

APAN Advances and Perspectives in Auditory Neuroscience

Sponsored by TDT and NIDCD
Wyndham Chicago Grand Riverfront, Chicago, IL
Friday, October 18th, 2019

8:00 – 9:00 **Registration and Poster set-up**
9:00 – 9:05 **Opening Remarks** (Jenny Bizley)

Keynote Lecture (Chairs: Jenny Bizley and Dan Polley)

9:05 – 10:00 Prof. **Barbara Shinn-Cunningham, Carnegie Mellon University.**
When an engineer realizes that auditory cortex matters

Poster Teaser Session I (Chairs: Liberty Hamilton and Maria Chait)

10:00 – 10:15 **Four 3-minute Teasers**

- Short-term effects of vagus nerve stimulation on auditory learning and stimulus-specific activity in auditory cortex - *Jesyin Lai, Stephen David (p54)*
- Transformations of sound representations from the cochlea to the auditory cortex - *Jacques Bourg, Alexandre Kempf, Thibault Tarpin, Jérôme Bourien, Jean-Luc Pue, Brice Bathellier (p58)*
- Temporal context invariance reveals neural processing timescales in human auditory cortex - *Sam V Norman-Haignere, Laura K. Long, Orrin Devinsky, Werner Doyle, Guy M. McKhann, Catherine A. Schevon, Adeen Flinker, Nima Mesgarani (p30)*
- Neural correlates of auditory stream segregation in the auditory pathways of macaque monkeys - *Taku Banno, Jaejin Lee, Yonatan I. Fishman, Yale E. Cohen (p24)*

10:20 – 12:00 **Morning Poster Session (Presentations by EVEN # Posters)** and Coffee Break

Slide Session I (Chairs: Molly Henry and David Schneider)

12:00-12:15 Functional segregation of the marmoset auditory cortex by data-driven decomposition of responses to naturalistic sounds with wide-field optical imaging - *Yueqi Guo, Xindong Song, Chenggang Chen, Xiaoqin Wang*

12:15-12:30 Allocentric sound localization in ferrets - *Stephen Town, Jennifer Bizley*

12:30-12:45 The posterior tail of striatum plays an important role in tonal associative learning - *Miaomiao Liu, Hanqing Wang, Tianyu Li, Yiwei Wang, Dongqin Cai, Kexin Yuan*

12:45 – 2:15 **Lunch** on your own (posters remain up through entire meeting)

2:15-2:20 NIDCD Announcements

Young Investigator Spotlight I (Chair: Stephen David)

2:20-2:45 Kerry Walker – University of Oxford
The neural basis of pitch perception: Insights from a multidisciplinary approach

Side Session II (Chairs: Tobias Overath and Kexin Yuan)

2:45-3:00 General auditory and speech-specific contributions to cortical envelope tracking revealed using auditory chimeras - *Kevin Prinsloo, Edmund Lalor*

3:00-3:15 Neuromodulation enhances plasticity in a rodent model of cochlear implant use - *Erin Glennon, Jasmin Multani, Mario Svirsky, Robert C. Froemke*

3.15-3.30 Encoding of natural sounds in the aging human auditory cortex - *Julia Erb, Lea-Maria Schmitt, Jonas Obleser*

Young Investigator Spotlight II (Chair: Dan Polley)

3.30 – 3.55 Brice Bathellier - Institut Pasteur
Deciphering and manipulating neural population codes for auditory perception in mice.

