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**EDUCATIONAL HISTORY:**

Ph.D., Neuroscience Program, 1998  
University of California, San Francisco  
B.A. Molecular and Cell Biology (Biochemistry), Honors Program, 1993  
University of California, Berkeley

**EMPLOYMENT HISTORY:**

2019-present: Interim Director, Texas Biomedical Device Center, [www.txbdc.com](http://www.txbdc.com)  
- Creating new biomedical technology and therapies  
2014-2018: Associate Director, Texas Biomedical Device Center  
- Creating new biomedical technology and therapies  
2013-present: Margaret Fonde Jonnson Professor - UT Dallas  
- Directing cortical plasticity to understand and treat neurological disease  
2011-2013: Full Professor - UT Dallas  
- Directing cortical plasticity to understand and treat neurological disease  
2004-2011: Associate Professor - UT Dallas  
- Cortical plasticity and the neural basis of speech sound processing  
1999-2004: Assistant Professor - UT Dallas  
- Investigation of the principles of cortical plasticity

1998: Post-doctoral Fellow - UC San Francisco

- Michael Merzenich, Sooy Professor
- Cortical Representation of Spectrotemporal Stimuli

1994-1998: Doctoral Research - UC San Francisco

- Michael Merzenich, Sooy Professor
- Induction of large-scale reorganization of primary auditory cortex by cholinergic forebrain stimulation
- Psychophysics of directed attention in tactile perception

**AWARDS:**

University of Texas Regents Outstanding Teaching Award (\$30,000), 2009 – inaugural year

Chancellor's Council Outstanding Teaching Award (\$5,000), 2008

Honorary Member, Golden Key International Honour Society, 2006

John Merck Scholar Finalist (\$10,000), 2003

Teaching Award, UTD School of Behavioral and Brain Sciences, 2002

Callier Scholar Award (\$5,000), 2002

NIDCD National Research Service Award (\$70,000), 1998 [not activated]

Krevan's Distinguished Dissertation Award (\$500), UC San Francisco, 1998

Outstanding Geneticist of the Year, UC Berkeley, 1993

National Merit Scholar

Eagle Scout - BSA

**GRANTS/CONTRACTS AWARDED:**

>\$30 million in total external research funding

Current Funding

**Principle Investigator (PI) on \$8,559,466 in ongoing research grants**

**Co-PI on an additional \$7,463,732 in ongoing research grants**

DARPA TNT Research Grant (\$6,703,587) Targeted Neuroplasticity Training to Accelerate Complex Skill Learning, 2016 (PI).

Wings for Life (\$815,374), Enhancing Recovery in SCI Patients with Vagus Nerve Stimulation, 2019 (PI).

FitMi VNS: The First Automated Home Therapy System for Vagus Nerve Stimulation, National Institute of Neurological Disorders and Stroke, \$498,275, 2020 (PI).

NIH Research Grant, UH3 (\$2,591,208), Wireless Nerve Stimulation Device to Enhance Recovery after Stroke (co-I with Seth Hays), 2021.

DARPA ElectRx Research Grant (\$6,995,309), Closed-loop Neuromodulation to Treat PTSD (co-PI with Rob Rennaker), 2015.

NIH Research Grant, R01 (\$1,673,440) Enhancing Recovery after Chronic Bilateral Cervical Spinal Cord Injury with Targeted Plasticity Therapy (co-PI with Robert Rennaker), 2018.

#### Past Funding

NIH Research Grant, UG3 (\$3,563,399), Wireless Nerve Stimulation Device to Enhance Recovery after Stroke (co-I with Seth Hays), 2019.

NIH Research Grant, R01 (\$1,912,500), Enhancing Speech Processing in a Rat Model of Autism Using Vagus Nerve Stimulation (co-I with Crystal Engineer), 2019.

Congressionally Directed Medical Research Program (\$895,000) Hearing restoration through synaptic plasticity directed by vagus nerve stimulation, 2018 (PI).

NIH Research Grant, R01 (\$1,673,440) Evaluation of the Neuromodulatory Mechanisms of Vagus Nerve Stimulation to Improve Motor Rehabilitation after Stroke (co-I with Seth Hays), 2016.

Wings for Life (\$300,071) Promoting Recovery from Cervical Spinal Cord Injury by Pairing Rehabilitation with Vagus Nerve Stimulation, 2016 (PI).

International Rett Syndrome Foundation Research Grant (\$150,000), Reversing speech sound processing deficits in Rett syndrome, 2016 (PI).

NINDS R01 Research Grant (\$1,940,000), Vagus Nerve Stimulation Paired with Rehabilitative Training to Enhance Plasticity (co-PI with Rob Rennaker), 2014.

