June 18, 2024

Jennifer M. Groh

Duke University
LSRC Rm B203
Box 90999
Durham NC 27708

Phone: 919-681-6536
Email: jmgroh@duke.edu
http://www.duke.edu/~jmgroh/
ORCID ID : 0000-0002-6435-3935

Academic Positions

2011-present	Professor (primary), Department of Psychology and Neuroscience, Duke University Professor (primary), Department of Neurobiology, Duke University Professor (core), Center for Cognitive Neuroscience, Duke University
2019-present	Professor (secondary), Department of Biomedical Engineering, Duke University Professor (secondary), Department of Computer Science, Duke University
2011	Co-director, Duke Institute for Brain Sciences (interim), Duke University
2006-2011	Associate Professor, Department of Psychology and Neuroscience, Department of Neurobiology, Center for Cognitive Neuroscience, Duke University
2004-2006	Associate Professor, Department of Psychological and Brain Sciences, Center for Cognitive Neuroscience, Dartmouth
1997-2004	Assistant Professor, Department of Psychological and Brain Sciences, Center for Cognitive Neuroscience, Dartmouth.

Education

1994-1997	Stanford University, Postdoctoral Fellow in Neurobiology Supervisor: Dr. William T. Newsome
1989-1993	University of Pennsylvania, PhD in Neuroscience Advisor: Dr. David L. Sparks Thesis title: Coordinate transformations, sensorimotor integration, and the neural basis of saccades to somatosensory targets.
1988-1989	University of Michigan, MS in Neuroscience
1984-1988	Princeton University, AB *Summa cum laude* in Biology

Summer Courses Attended

1994	"Computational Vision", Cold Spring Harbor Laboratory
1991	"Methods in Computational Neuroscience", Woods Hole Marine Biological Laboratories

Honors and Awards

2024	Keynote Address: International Multisensory Research Forum, Reno NV
2022	Keynote Address: 7th International Conference on Auditory Cortex, Magdeburg Germany
2021	Presidential Symposium, Association for Research in Otolaryngology Midwinter Meeting
2020	Keynote Address: Primate Neurobiology Conference, Tuebingen, German, March 2020 (to be rescheduled)
2019	Keynote Address: European Conference on Eye Movements, Alicante, Spain (August 2019)
2018	Keynote Address: University of Southern California Human Communication Neuroscience annual retreat, Catalina Island, April 30-May 1, 2018.

2017 Keynote Address: Advances and Perspectives in Auditory Neuroscience, Washington DC
2015 *Making Space: How the Brain Knows Where Things Are:* rated "Best of the Best" of the University Presses (American Library Association); rated "Outstanding" by American Association of School Librarians (American Library Association); rated "Outstanding" by Reference and User Services Association (American Library Association)
2015 Keynote Address, Gordon Research Conference on Oculomotor System Biology
2012 Thomas Langford Lecture, Duke University
2009 John Simon Guggenheim Fellowship for book *Making Space: How the Brain Knows Where Things Are* (Harvard University Press, 2014)
2007 Kavli Frontiers of Science Fellow
2002 EJLB Foundation Research Grant
2001 The Walter and Constance Burke Research Initiation Awards for Junior Faculty, Dartmouth
1999 ONR Young Investigator Program Award
1999 John Merck Scholarship in the Biology of Developmental Disabilities in Children
1998 Alfred P. Sloan Foundation Research Fellowship
1998 McKnight Scholar Award
1998 Whitehall Foundation Research Grant
1994 Helen Hay Whitney Postdoctoral Fellowship
1994 Joanne S. Diamond Award Lecture in Behavioral Neurobiology, Duke University
1992 Alfred N. Richards Predoctoral Fellowship in Biomedical Science, University of Pennsylvania
1989 National Defense Science and Engineering Graduate Fellowship
1988 Senior Book Prize in Biology, Phi Beta Kappa; Sigma Xi; Princeton University
1988 National Science Foundation Graduate Fellowship
1987 National Science Foundation summer research fellowship

Research Grants and Contracts

Active:

NIH (NIDCD) R01 DC017532 "Multisensory Processes in the Mechanics of Hearing", approx. $1,710,094 4/1/2019-3/31/2024, **PI: Groh.**
NIH (NIDCD) R01 "Mechanisms of Oculomotor Influences on Hearing" approx $2,957,272, 5 years, 4/1/2022-3/31/2027. **PI Groh**, coI D. Kaylie, C. King (Duke).
NIH (NINDS) R01 "Information Preservation in Neural Codes", approx $3,589,521, 5 years, 2022-2027, PIs **Groh**, S. Tokdar

Previous:

NIH (NIDCD) R21 DC019826-01A1 "Causal contribution of a corticofugal pathway to auditory perception" PIs Y. Cohen (U Penn), **Groh**.
NIH (NIDCD) R01 DC016363 "Spatial Information Codes", approx. $1,646,896, 5 years, 7/1/2017-6/30/2022. NCE to 6/30/2023 **PIs Groh,** S. Tokdar
NIH (NIDCD) R01 DC013906 "Information in Limited Capacity Neural Codes", approx. $1,649,678, 5 years, 12/1/2014-11/30/2019. **PI: Groh**; co-I: Tokdar (Duke, Statistics).
NIH R13: 2018 Gordon Research Conference: Neurobiology of Cognition. PI: Groh. $23,950
NSF: 2018 Gordon Research Seminar: Neurobiology of Cognition. PI: Groh. $25,200
John Merck Scholarship in the Biology of Developmental Disabilities in Children, $240,000, 1999-2017 (no cost extension) PI: **Groh.**

NIH (NINDS) R01 NS50942-05, "CRCNS: Integrative Information Processing", approx. $1,706,250, 5 years, 2009-2014, PI: **Groh**

NSF 0924750 "Neural basis of the perception of sound location", approx. $700,000, 4 years, 2009-2013, PI: **Groh**.

National Organization for Hearing Research Foundation, "The role of the inferior colliculus in auditory perception: implications for prosthetic design". $20,000, 2009-2010, PI**: Groh**

Duke Institute for Brain Sciences Research Incubator Award: "Feasibility Studies of the Inferior Colliculus as a Prosthetic Site", 1 year, 2009-2010. PI: **Groh**, with Cant, Grill, Tucci and Wilson.

NEI R13, "2007 (Oculomotor System Biology) Gordon Conference", $30,000. PI: Neeraj Gandhi; coPI: **Groh**.

NEI R01EY016478-01 "Visual signals in auditory midbrain", approx. $1,758,900, 5 years, 2006-2011, PI: **Groh.**

NSF 0415634 "Eye position and the neural basis of sound localization", approx. $591,875, 4 years, 2005-2009, PI: **Groh.**

NEI R13 EY016649-01 "2005 (Oculomotor System Biology) Gordon Conference", $20,000, 2005-2006, PI: Neeraj Gandhi; **coPI: Groh**.

NIH (NINDS) R01 NS50942-01, "Integrative Information Processing", approx. $922,674, 4 years, 2004-2008, PI: **Groh** (renewed; see above)

EJLB Foundation Grant, "Frames of Reference in the Auditory Pathway" $300,000 CAN, 2002-2004, PI: **Groh.**

ONR Young Investigator Program Grant, "Neural algorithms for sensor fusion" $343,000, 1999-2002, PI: **Groh.**

NINDS Program project grant (PI of project 2) (NIH NS 17778-19) "Program in Cognitive Neuroscience", "Cortical substrates of multisensory integration".1999-2005, Overall PI: Gazzaniga, PI of project 2: **Groh**

Alfred P. Sloan Research Fellowship, $35,000, 1998-2000, PI: **Groh.**

Whitehall Foundation Research Grant, "Coordinate transformations of spatial information" $225,000, 1998-2001; renewal $150,000 2001-2004, PI: **Groh.**

McKnight Scholar Award, $150,000, "Neural Coordinate Transformations" 1998-2011 PI: **Groh.**

Professional Affiliations

Society for Neuroscience
International Brain Research Organization
Association for Research in Vision and Ophthalmology
American Physiological Society

Professional Activities

Society Committee Service, Reviewing, Editorial Activities:

Board of Reviewing Editors, *eLife* (2020-present)
Editorial Board, Multisensory Research (~2019-present)
Advisory Board, Oxford Research Encyclopedia of Neuroscience (2019-present)
Senior Editor, Oxford Research Encyclopedia of Neuroscience (2017-2019)

External Review Committee, University of Pennsylvania, Neuroscience Graduate Program (May 2013).
Member, Society for Neuroscience Program Committee, 2009-2012
Member, Advances and Perspectives in Auditory Neuroscience Program Committee, 2009-2012
Member, Society for Neuroscience Committee on Animal Research, 2006-2009
Reviewer for:

Nature, Nature Neuroscience, Neuron, Journal of Cognitive Neuroscience, Journal of Neuroscience, Journal of Neurophysiology, Biological Cybernetics, Experimental Brain Research, Journal of Comparative Neurology, European Journal of Neuroscience, Behavioral Brain Research, Vision Research, Current Biology, Perception, Hearing Research, PLOS One, Journal of the Acoustical Society of America, PLOS One, eNeuro

Associate Editor, Frontiers in Integrative Neuroscience (through 2020)

NIH Service and Grant Reviewing

Member, National Institutes of Mental Health Board of Scientific Counselors (2020-present) (review of intramural program, 3X/year)
Ad Hoc member of COG, AUD, CVP, IFCN-E-02, CRCNS and Brain Initiative panels for NIH, misc. NSF panels, 1998-present
Member COG study section, 2006-2010.
John Simon Guggenheim Foundation, 2015-2021

Conferences and Symposia:

Co-Chair, 2018 Gordon Conference on the Neurobiology of Cognition, with David Leopold.
Moderator, Cerebral Cortex 3.0, Ernst Strungmann Forum, 2018
Organizer and Chair of Symposium “Multiple senses, multiple stimuli: matching sights and sounds at the cocktail party”, International Multisensory Research Forum, 2015.
Organizer and Chair of Symposium "Maps and Meters for Sound Location", Society for Neuroscience Annual Meeting 2013.
Chair, Gordon Conference on Oculomotor System Biology. With Neeraj Gandhi. June 2007
Chair, Cosyne Workshop. “Parietal cortex: function and computations”. With Yale Cohen. March, 2006.
Co-Chair. *Society for Neuroscience* Minisymposium. Going beyond “auditory” in auditory cortex. With Jonathon Fritz. October, 2006.
Vice-Chair, Gordon Conference on Oculomotor System Biology, June 2005
Organizer and Chair of Symposium "How our eyes affect our ears: visual intrusions into the domain of hearing", Society for Neuroscience, 2001.
Organizer and Chair of Symposium "Interpreting Neural Activity", Cognitive Neuroscience Society Meeting, 1999
Invited participant, 10th Annual Frontiers of Science Symposium, National Academy of Sciences, Irvine, CA, 1998

Advocacy:

Active supporter of BiasWatchNeuro, a group focused on reducing the impact of bias in neuroscience

Invited Presentations and Colloquia

Computing the location(s) of sound(s) in the visual scene:

Colloquium, Columbia University, September 2023
Colloquium, Carnegie Mellon University, September 2023
Speaker, Gordon Conference on Eye Movements, July 2023
Colloquium, University of California, Davis, April 2023
Colloquium, Stanford University, April 2023
Colloquium, Baylor College of Medicine, March 2023
Colloquium, Johns Hopkins University, February 2023

Upcoming: Columbia University Theory Series (March 2023),
Upcoming: University of Texas at Austin (March 2023).

