust discrimination of sounds embedded in noise by adapting cortical gain. Society for Neuroscience meeting, Washington, D.C. 2017. Also poster presentation at Advances and Perspectives in Auditory Neurophysiology, Washington, D.C. 2017.

Angeloni, C., Aizenberg, M., Geffen, M.N. Cortical gain adaptation to extract signals from background noise. Computational and Systems Neuroscience meeting, Salt Lake City, UT, 2017.

Blackwell, J., Aizenberg, M., Rao, W., Natan, R.G., Geffen, M.N. Activating distinct neuronal subtypes in auditory cortex differentially affects collicular responses. Computational and Systems Neuroscience meeting, Salt Lake City, UT, 2017. Also presented at Auditory Cortex meeting, Banff, Canada, 2017.

Natan, R.G., Rao, W., Geffen, M.N. Adaptation in auditory cortex is actively shaped by somatostatin-positive and not parvalbumin-positive interneurons. Society for Neuroscience meeting, San Diego, CA, 2016. 51.13. Also poster presentation at Advances and Perspectives in Auditory Neurophysiology, San Diego, CA, 2016.

Blackwell, J., Aizenberg, M., Mwilambwe-Tshilobo, L., Jones, S., Natan, R.G., Geffen, M.N. Two types of interneurons differentially modulate behavioral frequency discrimination acuity. Society for Neuroscience meeting, San Diego, CA, 2016. 51.18. Also poster presentation at Advances and Perspectives in Auditory Neurophysiology, San Diego, CA, 2016.

Gervain, J., Werker, J.F., Black, A., Geffen, M.N. The neural correlates of processing scale-invariant environmental sounds in infancy. Boston University Conference on Language Development, Boston, MA, 2016.

Gervain, J, Geffen, M.N. Speech Perception: A new perspective from efficient neural coding. HFSP meeting. Singapore. 2016.

Geffen, M.N. Dynamic modulation of auditory acuity by circuits in the auditory cortex. FENS meeting, Copenhagen, 2016.

Natan, R.G., Xia, C.H., Rao, W., Geffen, M.N. Cortical adaptation is actively shaped by somatostatin-positive and not parvalbumin-positive neurons. Computational and Systems Neuroscience meeting, Salt Lake City, UT, 2016.

Xia, C.H., Natan, R.G., Rao, W., Geffen, M.N. Two subtypes of interneurons complementarily mediate behavioral detection of deviant sounds. Computational and Systems Neuroscience meeting, Salt Lake City, UT, 2016.

Blackwell, J., Aizenberg, M., Mwilambwe-Tshilobo, L., Jones, S., Natan, R.G., Geffen, M.N. Two types of cortical interneurons differentially modulate behavioral frequency discrimination acuity. Computational and Systems Neuroscience meeting, Salt Lake City, UT, 2016.

Natan, R.G., Briguglio, J., Mwilambwe-Tshilobo, L., Goldberg, E.M., Geffen, M, N. Multiple mechanisms for stimulus-specific adaptation in the primary auditory cortex. Society for Neuroscience meeting, Chicago, IL, 2015 57.07/J1. Also poster presentation at Advances and Perspectives in Auditory Neurophysiology, Chicago, IL, 2015.

Blackwell, J., Aizenberg, M., Mwilambwe-Tshilobo, L., Jones, S., Natan, R.G., Geffen, M.N. Two types of interneurons differentially modulate tone-evoked responses in the primary auditory cortex. Society for Neuroscience meeting, Chicago, IL, 2015 N226-652.04. Platform. Also presented at Advances and Perspectives in Auditory Neurophysiology, Chicago, IL, 2015.

Geffen, M.N., Cabrera, L., Werker, J.F., Gervain, J. The perception of natural sounds: an efficient neural coding perspective. Auditory Development, Seattle, WA, 2015

Natan, R.G., Briguglio, J., Mwilambwe-Tshilobo, L., Geffen, M, N. Multiple mechanisms for stimulus-specific adaptation in the primary auditory cortex. Computational and Systems Neuroscience meeting, Salt Lake City, UT, 2015.

Aizenberg, M., Mwilambwe-Tshilobo, L., Geffen, M.N. Cortical inhibition regulates frequency discrimination acuity and specialization of emotional learning. Platform Presentation, Society for Neuroscience Meeting, Washington, DC, 2014. Platform. Also platform presentation at Advances and Perspectives in Auditory Neurophysiology, Washington, DC, 2014.

Mwilambwe-Tshilobo, L., David, A.J.O., Geffen, M.N. Effects of noise-induced tinnitus on frequency discrimination acuity in mice. Society for Neuroscience Meeting, Washington, DC, 2014. Also presented at Advances and Perspectives in Auditory Neurophysiology, Washington, DC, 2014.

Briguglio, J., Natan, R.G., Mwilambwe-Tshilobo, L., Geffen, M, N. Effects of local inhibition on stimulus-specific adaptation across laminae of primary auditory cortex. Society for Neuroscience Meeting, Washington, DC, 2014. Also presented at Advances and Perspectives in Auditory Neurophysiology, Washington, DC, 2014. One of 3 posters selected for travel award at APAN.

Natan, R.G., Mwilambwe-Tshilobo, L., Geffen, M.N. The role of local inhibitory interneurons in stimulus-specific adaptation in primary auditory cortex. Computational and Systems Neuroscience meeting, Salt Lake City, UT, 2014. Platform presentation.