NINDS R43 Research Grant (\$225,043) A Novel Adjunct to Physical Training to Improve Motor Recovery Following Stroke (co-PI with Navzer Engineer), 2013.

Michael J. Fox Foundation for Parkinson's Research Rapid Response Innovation Award (\$75,000), Evaluation of Targeted Plasticity Therapy as a Treatment for Motor Dysfunction in Parkinson's (co-PI with Seth Hays), 2013.

NIDCD R01 Research Grant (\$1,683,000), Animal Model of Speech Sound Processing in Autism, 2010 (PI).

NIDCD R44 Research Grant (\$2,113,757), Targeted Neural Plasticity for the Treatment of Tinnitus (co-PI with Navzer Engineer), 2010.

NIDCD R43 Research Grant (\$585,483), Targeted Neural Plasticity for the Treatment of Tinnitus (co-PI with Navzer Engineer), 2009.

Texas Advanced Research Program Award (\$150,000), Guiding Brain Plasticity via Vagus Nerve Stimulation, 2007 (PI).

NIDCD Academic Research Enhancement Award (\$265,961), Cortical Plasticity and Processing of Speech Sounds, 2004 (PI).

James S. McDonnell Foundation Bridging Brain, Mind, and Behavior Research Award, Brain Plasticity and Neuro-Rehabilitation (\$446,000), 2002 (PI).

Cure Autism Now Foundation: Sensory Experience, Behavioral Therapy and Neural Plasticity: Implications for Autism Remediation (\$80,000), 2002 (PI).

NIDCD Research Grant (\$152,765), Cortical Plasticity and Processing of Complex Stimuli, 2000 (PI).

National Science Foundation Fellowship (\$50,000), 1994 (PI).

## **ACHIEVEMENTS IN ORIGINAL INVESTIGATION:**

### Book Chapters (6):

Targeting Plasticity with Vagus Nerve Stimulation to Treat Neurological Disease. Hays SA, Rennaker RL, Kilgard MP. In Changing Brains - Applying Brain Plasticity to Advance and Recover Human Ability, Progress in Brain Research, 207:275-99, 2013.

Neural Coding of Speech Sounds. Kilgard M., Engineer C. In: Jaeger D., Jung R. (Ed.) Encyclopedia of Computational Neuroscience: Springer-Verlag Berlin Heidelberg, 2013.

Experience-Dependent Plasticity and the Auditory Cortex. KN Shepard, MP Kilgard, RC Liu, in Neural Correlates of Auditory Cognition, Springer (Eds. A. Popper, R. Fay, and Y. Cohen), Volume 45, 2013.

Auditory Environment, Stress, and Brain Plasticity. Nichols JA, Bose M, Jakkamsetti VP, Kilgard MP, Atzori M. in The Neurobiology of Stress: an Evolutionary Approach, Research Signpost, (Eds. F Aboitiz and A Dagnino-Subiabre), 2007.

Cortical Plasticity and Rehabilitation. Moucha R, Kilgard MP, in Reprogramming the Brain, Progress in Brain Research, Elsevier, (Ed. A. Moller), 157:111-122, 2006.

How Sensory Experience Shapes Cortical Representations, MP Kilgard, in Neuropsychology of Memory, Guilford Press (Eds. L.R. Squire and D.L. Schacter), 2002.

Using Vagus Nerve Stimulation to Direct Synaptic Plasticity and Treat Neurological Disease. Seth A. Hays, Robert L. Rennaker 2nd, Jane G. Wigginton, Michael P. Kilgard, Chapter in Vagus Nerve Stimulation, Elsevier (Ed. Staats), in press.

Scientific Articles (134): (Search [PubMed](#) or [Google Scholar](#))

Timing of Vagus Nerve Stimulation During Fear Extinction Determines Efficacy in a Rat Model of PTSD. Souza RR, Powers MB, McIntyre CK, Hays SA, Kilgard MP. *Scientific Reports*, 2022, 12:16526.

Usage of RePlay as: a take-home system to supporting support high-repetition motor rehabilitation after neurological injury. Pruitt DT, Duong-Nguyen y, Meyers EC, Epperson JD, Wright JM, Hudson RA, Wigginton JG, Rennaker II RL, Hays SA, Kilgard, MP. *Games for Health Journal*, 2023, 12:73-85.

Vagus nerve stimulation does not improve recovery of forelimb motor or somatosensory function in a model of neuropathic pain. Adcock KS, Danaphongse T, Jacob S, Rallapalli H, Torres M, Haider Z, Seyedahmadi A, Morrison RA, Rennaker RL, Kilgard MP, Hays SA. *Sci Rep*. 2022, 12:9696.