Poster Teaser Session II (Chair: Steve Eliades and Vatsun Sadogopan)

3:55 – 4:10 **Four 3-minute Teasers**

- Behavioral and neural evidence for implicit memory for regularities in rapid sound sequences - *Roberta Bianco, Cora Bolger, Mingyue Hu, Peter Harrison Marcus Pearce, Maria Chait (p27)*
- Neural correlates of figure-ground segregation in anterolateral fields of the monkey auditory cortex - *Felix Schneider, Fabien Balezeau, Yukiko Kikuchi, Chris Petkov, Alexander Thiele, Timothy Griffiths (p37)*
- Deep Neural Networks as Models of Real-World Human Sound Localization - *Andrew Francl, Josh McDermott (p87)*
- Neural encoding and decoding of auditory cortex during perceptual decision making - *Akihiro Funamizu, Fred Marbach, Anthony M. Zador (p109)*

4:10 – 6:15 **Afternoon Poster Session (Presentations by ODD # Posters until 5:20 PM)** and Open Bar

6.15 - 6.20 **Travel Awards and Other Announcements** (Santiago Jaramillo, Molly Henry, Maria Chait)

6:20 – 6:40 **Business Meeting** (Open to all, including Programming, Event and Organizing Committee members)

Posters

- 1 Auditory representation in cortex during perceptual learning
Kathleen A Martin, Robert C Froemke
- 2 Top-down and bottom-up expectations in the prefrontal and auditory cortices
Lalitta Suriya-Arunroj, Yale E. Cohen, Joshua I. Gold
- 3 Human speech cortex encodes amplitude envelope as transient, phase-locked responses to discrete temporal landmarks
Katsuaki Kojima, Yulia Oganian, Chang Cai, Anne Findlay, Edward Chang, Srikantan Nagarajan
- 4 Representation of behavioral integration time downstream of auditory cortex
Justin Yao, Justin Gimoto, Dan Sanes
- 5 Musical training enhances cortical phase-locking while listening to continuous naturalistic speech
Sebastian Puschmann, Mor Regev, Sylvain Baillet, Robert J. Zatorre
- 6 Rats and VRats: using virtual rats to study the behavior and neural activity of freely moving rats in a complex environment
Alex Kazakov, Maciej M. Jankowski, Ana Polterovich, Johannes Niediek, Israel Nelken
- 7 Synaptic zinc contributes to contrast adaptation in auditory cortex
Patrick A Cody, Thanos Tzounopoulos
- 8 Human Neural Envelope Coding is Predictive of Speech Intelligibility in Noise
Vibha Viswanathan, Hari M. Bharadwaj, Barbara G. Shinn-Cunningham, Michael G. Heinz
- 9 Role of top-down inputs in auditory cortex during vocalization in marmoset monkeys *Steven J Eliades, Joji Tsunada*
- 10 Behavior of freely moving rats in a complex environment modeled by reinforcement learning with informational constraints
Johannes Niediek, Maciej M. Jankowski, Ana Polterovich, Alex Kazakov, Israel Nelken
- 11 Multisensory Responses in Primary Auditory Cortex of the Cat