Miscellaneous:

Computational Vision Summer course, Cold Spring Harbor, July 2022; July 2024 (upcoming)
COSYNE workshop "Brain-Score Competition 2022", Lisbon, Portugal, March 2022
COSYNE workshop "What are your coordinates? Domain-general neural computations underlying coordinate transformations", Lisbon, Portugal, March 2019
Panelist: "The relation between psychology and neuroscience", Cognitive Neuroscience Society annual meeting, San Francisco, March 2019.

"Noises your ears make when your eyes move", the Dora Angelaki Lecture in the Senior Women in Science lecture series, Duke University

"Hearing in a world of light: why, where, and how visual and auditory information are connected by the brain"

Colloquium, Head Neck Surgery and Communication Sciences, Duke University, Jan 2022
Colloquium, Duke Institute for Brain Sciences, March, 2022

Presidential Symposium, Association for Research in Otolaryngology Midwinter Meeting, Feb 2021
Colloquium, International Multisensory Talk Series, Fall 2021
Colloquium, TU Dresden, Spring 2021
Colloquium, Hebrew University, Fall 2020
Colloquium, University of California, San Francisco, Fall 2019
Colloquium, Emory University, Fall 2019
Colloquium, University of Pittsburgh, Fall 2019
Keynote address, European Conference on Eye Movements, Alicante, Spain, August 2019
Audiology Grand Rounds, Duke University, May 2019
Smokes Cognition and Neuroscience Symposium (SCANS) Asheville NC, April 2019
UNC-Greensboro, Dept. of Psychology, February 2019
TEDx event (hosted by East Chapel Hill High School), January 2019
National Institute of Deafness and Communication Disorders Council Meeting, January 2019
Duke University, Dept of Computer Science, Nov 2018
Duke University, Dept. of Neurobiology, Oct 2018
University of North Carolina, Chapel Hill, Oct 2018

Johns Hopkins University, Dept of Neuroscience, Oct 2018
University of Rochester, Sept, 2018
Keynote address, University of Southern California Human Communication Neuroscience annual retreat, Catalina Island, April 30-May 1, 2018.
McGill University, Department of Physiology, February, 2018
York University, Departments of Psychology & Biology, January 2018
Public talk: "Larger Than Life Science", LaunchBio, Durham NC, April 2018
Keynote address, Advances and Perspectives in Auditory Neuroscience, November, 2017

"How do neurons do more than one thing at a time?"
MIT, Design and Computation group, March 2017
Duke University, Dept of Psychology and Neuroscience, January 2017
Ernst Strüngmann Institute, Frankfurt, Germany, 2016
Max Planck Institute, Gottingen, Germany, 2016
Neurospin, France, 2015
Ecole Normale Superieure, Paris, France, 2015

"Looking at sounds: neural computations for associating visual and auditory events"
University of Hamburg, December 2016
Boston University, January 2014
Duke University, Center for Cognitive Neuroscience, September 2013
Washington University in St Louis, March 2011
Medical College of Georgia, February 2010
University of British Columbia, Department of Computer Science, September 2009
North Dakota State University, Department of Psychology, January 2009.
Barrow Neurological Institute, March, 2008
University of North Carolina, Department of Psychology, March, 2008
Johns Hopkins University, Department of Otolaryngology, April, 2008
University of Rochester, October, 2008
North Carolina State University, Department of Electrical and Computer Engineering, October 2006
University of Oregon, February, 2005
University of Maryland, February, 2005
Yale University, February, 2005
University of California, Berkeley, April, 2005
University of Michigan, May, 2005
Columbia University, September, 2005
Boston University, September, 2005
Duke University, Center for Cognitive Neuroscience, September, 2005
Duke University, Dept. of Psychological and Brain Sciences, November, 2005.
University of Pittsburgh, November, 2005
Queen's University, Kingston, Ontario, Canada, Sept, 2004
Massachusetts Institute of Technology, Nov, 2004

"Frames of reference and multisensory integration"
Dartmouth Medical School, Dept. of Physiology, April 2004
City University of New York, May, 2004
University of Texas, Austin, January 2004

Baylor College of Medicine, January 2004
Stanford University Dept. of Neurobiology, January 2004
University of California, San Francisco, January 2004
University of California, Davis, January 2004
National Institutes of Health, May, 2003
Massachusetts Institute of Technology, 2nd Annual McGovern Symposium, 2003
University of Connecticut, 2002
Rutgers University, 2002
Harvard University, 2001
New York University, 2001
Princeton University, 2000

"How the brain processes information"
Carnegie Mellon University, Center for the Neural Basis of Cognition, 1998

"How is a velocity signal extracted from MT?"
Cold Spring Harbor Laboratory, Computational Vision Course, 1998

"How are sensory maps read out? Effects of stimulating visual cortex on eye movements"
Cornell University, Dept. of Psychology, 1997
Cornell University, Dept. of Neurobiology and Behavior, 1997
Bowman-Gray School of Medicine, Department of Neurobiology and Anatomy, Wake Forest University, 1996.
Salk Institute, San Diego, 1996.
Stanford University, Department of Psychology, February 1996.
Harvard University, Department of Neurobiology, February 1996.
University of Chicago, Department of Organismal Biology and Anatomy, 1996.
Oxford University, Department of Physiology, Oxford, England, 1996.
University of California, Berkeley, Department of Molecular and Cellular Biology, 1996.
University of California, Berkeley, Department of Psychology, 1996.
Washington University, Department of Neurobiology and Anatomy, 1996.
Brown University, Department of Psychology, 1996.
Brown University, Department of Neuroscience, 1996
Georgetown University, Georgetown Institute for Cognitive and Computational Science, 1996.
City College of New York, Department of Biology, 1996.
Rockefeller University, 1996.
Columbia University, 1996.
Duke University, Department of Neurobiology, 1996.
University of California, Los Angeles, Brain Research Institute, 1996.
University of California, Los Angeles, Dept. of Psychology, 1996.
University of Rochester, Center for Visual Science, 1996
Dartmouth College, Dept. of Psychology, 1996
University of California, San Francisco, 1995.
University of California, San Diego, 1995.

"Sensorimotor integration for saccades and smooth pursuit."
Smith-Kettlewell Institute, 1995.

"Translating auditory and somatosensory signals into an eye-centered frame of reference."
Washington University, Computation and Neural Systems Seminar Series, 1994.
Office of Naval Research, Workshop on Sensor Fusion, National Academy of Sciences, Woods Hole, MA, 1994.

"Saccades to somatosensory targets: behavioral characteristics and collicular signals."
Stanford University, Department of Psychology, 1994.

"Effects of microstimulation in MT on saccades and smooth pursuit eye movements."
Stanford University, Department of Neurobiology, 1994.

"Transforming sensory signals into motor coordinates for generating eye movements."
Duke University, Department of Neurobiology, 1994.

"Oculomotor coordinate transformations: auditory models and somatosensory experiments."
Stanford University, Department of Neurobiology, 1993.
The Salk Institute, 1993.

"Two models for translating auditory signals from head-centered to eye-centered coordinates."
Medical College of Virginia, Department of Physiology, 1992.

Teaching

Duke University:
"Interdisciplinary Computing (Computer Science 102). Spring 2020.
"Computing and the Brain" (Neuro 103/Computer Science 103). Spring 2016 (as special topics Neuro 290); Spring 2017. New course developed with Prof Owen Astrachan, Computer Science.
"Perception and the Brain" (Psychology 182/308L), Spring 2007, Fall 2007, Fall 2008, Fall 2010, Spring 2012, Spring 2014, Spring 2019, Spring 2021, Spring 2022, Spring 2023
"Current Research in Neuroscience" (Neurosci 499S); Spring 2013, Spring 2015
Coursera course, "The Brain and Space", spring, fall 2014; winter 2015, spring 2015, fall 2015, then running continuously. Total enrolled students: ~89,000 (as of 12/31/2016).
Coursera "Specialization" Capstone Course, Neuroscience: Perception, Action, and the Brain, summer 2015.
Course director, Concepts in Neuroscience II, Neurobiology, Spring 2013, 2014.
Co-Instructor, Sensory Processing module in Concepts in Neuroscience II. Spring 2015, 2017, 2018, 2019. 2020, 2021, 2022, 2023
Lectures in "Frontiers in Neurobiology" 2007, 2008, 2009, 2010.
Lectures in "Foundation of Behavior/Computational Neuroscience" (Psy 380S); Fall 2007, Fall 2009, Fall 2011, Fall 2013, Fall 2015
Neuroscience of Cognition and Culture (Neurosci 290A, a.k.a. The Cultured Brain; Duke Neurohumanities in Paris), Summer 2013
Lectures in "Principles in Cognitive Neuroscience I" (Psychology 759S) Fall 2010, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022
Lectures in "Concepts in Cognitive Neuroscience II" (Psychology 760S) Spring 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019
Lectures/Labs in "Neurobiology Boot Camp", Fall 2010, 2011, 2012, 2015, 2016, 2017, 2018, 2019, 2021, 2022

Lectures in Psychology & Neuroscience Professional Development proseminar Fall 2006, 2012
Lectures in "Frontiers in Neuroscience" (Neurobio 325) Fall 2006, 2007, 2008, 2009, 2010, 2011
Lectures in BME 256, Neural Prosthetics, Fall 2010, Fall 2012, Fall 2014
"Neural Basis of Visual Perception" (Neurobio 257), Spring 2007 (team-taught)

Dartmouth College:
"Sensory Psychology - laboratory", (Psychology 64), Winter 1999, Winter 2001, Winter 2002, Winter 2004, Winter 2005, Winter 2006
"Methods in Data Analysis", (Psychology 111), Spring 2003, Fall 2003
"Memory and Brain", (Psychology 51) Spring 1998; Fall 1998, Spring 2005
"Proseminar - Neural Science I", (Psychology 113), Spring 1998*, Fall 1998*, Winter 2000, Fall 2000*, Spring 2003, Spring 2004*
* = course organizer
"Perception", (Psychology 21), Spring 2001

Undergraduate, graduate, and postdoctoral advising:

A. Postdoctoral Fellows:

2018-present Dr. Cynthia King (Research Scientist)
2020 Dr. Jeff Mohl
2021 Dr. Shawn Willett
2010-2018 Dr. Valeria Caruso
2008-2012 Dr. Jung Ah Lee
2007-2011 Dr. Deborah Ross
2007-2009 Dr. Joost Maier
2006-2008 Dr. Norbert Kopco
2000-2006 Dr. Uri Werner-Reiss
2000-2006 Dr. Ryan Metzger

B. Graduate Advising:

<u>PhD Students Advised:</u>

2021-present Justine Shih – Cognitive Neuroscience Admitting Program
2021-present Jesse Herche – Neurobiology, MD-PhD program
2020-present Stephanie Schlebusch – Psychology and Neurosience
2019-present Meredith Schmehl - Neurobiology
2016-2020 David Murphy – Cognitive Neuroscience Admitting Program/Psychology and Neuroscience
2015-2020 Jeffrey T. Mohl - Neurobiology
2014-2020 Shawn Willett – Cognitive Neuroscience Admitting Program/Neurobiology
2012-2016 Dan Pages – Psychology and Neuroscience (2008-2010, Neurobiology program)
PhD Dissertation: Stimulus Integration and Parsing in the Auditory Midbrain
2010-2016 Kurtis Gruters, Psychology and Neuroscience
PhD Dissertation: Non-auditory Influences on the Auditory Periphery
2005-2010 David Bulkin - Neurobiology
PhD Dissertation: Functional Mapping of the Macaque Inferior Colliculus

2000-2004 Kristin Kelly Porter
PhD Dissertation: The Representation of Auditory Space in the Auditory Pathway of Primates
1999-2004: O'Dhaniel Mullette-Gillman (jointly advised with Prof. Yale Cohen)
PhD Dissertation: Representation of Auditory and Visual Signals in the Parietal Sulcus of Rhesus Macaques