Common Cholinergic, Noradrenergic, and Serotonergic Drugs Do Not Block VNS-Mediated Plasticity. Morrison RA, Abe ST, Danaphongse T, Ezhil V, Somaney A, Adcock KS, Rennaker RL, Kilgard MP, Hays SA. *Front Neurosci*. 2022, 16:849291.

Radial nerve injury causes long-lasting forelimb sensory impairment and motor dysfunction in rats. Adcock KS, Hulsey DR, Danaphongse T, Haider Z, Morrison RA, Kilgard MP, Hays SA. *Pain Reports*, 2021. 6:e957.

Vagus Nerve Stimulation as a Potential Adjuvant to Rehabilitation for Post-stroke Motor Speech Disorders. Morrison RA, Hays SA, Kilgard MP. *Front Neurosci*. 2021, 15:715928.

Validation of a parameterized, open-source model of nerve stimulation. Bucksot JE, Chandler CR, Intharuck NM, Rennaker RL, Kilgard MP, Hays SA. *J Neural Eng*. 2021, 18(4).

Vagus nerve stimulation enhances fear extinction as an inverted-U function of stimulation intensity. Souza RR, Robertson NM, McIntyre CK, Rennaker RL, Hays SA, Kilgard MP. *Exp Neurol*. 2021, 341:113718.

Vagus nerve stimulation promotes extinction generalization across sensory modalities. Souza RR, Oleksiak CR, Tabet MN, Rennaker RL, Hays SA, Kilgard MP, McIntyre CK. *Neurobiol Learn Mem*. 2021

High intensity VNS disrupts VNS-mediated plasticity in motor cortex. Morrison RA, Danaphongse TT, Abe ST, Stevens ME, Ezhil V, Seyedahmadi A, Adcock KS, Rennaker RL, Kilgard MP, Hays SA. *Brain Res*. 2021 1756:147332.

The tactile experience paired with vagus nerve stimulation determines the degree of sensory recovery after chronic nerve damage. Darrow MJ, Mian TM, Torres M, Haider Z, Danaphongse T, Seyedahmadi A, Rennaker RL, Hays SA, Kilgard MP. *Behavioural Brain Research*. 2021; 396:112910.

Optimizing dosing of vagus nerve stimulation for stroke recovery. Pruitt DT, Danaphongse TT, Lutchman M, Patel N, Reddy P, Wang V, Prashar A, Rennaker RL, Kilgard MP, Hays SA.

Translational Stroke Research. 2021; 12(1):65-71.

Restoration of somatosensory function by pairing vagus nerve stimulation with tactile rehabilitation. Darrow MJ, Mian TM, Torres M, Haider Z, Danaphongse T, Rennaker RL, Kilgard MP, Hays SA. *Annals of Neurology*. 2020; 87(2):194-205.

Deficits in Skilled Motor and Auditory Learning in a Rat Model of Rett Syndrome. Adcock KS, Blount AE, Morrison RA, Alvarez-Dieppa A, Kilgard MP, Engineer CT, Hays SA. *Journal of Neurodevelopmental Disorders*. 2020; 12(1):27.

A limited range of vagus nerve stimulation intensities produce motor cortex reorganization when delivered during training. Morrison RA, Danaphongse T, Pruitt DT, Adcock KS, Mathew JK, Abe ST, Abdulla DM, Rennaker RL, Kilgard MP, Hays SA. *Behavioral Brain Research*. 2020; 391:112705.

Vagus Nerve Stimulation Paired with Rehabilitative Training Enhances Motor Recovery after Bilateral Spinal Cord Injury to Cervical Forelimb Motor Pools. Darrow MJ, Torres M, Sosa MJ, Danaphongse TT, Haider Z, Rennaker RL, Kilgard MP, Hays SA. *Neurorehabilitation and Neural Repair*. 2020; 34(3):200-209.

Efficient parameters of vagus nerve stimulation to enhance extinction learning in an extinction-resistant rat model of PTSD. Souza RR, Robertson NM, Mathew E, Tabet M, Bucksot JE, Pruitt DT, Rennaker RL, Hays SA, McIntyre CM, Kilgard MP. *Progress in Neuropsychopharmacology & Biological Psychiatry*. 2020; 99(20), 109848.

Vagus nerve stimulation produces immediate dose-dependent anxiolytic effect in rats. Mathew E, Tabet M, Robertson NM, Hays SA, Rennaker RL, Kilgard MP, McIntyre CM, Souza RR. *Journal of Affective Disorders*. 2020; 265:552-557.

Enhancing plasticity in central networks improves motor and sensory recovery after nerve damage. Meyers EC, Kasliwal N, Solorzano BR, Lai E, Bendale G, Berry A, Ganzer PD, Romero-Ortega M, Rennaker RL 2nd, Kilgard MP, Hays SA. *Nature Communications*. 2019 Dec 19;10(1):5782.