- Catherine Boucher, Xiaohan Bao, Yaser Merrikhi, M. Alex Meredith, Stephen G. Lomber*
- 12 Quantitative Delineation of Sub-regions of Marmoset Auditory Cortex using Ultra-high Field MRI
Yang Zhang, Xiaoqin Wang
- 13 Neural modulation to direction and speaker in spatial multi-talker speech perception
Prachi Patel, Jose L. Herrero, Ashesh D. Mehta, Nima Mesgarani
- 14 Neural evidence of location constancy for auditory spectral processing in marmoset auditory cortex
Yi Zhou, Jonas Braasch
- 15 Sequence Learning in Mammals: An Animal Model to Explore the Mechanisms of Language Acquisition
Dan Luo, Ryszard Aukstulewicz,, Jan W.H. Schnupp
- 16 The neural basis of auditory restoration for familiar zebra finch song
Margot C Bjoring, C Daniel Meliza
- 17 Birdsong syllable recognition with sparse spike sequence representations
Leonardo Estêvão Schendes Tavares, Dezhe Z. Jin
- 18 MEG correlates of periodicity relevant to pitch perception in human auditory cortex
Seung-Goo Kim, Tobias Overath, Will Sedley, Sukhbinder Kumar, Sundeep Teki, Timothy D. Griffiths
- 19 Reorganization of intrinsic neural networks associated with tinnitus
Somayeh Shahsavarani, Rafay A. Khan, Sara Schmidt, Yihsin Tai, Fatima T. Husain
- 20 Eye movement is linearly encoded by eardrum motion: the decipherable EMREO
David LK Murphy, Cynthia D. King, Stephanie Schlebusch, Rachel Landrum, Christopher A. Shera, Jennifer M. Groh
- 21 Assays of Temporal Coding in the Ascending Human Auditory Pathway
Agudemu Borjigin, Hari M. Bharadwaj
- 22 Computational model of complex combinatorial binding: Neurobiological simulations and hypotheses
Ryan M. Calmus, Benjamin Wilson, Yukiko Kikuchi, Zsuzsanna Kocsis, Hiroto Kawasaki, Timothy D. Griffiths, Matthew A. Howard, III, Christopher I. Petkov
- 23 Direct mapping of the cortical tinnitus network
Phillip E. Gander, William Sedley, Sukhbinder Kumar, Hiroyuki Oya, Christopher K. Kovach, Kirill V. Nourski, Hiroto Kawasaki, Matthew A. Howard III, Timothy D. Griffiths
- 24 Neural correlates of auditory stream segregation in the auditory pathways of macaque monkeys
Taku Banno, Jaejin Lee, Yonatan I. Fishman, Yale E. Cohen
- 25 Differing release patterns of dopamine and acetylcholine in the mouse basolateral amygdala in response to high-arousal vocal sequences
Zahra Ghasemahmad, Jeffrey Wenstrup
- 26 Alpha and gamma power in medial prefrontal cortex reinforces reward contingencies and predicts asymptotic performance in a cognitive flexibility task
Howard Gritton,, Nicholas M. James, Jian Carlo Nocon, Moona Abdulkerim, Kamal Sen, Xue Han
- 27 Behavioral and neural evidence for implicit memory for regularities in rapid sound sequences
Roberta Bianco, Cora Bolger, Mingyue Hu, Peter Harrison Marcus Pearce, Maria Chait;
- 28 Tracking of 1/f stimulus characteristics in the human EEG
Leonhard Waschke, Thomas Donoghue, Sydney Smith, Bradley Voytek, Jonas Obleser
- 29 The auditory dorsal pathway mirrors the semantic hierarchy of speech prediction
Lea-Maria Schmitt, Julia Erb, Sarah Tune, Anna Rysop, Gesa Hartwigsen, Jonas Obleser