Other:
2022-present Yuchen Cao – Computer Science (masters program)
2013 Isaac Dweck – Biomedical Engineering (masters program)
2009-2010 Sydney Koke – Psychology and Neuroscience

Thesis/Prelim committees:

2006-present (Duke)

Completed:

Michael Lindon	Statistics
Jonathon Winkle	Psychology and Neuroscience
Hrishikesh Rao	Biomedical Engineering
Hanna Oh	Psychology
Stephen Adamo	Psychology and Neuroscience
Mark Rossi	Psychology and Neuroscience
Anders Nelson	Neurobiology
Huimeng Lei	Neurobiology
Klaus Libertus	Psychology and Neuroscience
Ruey-Kuang Cheng	Psychology and Neuroscience
Stephen Shepherd	Neurobiology
Sarah Donohue	Neurobiology (IPCN – Interdisciplinary Program in Cognitive Neuroscience)
Sarah Heilbronner	Neurobiology (IPCN)
Betsy Johnson/Sumner	Neurobiology
Nick DeWind	IPCN
Drew Marticorena	IPCN
Geoff Adams	IPCN
Marissa Gamble	Psychology and Neuroscience
Bon Mi Gu	Psychology and Neuroscience
Charlie Giattino	Psychology and Neuroscience
Bryce Gessell	Philosophy
Dianna Amasino	Psychology and Neuroscience
Tim Darlington	Neurobiology
Kelsey McDonald	Psychology and Neuroscience
Na Young Jun	Neurobiology 2022
Shiva Nagappan	Neurobiology 2022

Current:

Aryana Yousefzadeh	Psychology and Neuroscience
Wenxi Xiao	Neurobiology
Joshue Stivers	CNAP

Corey Roach	Neurobiology
Jiayue Liu	Psychology and Neuroscience
Pranjal Gupta	CNAP
Hala El-Nahal	Biomedical Engineering
Yunran Chen	Statistics
Erin Campbell	Psychology and Neuroscience
Neerav Goswami	Biomedical Engineering

1997-2006 (Dartmouth)
Mike Nelson
Leanne Boucher
Gordon Gifford

Specialist (qualifying exam) committees:

1997-2006 (Dartmouth)

Kimberly Rose Clark
Leanne Boucher
Kestas Kverega
O'Dhaniel Mullette-Gillman
Kristin Kelly
Gordon Gifford
Marian Berryhill
Brian Russ
Gideon Caplovitz

Rotation students (2006-present):

Shuoyi Li	Neurobiology Spring 2023
Sara Gannon	Neurobiology
Justine Shih	CNAP
Jesse Herche	MD-PHD
Pranjal Gupta	CNAP
Meredith Schmehl	Neurobiology
Wenxi Xiao	CNAP
Nayoung Jun	Neurobiology
Rachel Landrum	Bioethics and Science Policy
Bryce Gessell	Philosophy
Rolando Estrada	CS (independent study)
Ashley Wilson	Neurobiology
Vanessa Punal	Neurobiology
Isaac Dweck	BME
Diane Friedeberg	Neurobiology
David Barack	IPCN (CNAP)
Sarah Donohue	IPCN(CNAP)
Shruti Agashe	BME (CNAP)
Daniel Bowling	IPCN (CNAP)

Joseph Harris	IPCN (CNAP)	

C. Undergraduate Research Advising:

Thesis advisor:

2000-2001	Amy Dillon	
1999-2000	Amanda Trause	

Other undergraduate research in laboratory:

2022-present	Maya Provençal	
2019-2022	Chloe Weiser	
2016-2018	Luke Farrell	
2016	Elizabeth Burnette	
2014-2016	Manish Nair	Bass Connections
2014-2015	Saranya Ranganathan	Bass Connections
2014-2015	Connor Higgins	Bass Connections
2014	Wilson Brace	HHMI summer fellows
2014	Jonathon Adler	
2013-2015	Ege Yalcinbas	Bass Connections
2013-2014	Akshita Iyer	Bass Connections
2013-2014	Ana Restrepo	Bass Connections
2012	Aida Ibrahim	Duke SROP program
2012-2013	Francesca Tomasi	
2010	Bao Tran-Phu	
2010	Steven Spear	Duke Mechanisms of Behavior program
2009-2010	Jeff Gamble	
2008	Holly Turner	
2008,2009	Nicholas Del Grosso	Duke Mechanisms of Behavior program
2007	Vanessa Kennedy	
2005-2006	Grace Chua	

Thesis committee:

2008-2009	Leena Padhye
2007-2008	Donna Werling
2007-2008	Jeremy Crawford
2006-2007	Ashley Nutter
1998-1999	Kristin Maczco

D. Honors and Awards won by students and postdoctoral fellows

Meredith Schmehl, graduate student: SfN travel award (2022); oral presentation at Advances and Perspectives in Auditory Neuroscience (2022)

David Murphy, graduate student: IMRF travel award (2017)

Jeff Mohl, graduate student, National Defense Science and Engineering Graduate Fellowship (2016-2019).

Kurtis Gruters, graduate student: Graduate Training in Wireless Intelligent Sensor Networks (WISeNet) (NSF IGERT program), 2014-2015

Daniel Pages, graduate student: Graduate Training in Wireless Intelligent Sensor Networks (WISeNet) (NSF IGERT program), 2014-2015.

David Bulkin, graduate student: NRSA Predoctoral fellowship, "Visual responses in the inferior colliculus" (2009-2011).
Jung Ah Lee, postdoctoral fellow: Korea Research Fellow. (2009-2010).
Sydney Koke, graduate student: Canadian NSERC fellowship: (2009-2010)
Kristin A. Kelly, graduate student: NRSA MD-PhD fellowship: "Eye Position Effects in Auditory Cortex", National Institute of Neurological Disorders and Stroke (2002-2004); The National Institute on Deafness and Other Communication Disorders Travel Fellowship, (2003); Marie Center 1982 Award for Excellence in Teaching, Dartmouth College, (2003)
Ryan Metzger, postdoctoral fellow: NRSA Postdoctoral fellowship: "Effects of Eye Position in the Auditory Pathway", National Institute on Deafness and Other Communication Disorders. (2002-2004).
Amy Dillon, undergraduate student: Benner Fellowship for undergraduate research in psychology (2000); Second place, Benjamin J. Benner 1969 Award for Excellence in Research in Psychology (2001); Nickerson Prize, for outstanding undergraduate in psychology (2001).
Amanda Trause, undergraduate student: Second place, Benjamin J. Benner 1969 Award for Excellence in Research in Psychology (2000); Waterhouse Grant, Dartmouth, summer research fellowship (1999); Marie Center Fund, Dartmouth, summer research fellowship (1999)
Leanne Boucher, graduate student: First place, The Dartmouth Graduate Student Poster Conference (1999)

Committee Service

Duke University

Present:

Faculty Mentoring Committees for: Prof Jamila Minga (Head/Neck Surgery and Communication Sciences); Prof Jenna McHenry (P&N); Prof Anita Disney (Neurobiology); Prof Tobias Overath (P&N), Prof Greg Cogan (Neurosurgery);

2022-	Area Head, Systems and Integrative Neuroscience Group, Psychology and Neuroscience Dept
2017-	Co-organizer, Cognitive and Neural Bases of Language and Speech (CANBLS) research group and talk series

Previous:

2022-2023	Neurobiology Faculty Search Committee
2022-2023	Neurobiology Graduate Admissions Committee
2022-2023	Academic Council (elected member)
2022-2023	Presidential Committee on Facilities and Environment
2021-2022	Center for Cognitive Neursocience Colloquium Series Co-organizer
2021-2022	Center for Cognitive Neuroscience Social Hour organizer
Late 2010s	Faculty Mentoring Committee for Prof Eve Puffer, Psychology & Neuroscience
2012-2021	Neurobiology Graduate Program Steering Committee
2010-2020	Cognitive Neuroscience Admissions Committee

2018-2019	Chair, Promotion committee for a Psychology and Neuroscience faculty member
2017-2018	Chair, Primate Neurobiology search committee
2016-2017	Behavioral Neuroscience search committee
2011, for several years	Coordinator/chair, Duke Consortium of Neuroscience Graduate Programs
2010-?	Undergraduate Neuroscience Major Steering Committee
2008-2017	Executive Board, Duke Institute for Brain Sciences
2012, 2015, 2016, 2017	Promotion committees for Neurobiology faculty members
2008-2009, 2015-2016	Director of Undergraduate Studies, Neuroscience
2010-2012, 2014-2016	Psychology and Neuroscience Advisory Committee
2014, 2015	Promotion committees for a MEMS faculty member
2014-2015	DCIDES director search committee
2014, 2015	Promotion committees for a Psychology and Neuroscience faculty member
2006-2007	Behavioral Neuroscience Search Committee
2007-2009	Undergraduate Neuroscience Major Steering Committee (chair)
2011-2012	"Big Ideas" Committee on Interdisciplinary Innovation
2012-2014	Neurobiology Executive Committee

Dartmouth College

2003	ARC Associate Veterinarian Search Committee
2002-2005	Institutional Animal Care and Use Committee
2002-2006	Neuroscience Day Steering Committee
2002	ARC Director Search Committee
2002-2003	Cognitive Neuroscience Search Committee
2002-2003	Behavioral Neuroscience Search Committee
2001-2004	Dartmouth College Graduate Committee
2000-2001	Education Department Search Committee
1997 -2001	Psychological and Brain Sciences Graduate Committee
1997-2000	MD-PhD Admissions Committee
1997-1998	Cognitive Neuroscience Search Committee

Commentary and Press Coverage of our Work

Commentary:

Snyder LH. Frame-up. Focus on "eye-centered, head-centered, and complex coding of visual and auditory targets in the intraparietal sulcus". *J Neurophysiol* 94: 2259-2260, 2005.

Recanzone, G. 2001. [Preview]. Hearing and looking. *Neuron*, 29: 314-315. (About: **Groh JM**, Trause, A. S., Underhill, A. M., Clark, K. R, Inati, S. 2001. Eye position influences auditory responses in primate inferior colliculus. *Neuron*, 29: 509-518.).

Pearson, H. 2001. Seeing is a hearing aid. *Nature Science Update*, (on-line publication), March 20, 2001, www.nature.com/nsu.

Treue, S. and Ilg, U. G. 2000. Image segmentation: a tug-of-war for the eyeball. *Current Biology*, 10(20): R746-R749. (About: Born, RT, **Groh, JM** , Zhao, R., and Lukasewycz, S. J. 2000. Segregation of object and background motion in visual area MT: effects of microstimulation on eye movements. *Neuron*, 26:725-734.).

Popular press:

- Coverage of our study "Parametric information about eye movements is sent to the ears" (PNAS 2023) has appeared in IEEE Spectrum (https://spectrum.ieee.org/eye-movements) and an article is expected to appear in The Transmitter (Simons Foundation). In addition, our work was featured on a German podcast, "Fakt Ab!" (https://open.spotify.com/episode/1MmwCtFZjZedQ2G3vIS3xZ?si=p8PH6yWORAihhxCPJ7DNgQ&nd=1&dlsi=0857028d64fa469d). It has also been discussed on reddit's r/science: https://www.reddit.com/r/science/comments/18eebnp/scientists_can_now_pinpoint_where_someones_eyes/ A partial list of additional media outlets can be found here: https://pnas.altmetric.com/details/156710220/news. The current altmetric score is 400.