Carruthers, I.A., Natan, R.G., Jaegle, A.C., Mwilambwe-Tshilobo, L., Geffen, M.N. Noise correlations and invariance to basic acoustic transformations of vocalizations in the auditory cortex. Society for Neuroscience Meeting, 214.04, San Diego, CA 2013. Platform Presentation. Also presented at: Advances and Perspectives in Auditory Neurophysiology, San Diego, CA 2013, Computational and Systems Neuroscience meeting, Salt Lake City, UT, 2014. Platform.

Natan, R.G., Carruthers, I.A., Geffen, M.N. Cellular and laminar specificity of stimulus-specific adaptation in the primary auditory cortex. Society for Neuroscience Meeting, 354.03, San Diego, CA 2013. Also presented at: Advances and Perspectives in Auditory Neurophysiology, San Diego, CA 2013.

Geffen, M.N. Specialization of the auditory cortex for temporal statistics of communication signals. Association for Research in Otolaryngology, Mid-Winter Meeting, Baltimore, MD 2013. Platform

Natan, R.G., Carruthers, I.A., Geffen, M.N. Adaptation to temporal correlation in the primary auditory cortex. Society for Neuroscience meeting, New Orleans, LA, 2012. Also presented at: Advances and Perspectives in Auditory Neurophysiology, New Orleans, LA, 2012; Eastern Auditory Retreat meeting, College Park, MD, 2012.

Carruthers, I.A., Natan, R.G., Geffen, M.N. A specialized mechanism for encoding con-specific vocalizations in the auditory cortex. Society for Neuroscience meeting, New Orleans, LA, 2012. Also presented at: Advances and Perspectives in Auditory Neurophysiology, New Orleans, LA, 2012; Eastern Auditory Retreat meeting, College Park, MD, 2012; Gordon Research Conference Auditory Systems, Lewiston, ME, 2012; Auditory Cortex, Lausanne, Switzerland, 2012.

Aizenberg, M., Geffen, M.N. Differential modulation of perceptual acuity by coarse and fine discriminative auditory fear conditioning. Society for Neuroscience meeting, New Orleans, LA, 2012. Also presented at: Advances and Perspectives in Auditory Neurophysiology, New Orleans, LA, 2012, Platform; Eastern Auditory Retreat meeting, College Park, MD, 2012; Gordon Research Conference Auditory Systems, Lewiston, ME, 2012.

Gervain, J., Werker, J.F., Geffen, M.N. Infants' perception of naturalness in water sounds: the role of scale-invariance. International Conference on Infant Studies Minneapolis, Minnesota, 2012.

Natan, R.G., Carruthers, I.A., Geffen, M.N. Adaptation to spectro-temporal correlation in the primary auditory cortex. Computational and Systems Neuroscience meeting, Salt Lake City, UT, 2012.

Carruthers, I.A., Natan, R.G., Geffen, M.N. Encoding of ultra-sonic vocalizations in the rodent primary auditory cortex. Computational and Systems Neuroscience meeting, Salt Lake City, UT, 2012.

Carruthers, I.A., Natan, R.G., Laplagne, D.A., Geffen, M.N. Encoding of ultra-sonic vocalizations in the rodent primary auditory cortex. Society for Neuroscience meeting, Washington, DC, 2011. Also presented at: APAN, Washington, DC 2011.

Laplagne, D.A., Geffen, M.N. Neurons in the auditory cortex adapt to the global temporal structure of the stimulus. Vibrissa meeting, JFRC/HHMI, Ashburn, VA, 2010. Also presented at APAN, San Diego CA, 2010.

Geffen, M.N., Taillefumier, T., Magnasco, M.O. The mammalian auditory cortex encodes information about global statistics of naturalistic sounds. Society for Neuroscience meeting, Chicago, IL 2009.

Geffen, M.N., Magnasco, M.O. Statistical analysis of natural sounds. Computational and Systems Neuroscience meeting, 2008. Salt Lake City, UT. Also presented at: Gordon Research Conference: Sensory Processing and the Natural Environment. Luca, Italy, 2008.

Geffen, M.N., Broome, B., Laurent, G., Meister, M. Temporal dynamics in the early olfactory system. Gordon Research Conference, Neural systems and plasticity, Newport, RI, 2007.

Neimark, M.A., Meister, M. Dynamic modulation of On and Off inputs to a retinal ganglion cell. Society for Neuroscience meeting, Washington, DC, 2005. Also presented at Gordon Research Conference, Neural Systems and Plasticity, Newport, RI, 2005.

Neimark, M.A., Meister, M. Salamander ganglion cell identity as on or off is determined by balance of differential inhibition on the two pathways. Computational and Systems Neuroscience meeting, Salt Lake City, UT, 2004.

Neimark, M.A., Meister, M. The classical receptive field of retinal ganglion cells changes from On to Off due to a peripheral shift. Society for Neuroscience meeting, San Diego, CA, 2004.

Neimark, M.A., Meister, M. Retinal Ganglion Cells Convert From OFF-type to ON-type During a Visual Saccade. Society for Neuroscience meeting, New Orleans, LA, 2003. Also presented at Gordon Research Conference: Neural Systems and Plasticity, Newport, RI, 2003.

Neimark, M.A., Andermann, M.L., Hopfield, J.J., Moore, C.I. A model of Texture Encoding by Vibrissa Resonance Properties, Society for Neuroscience Meeting, Orlando, FL 2002. Also presented at Barrels conference, San Diego, CA, 2001.