- 30 Temporal context invariance reveals neural processing timescales in human auditory cortex
Sam V Norman-Haignere, Laura K. Long, Orrin Devinsky, Werner Doyle, Guy M. McKhann, Catherine A. Schevon, Adeen Flinker, Nima Mesgarani
- 31 Chronic Bilateral Stimulation through Cochlear Implants during Development Can Reverse the Effect of Early-Onset Deafness on Neural ITD Sensitivity
Woongsang Sunwoo, Bertrand Delgutte, Yoojin Chung
- 32 Metamers of audio-trained deep neural networks
Jenelle Feather, Alex Durango, Ray Gonzalez, Josh McDermott
- 33 Cortical mapping of prediction error responses to multiple sensory features
HyunJung Ahn, Ryszard Aukstulewicz, Jan W. Schnupp
- 34 Temporal weighting functions for binaural cues in rats
Kongyan Li, Chloe H. K. Chan, Ambika Prasad Mishra, Jan W. H. Schnupp
- 35 Anterior temporal lobe disconnection disrupts neural responses to speech along the human auditory cortical neural network
Z. Kocsis, R. L. Jenison, B. McMurray, A. E. Rhone, M. E. Sarrett, P. E. Gander, K. V. Nourski, M. Steinschneider, R. M. Calmus, H. Kawasaki, J. D. Greenlee, C. K. Kovach, T. D. Griffiths, M. A. Howard, III, C. I. Petkov
- 36 Comparison of Dendritic Spine Density/Size for Anterior Auditory Field Neurons from Early-deaf and Hearing Cats.
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- 37 Neural correlates of figure-ground segregation in anterolateral fields of the monkey auditory cortex
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- 38 Attentional capture in budgerigars (*Melopsittacus undulatus*)
Huaizhen Cai, Micheal L. Dent
- 39 Cortical tracking of words during natural story comprehension
Cheng Luo, Nai Ding
- 40 Eye activity tracks task-relevant structures during speech and auditory sequence perception
Peiqing Jin, Jiajie Zou, Tao Zhou, Nai Ding
- 41 Auditory and language contributions to neural encoding of speech features in noisy environments
Jiajie Zou, Jun Feng, Tianyong Xu, Peiqing Jin, Cheng Luo, Jianfeng Zhang, Xunyi Pan, Feiyan Chen, Jing Zheng, Nai Ding
- 42 Acoustic Trauma Following Blast-Induced Traumatic Brain Injury (TBI) in CBA/CaJ Mice
Kali Burke, Senthilvelan Manohar, Richard J. Salvi, Micheal L. Dent
- 43 Cortical responses to auditory novelty across task conditions as revealed by intracranial recordings
Kirill Nourski, Mitchell Steinschneider, Ariane Rhone, Hiroto Kawasaki, Matthew Howard, Matthew Banks
- 44 Direct comparison of nonlinear sensory encoding models in ferret primary auditory cortex
Jacob Pennington, Stephen David
- 45 Auditory Neurofeedback for Noise Suppression and Speech Enhancement
Yue Dong, Yan Gai
- 46 The effect of lexical status on acoustic encoding in human auditory cortex: preliminary results from intracranial recordings
McCall E Sarrett, Kayleen Schreiber, Hiroto Kawasaki, Matthew A Howard III, Bob McMurray
- 47 Efficient codes of the auditory nerves reconsidered with natural reverberations
Hiroki Terashima, Shigeto Furukawa