- Coverage of our study "Coordinated multiplexing of information about distinct objects in visual cortex" (*eLife. 2022)* has appeared on WYPL-FM 89.3's radio program "Eye on Vision"; a recording is available at http://eyeonvision.blogspot.com/2022/12/multiplexing-to-interpret-multiple.html. A partial list of additional media outlets can be found here: https://www.altmetric.com/details/139348364/news The current altmetric score is 47 (as of 12/23).

- Coverage of our study "The eardrums move when the eyes move: a multisensory effect on the mechanics of hearing" has appeared in the Atlantic, CBC's Quiks and Quarks, the Sean Moncrieff show on Irish radio NewsTalk, the New Scientist, United Press International, and other news sites. This finding was included as #14 on a list of the 50 most amazing things discovered in the 2010's (https://bestlifeonline.com/amazing-facts-from-2010s/) and continues to receive news coverage (https://www.altmetric.com/details/32125792/news). Its current altmetric score is 527 (as of 12/23).

- Coverage of my book "Making Space: How the Brain Knows Where Things Are" has appeared on the BBC World Service (The Forum: Natural Navigation); WUNC NPR ("The State of Things" with Frank Stasio); CBC IDEAS; Ideas Roadshow (video).

- Coverage of our work "Different stimuli, different spatial codes: A visual map and an auditory rate code for oculomotor space in the primate superior colliculus." Lee, J. and Groh, JM. 2014. PLoS ONE 9(1): e85017 appeared in Futurity and Business Standard.

- Coverage of our work "Looking at the ventriloquist: Visual outcome of eye movements calibrates sound localization." Pages, D. S. and Groh, J. M. 2013. PLOS One. 8(8):e72562. doi: 10.1371/journal.pone.0072562 appeared on talk radio WPTF, and an article appeared in the Raleigh News and Observer.

- Coverage of our work "Visual- and saccade-related signals in the primate inferior colliculus." (Porter, KK, Metzger, RR, and **Groh, JM**. 2007. *Proceedings of the National Academy of Sciences*. 104(45): 17855-60.) has appeared in Scientific American (ScientificAmerican.com), Fox News (foxnews.com), the CBC radio program "Quirks and Quarks", the Radio New Zealand program "Nights", the Telegraph, the Italian science magazine "Newton", and LiveScience.com and numerous other online science news web sites.

Books

Groh, JM. "Making Space: How Your Brain Knows Where Things Are". 2014. Harvard University Press. This book concerns how the brain gathers and processes information about where things are in the environment. It is written for a broad audience. It has been favorably reviewed in Nature, the New Scientist, Scientific American, the Times Higher Education Supplement, the Times Literary Supplement, and Current Biology, and rated "Outstanding" by the American Association of School Librarians and by the Reference and User Services Association of the American Library Association.

Augustine G, **Groh JM,** Huettel S, LaMantia A, White L**. "Neuroscience" 2023.** Textbook: Oxford University Press. Editor of sensory unit, 7th edition, formerly Purves et al.

Datasets

Schlebusch, Stephanie; King, Cynthia; Murphy, David LK; **Groh, Jennifer** (2023). Lovich et al. Phil Trans B 2023 dataset. figshare. Dataset. https://doi.org/10.6084/m9.figshare.23297849.v1

Groh, J. M.; Murphy, David LK; Lovich, Stephanie; King, Cynthia (2023). Eye movement-related eardrum oscillations (EMREOs) dataset and supporting code. Figshare+. Dataset. **https://doi.org/10.25452/figshare.plus.24470548.v1**

Articles in press

Groh, J. M., Schmehl, M. N., Caruso, V. C., Tokdar, S. T. Signal switching across time: How neural turn-taking might enhance the processing power of the brain. *Trends in Cognitive Science.*.

Articles published

Schmehl MN, Caruso VC, Chen Y, Willett SM, Mohl JT, Jun NY, Ruff DA, Cohen M, Freiwald W, Tokdar ST, **Groh JM.** Multiple objects evoke fluctuating responses in several regions of the visual pathway. *eLife*, **13**. *Biorxiv* **doi:** https://doi.org/10.1101/2023.07.19.549668

Lovich, S. N., King, C. D., Murphy, D. L. K., Landrum, R., Shera, C. A. **Groh., J. M.** 2023**.** Parametric information about eye movements is sent to the ears. Proceedings of the national academy of sciences, 2023. 120(48): p. e2303562120.

King, C. D., Lovich, S. N., Murphy, D. L. K., Landrum, R., Kaylie, D; Shera, C. A. **Groh., J. M.** 2023. Individual similarities and differences in eye-movement-related eardrum oscillations (EMREOs). *Hearing Research.* **440**: p. 108899.

Lovich, SN; King, CD; Murphy, DLK; Abbasi H, Bruns P, Shera CA, **Groh JM.** 2023. Conserved features of eye movement related eardrum oscillations (EMREOs) across humans and monkeys. *Philos Trans R Soc Lond B Biol Sci,* **378**(1886): p. 20220340.

Jun NY, Ruff DA, Kramer LE, Bowes B, Tokdar ST, Cohen, M. R., **Groh, J. M**. 2022. Coordinated multiplexing of information about distinct objects in visual cortex. *eLife. Nov 29, 2022* *https://doi.org/10.7554/eLife.76452* *see also bioRxiv*: doi: https://doi.org/10.1101/777912.

Willett SM, **Groh JM**. 2022. Multiple sounds degrade the frequency representation in monkey inferior colliculus. *European Journal of Neuroscience55(2): 528-548.*

Caruso, V. C., Pages, D. S., Sommer, M. A., **Groh, J. M**. 2021. Compensating for a shifting world: A quantitative comparison of the reference frame of visual and auditory signals across three multimodal brain areas. *Journal of Neurophysiology; 2021 Jul 1;126(1):82-94. doi: 10.1152/jn.00385.2020.* bioRxiv 669333; doi: https://doi.org/10.1101/669333

Schmehl, M. N. and **Groh, J. M**. Visual Signals in the Mammalian Auditory System. 2021. *Annual Review of Vision Science,* 7:201-223

Glynn, C. D., S. T. Tokdar, A. Zaman, V. C. Caruso, J. T. Mohl, S. M. Willett, **J. M. Groh**. 2021. Analyzing second order stochasticity of neural spiking under stimuli-bundle exposure. *Annals of Applied Statistics.* 15(1): 41-63 (March 2021). DOI: 10.1214/20-AOAS1383

Mohl JT, Pearson JM, **Groh JM**. 2020. Monkeys and humans implement causal inference to simultaneously localize auditory and visual stimuli. *J Neurophysiol* 124: 715-27

Mohl, J. T., Caruso, V. C., Tokdar, S., **Groh, J. M**. 2020. Sensitivity and specificity of a Bayesian single trial analysis for time varying neural signals. *Neurons, Behavior, Data Analysis, and Theory* 3:1.

Kopčo, N., Lokša, P., Lin, I-fan, **Groh, J. M**. and Shinn-Cunningham, B. 2019. Hemisphere-Specific Properties of the Ventriloquism Aftereffect. *JASA-Express Letters,* 146: EL177.

Caruso, VC; Mohl, JT; Glynn C; Lee J; Willett, S; Zaman A; Ebihara, A. F., Estrada R; Freiwald, W. A. Tokdar S; **Groh, JM**. 2018. Single neurons may encode simultaneous stimuli by switching between activity patterns. *Nature Communications*. Originally posted on *biorxiv* as Caruso, VC; Mohl, JT; Glynn C; Lee J; Willett, S; Zaman A; Estrada R; Tokdar S; Groh, JM. Evidence for time division multiplexing of multiple simultaneous items in a sensory coding bottleneck. doi: https://doi.org/10.1101/107185. Altmetric score 251 (July, 2018)

Gruters, KG; Murphy, DLK; Jenson, CD; Smith DW; Shera CA; **Groh JM**. 2018. The eardrums move when the eyes move: a multisensory effect on the mechanics of hearing. *Proceedings of the National Academy of Sciences*. (First posted on pre-print server biorxiv : doi : https://doi.org/10.1101/156570) Altmetric score 506 (July, 2018).

Caruso, VC; Pages DS ; Sommer MA; **Groh JM.** 2017 (biorxiv, epub) 2018 (print). Beyond the labeled line: Intraparietal cortex, frontal eye fields, and the superior colliculus employ different reference frames for encoding visual saccade targets. *Journal of Neurophysiology*, 119(4):1411-1421 doi: 10.1152/jn.00584.2017. Epub 2017 Dec 20. Also available on pre-print server biorxiv: doi: https://doi.org/10.1101/124628

Pages, DS; Ross, DA; Puñal, VM; Agashe, S; Dweck, I; Mueller, J; Grill, WM; Wilson, BS; **Groh, JM**. 2016. Effects of electrical stimulation in the inferior colliculus on frequency

discrimination by rhesus monkeys and implications for the auditory midbrain implant. *J. Neurosci.* 36(18):5071-83. doi: 10.1523/JNEUROSCI.3540-15.2016. PMID: 27147659

Caruso, VC; Pages, DS; Sommer, MA; **Groh, JM.** 2016. Similar prevalence and magnitude of auditory-evoked and visually-evoked activity in the frontal eye fields: implications for multisensory motor control. *J. Neurophys.* 2016 Mar 2:jn.00935.2015. doi: 10.1152/jn.00935.2015. [Epub ahead of print]. PMID: 26936983

Lee, J. and **Groh, JM.** 2014. Different stimuli, different spatial codes: A visual map and an auditory rate code for oculomotor space in the primate superior colliculus. *PLoS ONE 9(1): e85017* . PMID: 24454779; PMCID: PMC3893137

Zucker, N. L., Merwin, R. M., Bulik, C. M., Moskovich, A., Wildes, J.E.,, **Groh, J. M.** 2013. Subjective Experience of Sensation in Anorexia Nervosa. *Behaviour Research and Therapy* (6):256-65. doi: 10.1016/j.brat.2013.01.010. Epub 2013 Feb 27 PMID: 23523866

Pages, D. S. and **Groh, J. M**. 2013. Looking at the ventriloquist: Visual outcome of eye movements calibrates sound localization. *PLOS One.* 8(8):e72562. doi: 10.1371/journal.pone.0072562. PMCID: PMC3757015

Bulkin, DA. and **Groh, JM**. 2012. Distribution of eye position information in the monkey inferior colliculus. *J Neurophysiol.* 107(3):785-95. PMCID: PMC3289473

Lee, J. and **Groh, JM**. 2012. Auditory signals evolve from hybrid- to eye-centered coordinates in the primate superior colliculus. *J. Neurophysiol. 108(1):227-42.* PMCID: PMC3434609

Bulkin, DA and **Groh, JM.** 2012. Distribution of visual and saccade related information in the monkey inferior colliculus. *Frontiers in Neural Circuits,* 6:61. PMID: 22973196; PMCID: PMC3433683

Gruters, KG and **Groh, JM**. 2012. Sounds and beyond: multisensory and other non-auditory signals in the inferior colliculus. *Frontiers in Neural Circuits* 6:96 PMCID: PMC3518932

Groh, J.M. 2011. Effects of initial eye position on saccades evoked by microstimulation in the primate superior colliculus: implications for models of the SC read-out process. *Frontiers in Integrative Neuroscience* 4:130 (1-16). PMCID: PMC3025650

Groh, J.M. 2011. Book Review: The Tell Tale Brain. *Journal of Clinical Investigation,* 121:2953. PMCID: PMC3148743

Bulkin, DA. and **Groh, JM**. 2011. Systematic mapping of the monkey inferior colliculus reveals enhanced low frequency sound representation. *Journal of Neurophysiology*. 105:1785-1797. PMCID: PMC3075276

Maier, J.X. and **Groh, J.M.** 2010. Comparison of gain-like properties of eye position signals in inferior colliculus *versus* auditory cortex of primates. *Frontiers in Integrative Neuroscience*, 4:121-132. PMCID: PMC2936885

Mullette-Gillman, O. A., Cohen, Y. E. and **Groh, JM**. 2009. Motor-related signals in the intraparietal cortex encode locations in a hybrid, rather than eye-centered, reference frame. *Cerebral Cortex,* Aug;19(8):1761-75 PMCID: PMC2705694

Maier, J.X. and **Groh, J.M.** 2009. Multisensory guidance of orienting behavior. *Hearing Research*, 258:106-112. PMCID: PMC2790026

Kopčo, N; Lin, I-F. Shinn-Cunningham, B. G. and **Groh, J. M**. 2009. Reference frame of the ventriloquism aftereffect. *J. Neurosci,* 29:13809-13814. PMCID: PMC2804958

Werner-Reiss, U. and **Groh, JM.** 2008. A rate code for sound azimuth in monkey auditory cortex: implications for human neuroimaging studies. *Journal of Neuroscience.* 28:3747-3758.