- 48 Cooling of the auditory cortex modulates temporal processing of auditory thalamic neurons in awake marmosets
Yuanqing Zhang, Siyi Bai, Xiaohui Wang, Rui Li, Hao Sun, Lixia Gao
- 49 Olfactory cue congruency modulates neuronal responses in primary auditory cortex
Omri Gilday, Adi Mizrahi
- 50 Pupil response to rapid predictable auditory sequences
Alice Milne, Christina Tampakaki, Sijia Zhao, Maria Chait
- 51 Activity in auditory cortex predicts specificity of fear learning
Katherine C. Wood, Richard Betzel, Danielle Bassett, Maria N. Geffen
- 52 Variation in temporal coding of vocalizations along the anterior-posterior extent of marmoset auditory cortex
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- 53 Relationship between saccade-related eardrum oscillations and clinical measures of middle ear impedance
Cynthia King, Rachel Landrum, David Murphy, Stephanie Schlebusch, David Kaylie, Christopher A. Shera and Jennifer Groh
- 54 Short-term effects of vagus nerve stimulation on auditory learning and stimulus-specific activity in auditory cortex
Jesyin Lai, Stephen V David
- 55 Extensive psychophysical and neural comparisons of deep neural networks to human hearing
Alexander J.E. Kell, Erica N. Shook, Josh H. McDermott
- 56 Targeted cortical manipulation of auditory perception in a challenging sound discrimination
Sebastian Ceballo, Zuzanna Piwkowska, Jacques Bourg, Aurélie Daret and Brice Bathellier
- 57 Fundamental response properties of auditory cortical activity in Heschl's gyrus of children as observed from direct intracranial recordings
Mitchell Steinschneider, Ariane E. Rhone, Kirill V. Nourski, Christopher K. Kovach, Brian J. Dlouhy
- 58 Transformations of sound representations from the cochlea to the auditory cortex
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- 59 Sound Representation in the Mouse Temporal Association cortex (TeA)
Libi Feigin, Gen-ichi Tasaka, Ido Maor and Adi Mizrahi
- 60 Functional Connectivity Between Cortical and Subcortical Auditory Regions: Examining voxel-wise connectivity during rest and the movie paradigm
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- 61 Infant neural response to speech and tones
Bonnie K. Lau, Samu Taulu, Patricia K. Kuhl, Adrian KC Lee
- 62 Binaural hearing in the naked mole-rat *
- E. McCullagh, J. Peacock, A. Klug, T. Park, D. J. Tollin;
- 63 Multiple Temporal Integration Windows for Sound Statistics
Richard McWalter, Josh H. McDermott
- 64 Characteristics of Human Pitch Perception Emerge in Neural Networks Optimized to Estimate F0 from Natural Sounds
Mark R Saddler,, Ray Gonzalez, Josh H McDermott
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- 66 Functional Architecture of Auditory Cortex in Awake Marmosets revealed by Multi-scale Multi-modal optical Imaging
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- 67 The caudal paralaminar thalamus plays a critical role in cortical activation and arousal
Yiwei Wang, Ling You, Jingshan Zou, Rouyu Chen, Meijie Li, Miaomiao Liu, Dongqin Cai, Fenghua Xie, Yin Yue, Tianyu Li, Kexin Yuan
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- 73 Assessing the contribution of visual speech features to audiovisual speech perception in noise
Aisling E. O'Sullivan, Aaron R. Nidiffer, Edmund C. Lalor
- 74 Aging differentially affects the cortical representation of ramped and damped sounds
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- 75 Specificity of an amygdala-prefrontal projection for integrating emotional and multisensory information in the macaque
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- 76 Neural correlation codes for sound identification and categorization: the contribution of sound spectrum and envelope correlation structure
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- 78 The contribution of stimulus driven and noise correlations for neural decoding and identification of texture sounds
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- 79 A corticothalamic circuit for motor modulation of auditory processing
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- 80 Synaptic integration and sound processing by VIP neurons in the inferior colliculus of mice
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- 81 What white matter plasticity can tell us about the associations between tinnitus and hearing loss
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- 82 Diverse brain regions targeting layer 1 interneuron subtypes in auditory cortex
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- 87 Deep Neural Networks as Models of Real-World Human Sound Localization
Andrew Francl, Josh McDermott
- 88 Phasic arousal suppresses suboptimal decision biases in mice and humans
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- 92 Graded control of pupil dilation and cortical neuromodulation using selective and parametric stimulation of the Vagus Nerve
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- 93 Characterization of modularity in the lateral cortex of the mouse inferior colliculus using a combination of optogenetic circuit mapping and in vivo two-photon imaging
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- 94 Characterizing the nonlinear encoding of speech in the human auditory cortex
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- 96 Neural oscillations and nursery rhymes; A longitudinal EEG study into individual differences in infant language development
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- 97 Imaging the representation of sound location in the auditory cortex of awake marmoset
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- 99 Neural activity in the auditory cortex during memory formation of auditory patterns