Porter, KK, Metzger, RR, and **Groh, JM**. 2007. Visual- and saccade-related signals in the primate inferior colliculus. *Proceedings of the National Academy of Sciences*. 104(45): 17855-60. PMCID: PMC2077072

Werner-Reiss U, Porter, KK, Underhill AM, **Groh JM**. 2006. Long-lasting attenuation by prior sounds in auditory cortex of awake primates. *Experimental Brain Research*, 168:272-6.

Porter, KK, Metzger, RR, and **Groh, JM**. 2006. The representation of eye position in primate inferior colliculus. *Journal of Neurophysiology*, 95:1826-42.

Porter, KK and **Groh, JM**. 2006. The "other" transformation required for visual-auditory integration: representational format. *Progress in Brain Research*, 155:313-23.

Bulkin, DA and **Groh, JM**. 2006. Seeing sounds: Visual and auditory interactions in the brain. *Current Opinions in Neurobiology*,16:415-9.

Metzger, RR, Greene, NT, Porter, KK and **Groh, JM**. 2006. Effects of reward and behavioral context on neural activity in the primate inferior colliculus. *Journal of Neuroscience*, 26:7468-76.

Mullette-Gillman, OA., Cohen, YE, **Groh, JM**. 2005. Eye-centered, head-centered, and complex coding of visual and auditory targets in the intraparietal sulcus. *Journal of Neurophysiology*, 94:2331-2352.

Metzger RR, Mullette-Gillman OA, Underhill AM, Cohen YE, **Groh JM**. 2004. Auditory saccades from different initial eye positions: implications for coordinate transformations in the primate brain. *Journal of Neurophysiology*, 92:2622-2627.

Werner-Reiss, U, Kelly, KA, Trause, AS, Underhill, AM and **Groh, JM.** 2003. Eye position affects activity in primary auditory cortex of primates. *Current Biology*, 13:554-562.

Groh, JM and Gazzaniga, MS. How the brain keeps time. 2003. *Daedalus*, Spring, 56-61.

Groh, JM, Kelly KA and Underhill, AM. 2003. A monotonic code for sound azimuth in primate inferior colliculus. *Journal of Cognitive Neuroscience*, 15(8):1217-1231.

Groh JM, Trause, A. S., Underhill, A. M., Clark, K. R, Inati, S. 2001. Eye position influences auditory responses in primate inferior colliculus. *Neuron*, 29:509-518. (This article was featured on the cover of the journal).

Groh, JM. 2001. Converting neural signals from place codes to rate codes. *Biological Cybernetics*, 85:159-65.

Boucher, L, **Groh JM**, Hughes HC. 2001. Afferent delays and the mislocalization of perisaccadic stimuli. *Vision Research*, 41: 2631–2644.

Groh, JM. 2000. Predicting perception from population codes. *Nature Neuroscience*, 3(3):201-202.

Born, RT, **Groh, JM** , Zhao, R., and Lukasewycz, S. J. 2000. Segregation of object and background motion in visual area MT: effects of microstimulation on eye movements. *Neuron*, 26:725-734.

Groh, JM. 1998. Reading neural representations. *Neuron*, **21**:661-664.

Wickersham, I. and **Groh, JM**. 1998. Electrically evoking sensory experience. *Current Biology*, **8**:R412-R414.

Groh, JM, Born, RT, and Newsome, WT. 1997. How is a sensory map read out? Effects of microstimulation in area MT on smooth pursuit and saccadic eye movements. *Journal of Neuroscience*, 17:4312-4330.

Groh, JM and Sparks, DL. 1996. Saccades to somatosensory targets: I. Behavioral characteristics. *Journal of Neurophysiology*, **75**: 412-427.

Groh, JM and Sparks, DL. 1996. Saccades to somatosensory targets: II. Motor convergence in primate superior colliculus. *Journal of Neurophysiology*, **75**: 428-438.

Groh, JM and Sparks, DL. 1996. Saccades to somatosensory targets: III. Influence of eye position on somatosensory activity in primate superior colliculus. *Journal of Neurophysiology*, **75**: 439-453.

Groh, JM, Born, RT, and Newsome, WT. 1996. Interpreting sensory maps in visual cortex. *International Brain Research Organization News*, **24**: 11-12.

Groh, JM, Seidemann, E, and Newsome, WT. 1996. Neural fingerprints of visual attention. *Current Biology,* **11**: 1406-1409.

Groh, JM and Sparks, DL. 1992. Two models for transforming auditory signals from head-centered to eye-centered coordinates. *Biological Cybernetics*, **67**(4):291-302.

Book Chapters (** denotes peer reviewed articles)

****Groh, JM.** 2020. Space for Thought. Section in *Space, a History*, edited by A. Janiak. Oxford University Press. In press.

Harris, K.D.; **Groh, J. M.;** DiCarlo, J.; Fries, P.; Kaschube, M.; Laurent, G.; MacLean, J. N.; McCormick, D. A.; Pipa, G.; Reynolds, J. H.; Scwartz, A. B., Sejnowski, T. J., Singer, W., Vinck, M. 2019. Functional properties of circuits, cellular populations, and areas. From "The Neocortex," edited by W. Singer, T. J. Sejnowski and P. Rakic. Strüngmann Forum Reports, vol. 27, J. R. Lupp, series editor. Cambridge, MA: MIT Press. ISBN 978-0-262-04324-3

** Willett, S, **Groh JM**, Maddox R. 2019. Hearing in a "moving" visual world: Physiological and behavioral evidence for coordinate transformations along the auditory pathway. In, Multisensory Processes: The Auditory Perspective, Springer Handbook of Auditory Research (editors Wallace, Lee, Fay, Popper).

Groh, JM and Pai, D. 2010. Looking at sounds: neural mechanisms in the primate brain. In, Primate Neuroethology. A. Ghazanfar and M. Platt, eds. Oxford University Press.

Kelly, KA, Metzger, RR, Mullette-Gillman, OA., Werner-Reiss U., **Groh, JM. 2003. Representation of sound location in the primate brain. In, Primate Audition: Behavior and Neurobiology, A. Ghazanfar, ed. CRC Press, Boca Raton, FL.

****Groh, JM** and Werner-Reiss, U. 2002. Visual and auditory integration. In, Encyclopedia of the Human Brain. V. S. Ramachandran, ed. Academic Press, San Diego, CA.

Sparks, DL and **Groh, JM**. 1995. The superior colliculus: a window to problems in integrative neuroscience. In, The Cognitive Neurosciences, Michael S. Gazzaniga, ed. MIT Press, Cambridge MA.

Theses

Groh, JM. 1993. Coordinate transformations, sensorimotor integration, and the neural basis of saccades to somatosensory targets. Ph.D. thesis, University of Pennsylvania.

Groh, JM. 1988. Bachelor male feral horses: characteristics of group living and aggression. Senior thesis, Princeton University.

Abstracts and Conference Presentations

King, C.D., Lovich, S.N., Zhu, T., Kaylie, D., Shera, C.A., Groh, J.M. 2024. Middle-ear muscles and outer hair cells implicated in generating and controlling eye movement-related eardrum oscillations (EMREOs). *Mechanics of Hearing*, Ann Arbor, MI, June 2024

Lovich, S.N., Kaylie, D.M., King, C., Shera, C., and Groh, J.M. 2024. The middle ear muscles control eye movement-related eardrum oscillations (EMREOs) and implicate the ear in beginning the computation of an eye-centered reference frame for localizing sound. *Mechanics of Hearing*, Ann Arbor, MI. June 2024.

Lovich, S.N., Kaylie, D.M., King, C., Shera, C., and Groh, J.M. 2024. The middle ear muscles control eye movement-related eardrum oscillations (EMREOs) and implicate an eye-centered reference frame in the ear for localizing sound. *Neural Control of Movement*, Dubrovnik, Croatia. April 2024.

King, C., Zhu, T., Groh, J. 2024. Case study: audible fluttering sounds associated with eye movements in a patient with palatal and possible tensor tympani myoclonus. *Association for Research in Otolaryngology*, Anaheim, CA, February 2024

Groh, JM, 2023. The brain sends parametric information about eye movements to motor structures within the ear. *Gordon Conference on Eye Movements*, S. Hadley, MA. July 2023

Herche, J., Schmehl, M., Bulkin, D., Tostaeva, G., Griego, J., Groh, JM. 2023. Signatures of Eye-Movement Related Eardrum Oscillations Detected in the Inferior Colliculus. *Simian Collective*, Chicago, IL.

Herche, J., Schmehl, M., Bulkin, D., Tostaeva, G., Griego, J., Groh, JM. 2023. Signatures of Eye-Movement Related Eardrum Oscillations Detected in the Inferior Colliculus. *Society for Neuroscience*, Washington, D.C.

Herche, J., Schmehl, M., Bulkin, D., Tostaeva, G., Griego, J., Groh, JM. 2023. Can vision modulate the ear? Recordings in human ear canals during observation of silent visual stimuli. *Advances and Perspectives in Auditory Neuroscience*, Washington, D.C.

King, C., Lovich, S., Kaylie, D., Shera, C., Groh, JM. 2023. Measuring the impact of auditory system impairments on eye-movement-related eardrum oscillations (EMREOs). *Association for Research in Otolaryngology Abstracts.* Orland, FL, February 2023.

King, C., Lovich, S., Kaylie, D., Shera, C., Groh, J. 2023. Evaluating eye-movement-related eardrum oscillations (EMREOs) in subjects with normal hearing. *Simian Collective*, Chicago, IL, September 2023

King, C., Lovich, S., Murphy, D., Landrum, R., Kaylie, D., Shera, C., Groh, J. 2023. Waveform similarities and differences of eye-movement-related eardrum oscillations (EMREOs) in subjects with normal hearing. *Society for Neuroscience Abstracts*, Washington, DC, November 2023.

King, C., Lovich, S., Murphy, D., Landrum, R., Kaylie, D., Shera, C., Groh, J. 2023. Waveform similarities and differences of eye-movement-related eardrum oscillations (EMREOs) in subjects with normal hearing. *Advances and Perspectives in Auditory Neuroscience*, Washington, DC, November 2023.

Lovich, S.N., Kaylie, D.M., King, C., Shera, C., and Groh, J.M. Saccade-related eardrum oscillations are altered by surgical denervation of the middle ear muscles. *Annual Meeting of the Society for Neuroscience*, Washington, DC. November 2023.

Lovich, S.N., Kaylie, D.M., King, C., Shera, C., and Groh, J.M. Saccade-related eardrum oscillations are altered by surgical denervation of the middle ear muscles. *Advances and Perspectives in Auditory Neuroscience*, Washington, DC. November 2023.

Lovich, S.N., Kaylie, D.M., King, C., Shera, C., and Groh, J.M. Middle ear muscles contribute to eye movement-related eardrum oscillations. *Annual Meeting of the Simian Collective*, Chicago, IL. September 2023.

Schmehl, M.N., Tokdar, S.T., and Groh, J.M. Visual cues modulate auditory responses in the macaque inferior colliculus. *Annual Meeting of the Society for Neuroscience*, Washington, DC. November 2023.

Schmehl, M.N., Tokdar, S.T., and Groh, J.M. Visual cues modulate auditory responses in the macaque inferior colliculus. *Advances and Perspectives in Auditory Neuroscience*, Washington, DC. November 2023.

Schmehl, M.N., Tokdar, S.T., and Groh, J.M. Visual cues modulate auditory responses in the macaque inferior colliculus. *Annual Retreat of the Duke Department of Neurobiology*, Wrightsville Beach, NC. September 2023.

Schmehl, M.N., Tokdar, S.T., and Groh, J.M. Visual cues modulate auditory responses in the macaque inferior colliculus. *Annual Meeting of the Simian Collective*, Chicago, IL. September 2023.

Schmehl, M.N., Caruso, V.C., Willett, S.M., Chen, Y., Jun, N.Y., Mohl, J.T., Ruff, D.A., Cohen, M., Ebihara, A.F., Freiwald, W., Tokdar, S.T., and Groh, J.M.* Fluctuating responses evoked by multiple objects: a general phenomenon. *Annual Meeting of the Simian Collective*, Chicago, IL. September 2023.

Schmehl, M.N., Caruso, V.C., Willett, S.M., Chen, Y., Jun, N.Y., Mohl, J.T., Ruff, D.A., Cohen, M., Ebihara, A.F., Freiwald, W., Tokdar, S.T., and Groh, J.M.* Fluctuating responses evoked by multiple objects: a general feature of visual representations. *Computational Cognitive Neuroscience*, Oxford, UK. August 2023.

Schmehl, M.N., Tokdar, S.T., and Groh, J.M. How seeing helps us hear: visual cues modulate auditory responses in the macaque inferior colliculus. *Duke Equity Advancement Symposium*, Durham, NC. July 2023.

Zhu, T., King, C., Groh, J.M. Visual Prism Adaptation and Eye-movement Related Eardrum Oscillations (EMREOs). *Advances and Perspectives in Auditory Neuroscience*, Washington, DC, November 2023.

Weiser, C., King, B., Provencal, M., Groh, JM., King, C. 2022. How many sounds can we hear? *Society for Neuroscience Abstracts.* San Diego, CA, November 2022.

King, C. Lovich, S, Kaylie, D. Shera C. Groh, JM. 2022. Impact of auditory system impairments on eye movement-related eardrum oscillations (EMREOs). *Society for Neuroscience Abstracts.* San Diego, CA, November 2022.

Lovich (Schlebusch), S, Kaylie, D. King, C., Shera C. Groh, JM. 2022. Physical properties of eye movement-related eardrum oscillations (EMREOs) in rhesus monkeys. *Society for Neuroscience*, San Diego, CA, November 2022.

Lovich (Schlebusch), S, Kaylie, D. King, C., Shera C. Groh, JM. 2022. Physical properties of eye movement-related eardrum oscillations (EMREOs) in rhesus monkeys. *Advances and Perspectives in Auditory Neuroscience*, San Diego, CA, November 2022.

Schmehl, M.N., Tokdar, S.T., and Groh, J.M. 2022. How vision helps us hear: visual cues bias single-trial responses in the macaque inferior colliculus to favor a visually-paired sound. *Advances and Perspectives in Auditory Neuroscience*, San Diego, CA, November 2022. Received research talk award.

Schmehl, M.N., Tokdar, S.T., and Groh, J.M. 2022. Visual cues bias single-trial responses in the macaque inferior colliculus to favor a visually-paired sound. *Society for Neuroscience*, San Diego, CA, November 2022.

Herche, J., King, C., Lovich (Schlebusch), S., Groh, JM. 2022. Can vision modulate the ear? Recordings in human ear canals during observation of silent visual stimuli. *Society for Neuroscience*, San Diego, CA, November 2022.

Herche, J., King, C., Lovich (Schlebusch), S., Groh, JM. 2022. Can vision modulate the ear? Recordings in human ear canals during observation of silent visual stimuli. *Advances and Perspectives in Auditory Neuroscience*, San Diego, CA, November 2022.

Groh, JM, 2022. Do neurons juggle different signals? Exploring whether multiplexing is a general phenomenon. *Gordon Conference on the Neurobiology of Cognition*, Sunday River, Maine, July 2022

Groh, JM; Jun, NY; Ruff, D; Kramer, L; Bowes, B; Tokdar S; Cohen M. 2022. Coordinated multiplexing of information about distinct objects in visual cortex. *Cosyne*, Lisbon Portugal, March 2022.

Groh, JM. How does the brain encode more than one stimulus at a time? Evidence from vision and hearing. 2022. *Cosyne workshop: Brain-Score and beyond: confronting brain-like ANNs with neuroscientific data* Cascais, Portugal, March 2022.

King, C. Lovich (Schlebusch), S, Kaylie, D. Shera C. Groh, JM. 2022. Comparing eye movement-related eardrum oscillations (EMREOs) in subjects with normal hearing and auditory system dysfunction. *International Multisensory Research Forum*, Ulm, Germany, July 2022.

Lovich (Schlebusch), S, Kaylie, D. King, C., Shera C. Groh, JM. 2022.The rhesus monkey as an animal model to study eye movement-related eardrum oscillations (EMREOs). *International Multisensory Research Forum*, Ulm, Germany, July 2022.

King, C., Landrum, R., Schlebusch, S., Kaylie, D., Shera, C. and Groh, J. 2022. Abnormal eye-movement related eardrum oscillations (EMREOs) in individuals with auditory system dysfunction. *Association for Research in Otolaryngology Midwinter Meeting*, Feb 5-9, 2022, San Jose, CA

Schlebusch, S., Cooper, M., Kaylie, D., King, C., Murphy, D., Shera, C. and Groh, J.M. 2022. The rhesus monkey as an animal model to study eye movement-related eardrum oscillations. *Association for Research in Otolaryngology Midwinter Meeting*, February 5-9, 2022, San Jose, CA.

Schmehl, M.N. and Groh, J.M. 2021. Visual stimuli modulate responses to single and multiple sounds in the macaque inferior colliculus. Annual Meeting of the Society for Neuroscience, virtual.

Schmehl, M.N. and Groh, J.M. 2021. Visual stimuli modulate responses to single and multiple sounds in the macaque inferior colliculus. Advances and Perspectives in Auditory Neuroscience, virtual.

King, C., Landrum, R., Schlebusch, S., Kaylie, D., Shera, C. and Groh, J. 2021. Abnormal eye-movement related eardrum oscillations (EMREOs) in individuals with auditory system dysfunction. Advances and Perspective in Auditory Neuroscience, virtual.

King, C.D.; Murphy, D. L. K.; Schlebusch, S.N., Landrum, R;, Kaylie, D; Shera, C. A.; Groh, J. M. 2020. Relationship between saccade-related eardrum oscillations and hearing loss. *Association for Research in Otolaryngology Midwinter Meeting.*

Schlebusch, S. N.; Cooper, M. W.; Kaylie, D. M.; King, C. D., Murphy, D. L. K.; Shera, C. A.; Groh, J. M. 2020. Changes in saccade-related eardrum oscillations after surgical denervation of the stapedius muscle. *Association for Research in Otolaryngology Midwinter Meeting.*

Murphy, D. L. K.; King, C. D.; Schlebusch, S. N.; Landrum, R.; Shera, C. A.; Groh, J. M. 2020. Eye Movement Decoded from Eardrum Motion: The Decipherable EMREO. *Association for Research in Otolaryngology Midwinter Meeting.*

Willett, S. M., Tokdar, S. T., Groh, J. M. 2019. Dynamics of primate inferior colliculus neurons during the localization of simultaneous sounds. *Society for Neuroscience Abstracts.*

Murphy, D. L. K., King, C. D., Schlebusch, S., Landrum, R. Shera, C. A., Groh, J. M. 2019. Eye movement is linearly encoded by eardrum motion: the decipherable EMREO. *Society for Neuroscience Abstracts.*

Schlebusch, S., Cooper, M., Kaylie, D., King, C., Murphy D. L. K., Shera, C. A., Groh, J. M., 2019. Changes in saccade-related eardrum oscillations after surgical denervation of the stapedius muscle. *Society for Neuroscience Abstracts.*

King, C., Landrum, R., Murphy, D. L. K., Schlebusch S., Kaylie, D. Shera, C. A., Groh, J. M. 2019. Relationship between saccade-related eardrum oscillations and clinical measures of middle ear impedance. *Society for Neuroscience Abstracts.*

Murphy, DLK; King CD, Schlebusch S; Landrum, R; Shera, CA; **Groh, JM.** 2019. The eardrums report both eye movement and eye position: the full EMREO map. *Association for Research in Otolaryngology Midwinter Meeting.*

King, CD; Murphy, DLK; Schlebusch, S; Landrum, R; Shera CA; **Groh, JM.** 2019. The eardrums

move when the eyes move: potential future clinical implications. *Association for Research in Otolaryngology Midwinter Meeting.*

Murphy, DLK; Landrum, R; Jenson, CD; Schlebusch S; Smith DW; Shera CA; King CD; **Groh, JM**. 2018. The eardrums report both eye position and eye movement: the full EMREO map. *Advances & Perspectives in Auditory Neuroscience*

Schlebusch S; Murphy, DLK; King CD; Kaylie, DM. **Groh, JM**. Reproducibility of eardrum movements accompanying saccades: implications for clinical testing Stephanie Schlebusch, David L.K. Murphy, Cynthia King, David M. Kaylie, Jennifer M. Groh. *Advances & Perspectives in Auditory Neuroscience*

Caruso, VC; Cogan, GB; Pearson, JM; Overath, T; Haglund, MM; Sinha, SR; Groh, JM. 2018. The neural representation of number-noun phrases: an ECoG study. *Soc Neurosci Abstracts; Advances & Perspectives in Auditory Neuroscience*

Jun, NY; Mohl, JT; Cohen, M; **Groh, JM.** 2018. Fluctuating activity (time-division multiplexing) varies across sensory brain regions. *Soc Neurosci Abstracts.*

Willett, SM; Caruso, VC; Tokdar, ST; **Groh, JM.** 2018. Frequency dependent interaction of dual sound representations in monkey inferior colliculus. *Soc Neurosci Abstracts; Advances & Perspectives in Auditory Neuroscience*

Mohl, J. T., Tokdar S., **Groh, JM.** 2018. Neural correlates of multisensory causal inference in the primate superior colliculus. *Soc Neurosci Abstracts; Advances & Perspectives in Auditory Neuroscience*

Groh, JM. 2018. The eardrums move when the eyes move: a multisensory effect on the mechanics of hearing. Invited presentation, Gordon Conference on Audition.

Gruters, KG; Murphy, DLK; Jenson, CD; Smith DW; Shera CA; **Groh JM.** 2018. The eardrums move when the eyes move: a multisensory effect on the mechanics of hearing. *Acoustical Society of America* meeting.

Groh, JM. 2017. Hearing in a world of light: why, where, and how visual and auditory information are connected by the brain. Keynote address, *Advances and Perspectives in Auditory Neuroscience*

Caruso, VC; Mohl, JT; Glynn, C; Lee, J; Willett, S; Zaman A; Estrada R; Tokdar S; **Groh, JM**. 2017. Fluctuating activity and coding of multiple items. *Cognitive and Computational Neuroscience* meeting, New York, 2017.