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Laura K Long, Minda Yang, Michael Sperling, Ashwini Sharan, Bradley Lega, Alexis Burks, Greg Worrell, Robert Gross, Barbara Jobst, Kathryn Davi, Kareem A Zaghloul, Sameer Sheth, Sandhitsu Das, Richard Gorniak, Paul Wanda, Michael Kahana, Joshua Jacobs, Nima Mesgarani
- 101 Phonological feature and pitch classification with a branched convolutional neural network
Ian M. GRIFFITH, Shailee JAIN, Alex. G. HUTH, Liberty. S. HAMILTON
- 102 Deficits in central auditory processing in mouse models of Alzheimer's disease
Kelly A. Fogelson, Jennifer Lawlor, Ziyi Zhu, Kishore V. Kuchibhotla
- 103 Rapid pupil dilations accompany unexpected self-generated sounds in mice
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- 104 High angular resolution diffusion-weighted MRI exploration of the homotopic and heterotopic connectivity of human auditory cortex.
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- 105 Reliable envelope coding from unreliable single neurons
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- 106 Speech encoding from simultaneous ECoG recordings of human temporal plane and lateral temporal cortex
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- 107 Behavioural and neural measures of auditory regularity detection in ferrets
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- 108 Multi and single unit neuronal activity in human Heschl's gyrus during speech perception and production
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- 109 Neural encoding and decoding of auditory cortex during perceptual decision making
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- 110 Neuromodulatory- and prefrontal- sensory cortical interactions underlying motivated shifts in attentional effort
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- 111 Spectral cues are necessary for encoding the azimuthal map of auditory space in the mouse superior colliculus
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- 112 Cortical dynamics of word-in-noise recognition in cochlear implant users
Subong Kim, Jason Geller, Ann Holmes, Bob McMurray, Inyong Choi
- 113 The Cognitive Computations of Metacognitive Sensitivity in Absolute Pitch Individuals
Tamara Tang, Megan A.K. Peters
- 114 Effects of stochastically varying modulation frequency on the detection of amplitude-modulated noise
Kevin N. O'Connor, Daniel. R. Johnson, Jeffrey. S. Johnson, Mitchell. L. Sutter
- 115 Species differences in the cortical analysis of auditory time windows in primates
Pradeep Dheerendra, Simon Baumann, Olivier Joly, Fabien Balezeau, Alexander Thiele, Timothy D Griffiths
- 116 Neural activity in mouse auditory cortex is influenced by context, behavior, and expectation
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- 117 Dynamics of primate inferior colliculus neurons during the localization of simultaneous sounds

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- 118 Changes in saccade-related eardrum oscillations after surgical denervation of the stapedius muscle
Stephanie Schlebusch, Matthew Cooper, David Kaylie, David L.K. Murphy, Cynthia King, Christopher Shera, Jennifer M. Groh
- 119 Two-photon calcium imaging of auditory processing in the echolocating bat
Melville Wohlgemuth, Jennifer Lawlor, Cynthia Moss, Kishore Kuchibhotla
- 120 Mixed neuronal selectivity to task variables in the mouse somatosensory cortex during recognition of elementary tactile sequences
Michael R. Bale, Malamati Bitzidou, Elena Giusto, Miguel Maravall
- 121 Auditory processing remains vulnerable to prolonged developmental hearing loss after the critical period
Kelsey L. Anbuhl, Todd M. Mowery, Dan H. Sanes
- 122 Neural representations of birdsongs across distinct processing regions of auditory cortex
Jordan M. Moore, Shihab A. Shamma, Sarah M.N. Woolley
- 123 Amodal Neural Representations in the Human and Macaque Brain
Ross S. Muers, Zsuzsanna Kocsis*, Catherine Perrodin, Christoph Kayser, Hiroto Kawasaki, Lizabeth Romanski, Timothy D. Griffiths, Matthew A. Howard III & Christopher I. Petkov*
- 124 Experience-based changes to corticostriatal GABAA receptor function gates learning
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- 125 Observational learning without visual cues
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- 126 Disruptions of learning, memory and experience-induced auditory cortical plasticity in a Next-Generation rat model of Alzheimer's Disease
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- 127 Neural circuits for somatosensory control of auditory thalamo-cortical processing
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- 128 Effects of arousal on population coding of natural sounds in primary auditory cortex
Charles R. Heller, Daniel Saderi, Zachary P. Schwartz, Stephen V. David
- 129 Neural correlates of tone-sequence awareness probed with pre- and post-stimulus cues in human listeners
Kai Gaertner, Alexander Gutschalk
- 130 Acoustic precision in memory is predicted by learning-induced auditory cortical and subcortical neurophysiological plasticity
Elena Rotondo, Kasia Bieszczad
- 131 Long lasting contextual discrimination in non primary auditory cortex
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- 132 Competing stimuli in the owl's auditory space map - Evidence supporting a population vector readout
Roland Ferger, Michael V Beckert, Keanu Shadron, Andrea Bae, Brian J Fischer, Jose L Pena
- 133 The effect of anticipated cue reliability on neural adaptation and novelty detection in barn owls
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