Caruso, VC; Ebihara, A. F., Tokdar, S; Freiwald, WA; **Groh, JM**. 2017. Multiplexing in face selective cortex: evidence of flexible trial-by-trial and sub-trial representations of multiple stimuli. *Cognitive and Computational Neuroscienc*e meeting, New York.

Caruso VC; Ebihara, AF; Tokdar, S; Freiwald, W; **Groh, JM.** 2017. Multiplexing in face selective cortex: Evidence of flexible trial-by-trial and sub-trial representations of multiple stimuli. *Soc Neurosci Abstracts; Advances & Perspectives in Auditory Neuroscience*

Farrell, L; **Groh, JM.** 2017. How many sound locations can humans distinguish at a time? Implications for neural processing of auditory space. *Soc Neurosci Abstracts; Advances & Perspectives in Auditory Neuroscience*

Mohl, JT; Tokdar, S; **Groh JM**. 2017. A dynamic neural code may underlie multisensory integration and segregation in the primate superior colliculus. *Soc Neurosci Abstracts; Advances & Perspectives in Auditory Neuroscience*

Murphy, DLK; Gruters, KG; Smith, DW; Shera, CA; **Groh, JM**. 2017. Eye movement-related eardrum oscillations (EMREOs): a biomarker for visual- auditory spatial integration in the auditory periphery? *Soc Neurosci Abstracts; Advances & Perspectives in Auditory Neuroscience*

Willettt, SM; **Groh, JM.** 2017. Stimulus dependent vs. cell specific computational strategies in localization of two simultaneous sounds. *Soc Neurosci Abstracts; Advances & Perspectives in Auditory Neuroscience*

Murphy, DLK; Gruters, KG; Smith DW; Shera CA; **Groh, JM.** 2017. Eardrum oscillations accompany eye movements, suggesting visual-auditory spatial integration begins in the auditory periphery. *Gordon Conference on Eye Movements.*

Murphy, DLK; Gruters, KG; Smith, DW; Shera, CA; **Groh, JM**. 2017. Eye movement-related eardrum oscillations (EMREOs) suggest visual-auditory spatial integration begins in the auditory periphery. *International Multisensory Research Forum.*

Caruso, VC; Pages, DS; Sommer, MA; **Groh, JM**. 2016. Evolution of a reference frame along a brain pathway: persistently hybrid coordinates of auditory signals in Frontal Eye Fields implicate the Superior Colliculus in computing eye-centered sound location. *Soc Neuro Abstr.*

Mohl, J.T; Caruso, V. C.; Glynn, C; Tokdar, S; **Groh, JM**. 2016. Characterization of a novel analysis method for single trial analysis of fluctuating neural responses. *Soc Neuro Abstr.*

Willett, S. M.; Caruso, V.C; Tokdar, S. T.; **Groh, J. M**. Interactions of simultaneous sound representations in the primate inferior colliculus. 2016. *Soc Neuro Abstr.*

Murphy, DLK; Gruters, KG; Smith, DW; Shera, CA; **Groh, JM**. 2016. Eye movement-related eardrum oscillations (EMREOs) suggest visual-auditory spatial integration begins in the auditory periphery. *Advances and Perspectives in Auditory Neuroscience.*

Murphy, DLK; Gruters, KG; Smith, DW; Shera, CA; Groh, JM. 2016. Eye movement-related eardrum oscillations (EMREOs) suggest visual-auditory spatial integration begins in the auditory periphery. *Gordon Conference on the Neurobiology of Cognition.*

Groh, J. M. 2016. When N>1: Multiplexing in the Brain. Invited presentation, *Neurizons Conference*, Max Planck Institute, Gottingen.

Groh, J. M. 2016. When N>1: Multiplexing in the Brain. Invited presentation, *Gordon Research Conference, Neurobiology of Cognition.*

Groh, J. M. 2016. When N>1: Multiplexing in the Brain. Invited presentation, *Cosyne Workshops.*

Caruso, VC; Lee J; Mohl, JT; Pages, DS; Lindon, M. Tokdar, S; **Groh, JM.** 2016. Multiplexing of multiple items in a subcortical auditory area. *Cosyne.*

Gruters, K., Shera, C. and **Groh JM**. 2015. Saccade-related modulation of acoustic activity recorded from the external ear canal. *Association for Research in Otolaryngology Midwinter Meeting.*

Gruters, K., Shera, C. and **Groh JM**. 2015. Eye movement-related modulation of the auditory transduction apparatus as recorded with a microphone in the external ear canal. *Neural Control of Movement Meeting.*

Caruso VC, Pages DS, Sommer MA, **Groh, JM.** 2015. Evolution of a reference frame along a brain pathway: persistently hybrid coordinates of auditory signals in Frontal Eye Fields implicate the SC in computing eye-centered sound location. *Neural Control of Movement Meeting.*

Groh, JM. Linking visual and auditory signals in space. 2015. *International Multisensory Research Forum.*

Groh, JM. Invited talk, 2015. Janelia Farm HHMI Forum: *Combining Information from Multiple Modalities Across the Animal Kingdom*

Caruso, VC; Ebhihara, AF; Mohl, JT; Lee J; Pages, DS; Milewski, A; Tokdar, S; Freiwald WA; **Groh, JM.** 2015. Is multiplexing a general strategy for encoding multiple items in the brain? Evidence from a visual cortical face area and a subcortical auditory area. *Advances and Perspectives in Auditory Neuroscience.*

Caruso, VC; Ebhihara, AF; Lee J; Pages, DS; Milewski, A; Tokdar, S; Freiwald WA; **Groh, JM.** 2015. Is multiplexing a general strategy for encoding multiple items in the brain? Evidence from a visual cortical face area and a subcortical auditory area. *Society for Neuroscience Abstracts.*

Pages, DS; Caruso, VC; **Groh, JM.** 2015. Neural correlates of auditory scene analysis in the primate inferior colliculus, *Society for Neuroscience Abstracts.*

Groh, JM. 2015. Keynote: Bridging Visual and Auditory Space (and What It Might Tell Us About Thought) *Eye Movements Gordon Research Conference.*

Caruso, VC; Ebhihara, AF; Lee J; Pages, DS; Milewski, A; Tokdar, S; Freiwald WA; **Groh, JM.** 2015. Is multiplexing a general strategy for encoding multiple items in the brain? Evidence from a visual cortical face area and a subcortical auditory area. *CRCNS PIs meeting.*

Gruters, K., Shera, C. and **Groh, JM**. 2014. Eye position influences on auditory processes measured from within the external ear canal. *Association for Research in Otolaryngology.*

Pages, DS, Caruso, VC, Tokdar, S. and **Groh, JM**. 2014. Frequency tagging and neural correlates of the cocktail party effect in the monkey inferior colliculus. *Society for Neuroscience Abstracts.*

Gruters, K., Shera, C. and **Groh, JM**. 2014. Saccade-related modulation of acoustic activity recorded from the external ear canal. *Society for Neuroscience Abstracts.*

Caruso, VC, Lee, JA, Pages, PS, Estrada, R, **Groh, JM**, and Tokdar, S, 2014. Neural mechanisms for preserving information about multiple sound items. *Society for Neuroscience Abstracts.*

Groh, JM, Caruso, VC, Lee, JA, Pages, PS, Estrada, R, and Tokdar, S. 2014. Time-domain multiplexing of multiple items in an auditory coding bottleneck. *CRCNS PIs meeting.*

Lee, J. Estrada R., Tokdar, ST, and **Groh, JM.** 2013. Monkeys can localize more than one simultaneous sound, but how they do it is mysterious: behavior and neural activity in the inferior colliculus. *Society for Neuroscience Abstracts.*

Gruters, K., Shera, C. and **Groh, JM**. 2013. Eye position influences on auditory processes measured from within the external ear canal. *Society for Neuroscience Abstracts.*

Caruso, V., Pages, D. S. and **Groh, JM**. 2013. Microstimulation of Frontal Eye Field in concert with saccades to visual or auditory targets. *Society for Neuroscience Abstracts.*

Caruso, V., Pages, D. S. and **Groh, JM**. 2013. Microstimulation of Frontal Eye Field in concert with saccades to visual or auditory targets. *Gordon Conference on eye movements.*

Groh, JM. 2013. An auditory meter in a visual map in the primate superior colliculus. *Society for Neuroscience Abstracts.*

Pages, D, Ross DA, and **Groh, JM.** 2012. Electrically activating auditory codes: effects of microstimulation in the inferior colliculus on sound frequency discrimination in primates. Auditory cortex conference, Lausanne, Switzerland.

Lee, J. and **Groh, JM**. 2012. Monkeys can localize more than one simultaneous sound, but how they do it is mysterious: behavior and neural activity in the inferior colliculus. *Society for Neuroscience Abstracts.*

Pages, D, Ross DA, and **Groh, JM.** 2012**.** The causal role of the inferior colliculus in perception: effects of electrical stimulation on frequency discrimination in primates. *Society for Neuroscience Abstracts.*

Caruso, V, Pages D, and **Groh, JM.** 2012. Frontal eye field may be "read out" differently for auditory vs. visual saccades. *Society for Neuroscience Abstracts.*

Caruso, V, Pages D, and **Groh, JM.** 2012. Probing the "read out" of the frontal eye fields with microstimulation: different results for auditory vs. visual saccades *Gordon Conference on Neurobiology of Cognition*, Italy, July 2012.

Lee J. and **Groh, JM**. 2012. Rethinking maps: signal transformations for linking visual and auditory events. *Gordon Conference on Neurobiology of Cognition*, Italy, July 2012.

Groh, JM. 2011. Current issues in audio-visual integration. *DARPA Acoustic/Visual Sensory Integration Meeting*

Groh, JM. 2011. Different codes for visual and auditory space in the superior colliculus. *Gordon Research Conference: Eye Movements: The Motor System that Sees the World*

Caruso, V, Pages D, and **Groh, JM.** 2011. Reference frame of visual and auditory signals in the primate frontal eye fields. *Society for Neuroscience Abstracts.*

Lee, J. and **Groh, JM.** 2010. The same neurons form a visual place code and an auditory rate code in the primate SC. COSYNE.

Pages D and **Groh, JM**. 2010. Is multisensory integration Hebbian? Ventriloquism aftereffect w/o simultaneous audiovisual stimuli. COSYNE.

Pages D and **Groh, JM**. 2010. Better late than now: Visual stimuli that follow sounds induce auditory plasticity. International Multisensory Research Forum.

Ross, D. A. and **Groh, JM**. 2010. Effects of microstimulation in the primate inferior colliculus on auditory perception: implications for the auditory midbrain implant. *Society for Neuroscience Abstracts.*

Lee, J. and **Groh, JM**. 2010. Different coding formats in the same primate SC neurons: a visual place code but auditory rate code. *Society for Neuroscience Abstracts.*

Pages, D. and **Groh, JM.** 2010. Better late than now: Visual stimuli after sounds shift auditory space in humans and monkeys. *Society for Neuroscience Abstracts.*

Ross, DA and **Groh, JM**. 2009. Performance of monkeys on a frequency discrimination task involving pitch direction (higher vs. lower) judgments. Society for Neuroscience Meeting. Washington, DC

Lee, J. and **Groh, JM.** 2009. Eye-centered reference frame of auditory and visual oculomotor signals in the primate superior colliculus. Society for Neuroscience Meeting. Washington, DC

Groh, JM. 2008**.** Visual- and saccade-related signals in the primate inferior colliculus. *Association for Research in Otolaryngology*, Symposium presentation.

Maier, JX, Porter, KK, **Groh, JM**. 2008. Eye position has an additive effect on neurons in monkey auditory cortex. *COSYNE.*

Bulkin, DA and **Groh, JM.** 2008. Visual information in the ascending auditory pathway. *Vision Sciences Society*.

Groh, JM. 2008**.** Visual- and saccade-related signals in the primate inferior colliculus. *AREADNE conference.*, oral presentation.

Pai, DK and **Groh, JM**. 2008. Neural codes for stable and accurate neural integration in the oculomotor system. *Soc. Neurosci. Abstr.*

Maier, JX and **Groh, JM**. 2008. Effects of eye position on saccades evoked by microstimulation of the monkey superior colliculus. *Soc. Neurosci. Abstr.*

Lin, I-F.; Kopco, N; **Groh, J. M**.; Shinn-Cunningham, B. G. 2007. Characteristics of visually-induced auditory spatial adaptation. *Acoustical Society of America.*

Lin, I-F.; Kopco, N; **Groh, J. M**.; Shinn-Cunningham, B. G. 2007. Characteristics of visually-induced auditory spatial adaptation. *Gordon Conference on Oculomotor System Biology.*

Groh JM. 2007. Neural computations for associating visual and auditory events. *Eleventh International Conference on Cognitive and Neural Systems.*

Groh JM; Pai DK. 2007. Hybrid reference frames for oculomotor control. *CRCNS PI's meeting.*

Groh JM; Pai DK. 2007. Hybrid reference frames for oculomotor control. *Soc. Neurosci. Abstr.*.

Bulkin, DA; Werner-Reiss, U; **Groh, JM**. 2007. Visual signals in the central nucleus and external cortex of the primate inferior colliculus. *Soc. Neurosci. Abstr.*

Kopco, N; Lin, I-F, Shinn-Cunningham, B. G.; **Groh, JM**. 2007. Visually-induced auditory spatial adaptation in monkeys and humans. *Soc. Neurosci. Abstr.*

Groh JM. 2006. Auditory and visual reference frames in the intraparietal sulcus. *Cosyne* Workshop. With O'Dhaniel Mullette-Gillman and Yale Cohen.

Groh JM. 2006. Hybrid reference frames: why? *Neural Control of Movement*.

Groh JM 2006. Rewards signals in primate inferior colliculus. *Society for Neuroscience* minisymposium..

Werner-Reiss, U., Greene, NT., Underhill, AM., Metzger, RR., **Groh, JM**. 2005. The representation of sound frequency in the primate inferior colliculus. *Association for Research in Otolaryngology Abstr.*

Groh, JM. 2005. Coordinate transformations for audio-visual integration. *European Conference on Visual Perception*. Invited speaker.

Werner-Reiss, U, Porter, K. K., Greene, N. T., Larue, D. T., Winer, J. A. and **Groh, J. M**. 2005. Eye position signals are distributed throughout the primate inferior colliculus. *Soc. Neurosci. Abstr.*

Porter, K. K., Metzger, R. R., Werner-Reiss, U. Underhill, A. M,. **Groh, J. M**. 2005. Visual responses in auditory neurons of the primate inferior colliculus. *Soc. Neurosci. Abstr.*

Groh, JM. 2005. Reference frame of visual and auditory signals in the primate intraparietal sulcus. *Gordon Conference on Oculomotor System Biology*.

Groh, JM, Mullette-Gillman, O. A. and Cohen, Y.E. 2004.A comparison between the effects of eye position in primate auditory cortex and lateral intraparietal cortex (LIP). *International Multisensory Research Forum*, Barcelona, June 2-5.

Mullette-Gillman, O.A.; Cohen, Y. E.; **Groh, JM.** 2004. Reference frame of auditory and visual signals in bimodal neurons of the primate lateral intraparietal area (LIP). *Soc. Neurosci. Abstr.*

Metzger, RR, Kelly, KA, **Groh, JM.** 2004. Sensitivity to eye position in the inferior colliculus of the monkey during an auditory saccade task *Soc. Neurosci. Abstr.*

Werner-Reiss, U., Underhill, A. M. **Groh, JM.** 2004. The representation of auditory space in core auditory cortex of primates maintaining fixation. *Soc. Neurosci. Abstr.*

Kelly, KA, Werner-Reiss, U, Underhill, AM and **Groh, JM**. 2003. Eye position signals change shape along the primate auditory pathway. *Soc Neurosci Abstr,*

Metzger, RR, Mullette-Gillman, OA, Underhill, AM, Cohen, YE and **Groh, JM**. 2003. Effect of initial eye position on saccades to auditory targets in monkeys. *Soc Neurosci Abstr,*

Mullette-Gillman, OA, Cohen, YE and **Groh, JM**. 2003. Similar eye position influences on auditory and visual responses in the lateral intraparietal area, LIP, of primates. *Soc Neurosci Abstr,*

Werner-Reiss, U, Kelly, KA, Underhill, AM and **Groh, JM**. 2003. Long inter-stimulus intervals affect responses in primate auditory cortex. *Soc. Neurosci. Abstr.*

Groh, JM. 2003. Visual-auditory integration: the role of eye position information. *Advances in primate auditory neurophysiology* (Satellite symposium at the Society for Neuroscience Meeting). Joint work with Yale Cohen, Kristin Kelly, Ryan Metzger, O'Dhaniel Mullette-Gillman, Abigail Underhill, and Uri Werner-Reiss.

Kelly, K. A., Werner-Reiss, U., Underhill, AM, **Groh, JM**. 2002. History of recent past affects neural responses in auditory cortex of awake primates. Association for Research in Otolaryngology, St Petersburg Beach, FL.

Metzger, RR and **Groh, JM.** 2002. Role of the primate inferior colliculus in sound localization. Multisensory Interactions Subserving Orienting Behavior. Naples, FL April 14-16, 2002.

Kelly KA, Werner-Reiss U, Underhill AM, and **Groh JM**. 2002. Eye position affects a wide range of auditory cortical neurons in primates. *Soc Neurosci Abstr*: 845.1.

Mullette-Gillman OA, Cohen YE, and **Groh JM**. 2002. Assessing the spatial alignment of auditory and visual responses in the inferior parietal sulcus. *Soc Neurosci Abstr*:,57.19.

Metzger RR and **Groh** JM. 2002. Linking primate inferior colliculus neural activity to sound localization performance. *Soc Neurosci Abstr*:, 845.2.

Groh, JM. 2001. How our eyes affect our ears: visual intrusions into the domain of hearing. Symposium, *Society for Neuroscience*, 2001. With E. I. Knudsen, Y. E. Cohen, T. R. Stanford.

Groh, JM, Underhill, AM. 2001. Coding of sound location in primate inferior colliculus. *Soc. Neurosi. Abstr., 27*:60.1.

Metzger, R R, Underhill, A. M. and **Groh, J. M.** 2001. Time course of eye position influence in primate inferior colliculus. *Soc. Neurosi. Abstr., 27* 60.3.

Werner-Reiss, U., Kelly, K.A., Underhill, A. M. and **Groh, J. M**. 2001. Eye position tuning in primate auditory cortex. *Soc. Neurosi. Abstr., 27:*60.2.

Groh, JM. 2001. The eyes and ears both have it: Frames of reference in the auditory pathway. In, "Processing the Auditory Environment: From synaptic mechanisms to population codes.". 6th Biennial Symposium of the Center for Neural Science at New York University. June 10-11, 2001.

Boucher, L., **Groh, JM**, Hughes, HC. 2001. Afferent delays and the mislocalization of perisaccadic stimuli. York Conference: Levels of Perception. Toronto, Canada. June 19-23, 2001.

Groh, JM. 2000. Frames of reference and multisensory integration. McKnight Conference on Neuroscience.

Groh, JM. 2000. Brain soup: sensory, motor, sensorimotor and cognitive signals - are these concepts or confounds? Symposium (LH Snyder, organizer). Neural Control of Movement 2000.

Trause, A. S., Werner-Reiss, U., Underhill, A. M., **Groh, J. M**. 2000. Effects of eye position on auditory signals in primate auditory cortex. *Soc. Neurosi. Abstr.*, 26:1977.

Clark, K. R., Trause, A. S., Underhill, A. M., **Groh, J. M**. 2000. Effects of eye position on auditory signals in primate inferior colliculus. *Soc. Neurosi. Abstr.*, 26:1977.

Boucher, L., **Groh JM.**, Hughes, HC. 2000. Oculomotor localization of perisaccadic auditory targets. *Soc. Neurosi. Abstr.* 26:1329.

Groh, JM. 1999. Converting neural signals from 'digital' to 'analog' representations. Symposium: Interpreting Neural Activity (**JM Groh**, organizer), Cognitive Neuroscience Society Meeting.

Boucher, L., **Groh, J.M**., and Hughes, H.C. 1999. Contributions of visual processing delays to mislocalization of perisaccadic stimuli. *Soc. Neurosi. Abstr.*, **29**.

Born, RT, Zhao, R., and Lukasewycz, S. J., **Groh, JM**. 1999. Representation of figure and ground in visual area MT. *Soc. Neurosi. Abstr.*

Groh, JM. 1998. How are neural signals converted from 'digital' to 'analog' representations? Evidence from visual area MT and the superior colliculus. The Fifth International Congress of Neuroethology.

Groh, JM. 1997. A model for transforming signals from a place code to a rate code. *Soc. Neurosci. Abstr.*, **23**:1560.

Groh, JM, Born, RT, and Newsome, WT. 1996. A comparison of the effects of microstimulation in area MT on saccades and smooth pursuit eye movements. *Invest. Ophthal. Vis. Sci.*, **37**(3):S472.

Groh, JM, Born, RT, and Newsome, WT. 1995. Effects of microstimulation of area MT on smooth pursuit eye movements. *Physiology and Anatomy of the Association Cortices (IBRO satellite symposium)*..

Groh, JM, Born, RT, and Newsome, WT. 1995. Microstimulation of area MT affects both saccades and smooth pursuit eye movements. *Soc. Neurosci. Abstr.*, **21**:281.

Born, RT, **Groh, JM**, and Newsome, WT. 1995. Functional architecture of primate area MT probed with microstimulation: effects on eye movements. *Soc. Neurosci. Abstr.,* **21**:281.

Shadlen, MN, **Groh, JM**, Salzman, CD and Newsome, WT. 1994. Responses of LIP neurons during a motion discrimination task: a decision process in action? *Soc. Neurosci. Abstr.* **20**:1279.

Groh, JM and Sparks, DL. 1993. Motor activity in the primate superior colliculus (SC) during saccades to somatosensory and visual targets. *Invest. Ophthal. Vis.. Sci.,* **34**:1137.

Glimcher, PW, **Groh, JM** and Sparks, DL. 1993. Low-frequency collicular stimulation specifies saccadic amplitude gradually. *Invest. Ophthal. Vis.. Sci.,* **34**:1137.

Groh, JM and Sparks, DL. 1993. Somatosensory activity in the superior colliculus (SC) influenced by eye position. *Soc. Neurosci. Abstr.*, **19**:858.

Groh, JM and Sparks, DL. 1992. Characteristics of saccades to somatosensory targets. *Soc. Neuro. Abstr.*, **18**:701.

Groh, JM and Sparks, DL. 1991. A model for transforming auditory signals from head-centered to eye-centered coordinates. *Soc. Neurosci. Abstr.*, **17**:458

Aldridge, JW, Thompson, JF, Walters, EA, **Groh, JM** and Gilman, S. 1991. Neostriatal unit activity related to movement preparation in a go/no-go task in the cat. *Soc. Neurosci. Abstr.*, **17**:1217.