Efficient parameters of vagus nerve stimulation to enhance extinction learning in an extinction-resistant rat model of PTSD. Souza RR, Robertson NM, Mathew E, Tabet MN, Bucksot JE, Pruitt DT, Rennaker RL, Hays SA, McIntyre CK, Kilgard MP. *Progress Neuropsychopharmacol & Biol Psychiatry*. 2019 Dec 19;99:109848

Vagus nerve stimulation produces immediate dose-dependent anxiolytic effect in rats. Mathew E, Tabet MN, Robertson NM, Hays SA, Rennaker RL, Kilgard MP, McIntyre CK, Souza RR. *J Affect Disorders*. 2019 Nov 13. pii: S0165-0327(19)31370-9.

Flat electrode contacts for vagus nerve stimulation. Bucksot JE, Wells AJ, Rahebi KC, Sivaji V, Romero-Ortega M, Kilgard MP, Rennaker RL 2nd, Hays SA. *PLoS One*. 2019 Nov 18;14(11):e0215191.

Pairing vagus nerve stimulation with tones drives plasticity across the auditory pathway. Borland MS, Vrana WA, Moreno NA, Fogarty EA, Buell EP, Vanneste S, Kilgard MP, Engineer CT. *J*

Neurophysiol. 2019 Aug 1;122(2):659-671.

Norepinephrine and serotonin are required for vagus nerve stimulation directed cortical plasticity. Hulseley DR, Shedd CM, Sarker SF, Kilgard MP, Hays SA. *Experimental Neurology*. 2019 Oct;320:112975. Vagus nerve stimulation reverses the extinction impairments in a model of PTSD with prolonged and repeated trauma. Souza RR, Robertson NM, Pruitt DT, Gonzales PA, Hays SA, Rennaker RL, Kilgard MP, McIntyre CK. *Stress* (2019) 22:509-520.

Pairing vagus nerve stimulation with tones drives plasticity across the auditory pathway. Borland MS, Vrana WA, Moreno NA, Fogarty EA, Buell EP, Vanneste S, Kilgard MP, Engineer CT. *J Neurophysiol*. (2019) 122:659-671.

Norepinephrine and serotonin are required for vagus nerve stimulation directed cortical plasticity. Hulseley DR, Shedd CM, Sarker SF, Kilgard MP, Hays SA. *Exp Neurol*. (2019) 320:112975

Vagus Nerve Stimulation Intensity Influences Motor Cortex Plasticity. Morrison RA, Hulseley DR, Adcock KS, Rennaker RL, Kilgard MP, Hays SA. *Brain Stimulation* (2019) 12:256-262.

Vagus Nerve Stimulation Rate and Duration Determine whether Sensory Pairing Produces Neural Plasticity. Buell EP, Borland MS, Loerwald KW, Chandler C, Hays SA, Engineer CT, Kilgard MP. *Neuroscience* (2019) 406:290-299.

Protocol for Construction of Rat Nerve Stimulation Cuff Electrodes. Rios MU, Bucksot JE, Rahebi KC, Engineer CT, Kilgard MP, Hays SA. *Methods Protocols* (2019) 2:1.

ReStore: A wireless peripheral nerve stimulation system. Sivaji V, Grasse DW, Hays SA, Bucksot JE, Saini R, Kilgard MP, Rennaker RL 2nd. *J Neurosci Methods* (2019) 320:26-36.

A suite of automated tools to quantify hand and wrist motor function after cervical spinal cord injury. Grasse KM, Hays SA, Rahebi KC, Warren VS, Garcia EA, Wigginton JG, Kilgard MP, Rennaker RL 2nd. *J Neuroeng Rehabilitation* (2019) 16:48.

Vagus nerve stimulation promotes generalization of conditioned fear extinction and reduces anxiety in rats. Noble LJ, Meruva VB, Hays SA, Rennaker RL, Kilgard MP, McIntyre CK. *Brain Stimulation* (2019) 12:9-18.

Vagus Nerve Stimulation Enhances Stable Plasticity and Generalization of Stroke Recovery. Meyers EC, Solorzano BR, James JT, Ganzer PD, Lai E, Rennaker RL, Kilgard MP, Hays SA, *Stroke* (2018) 49:710-717.

Vagus Nerve Stimulation Promotes Generalization of Conditioned Fear Extinction and Reduces Anxiety in Rats. Noble LJ, Meruva VB, Hays SA, Rennaker RL, Kilgard MP, McIntyre CK. *Brain Stimulation* (2018) 12(1):9-18.

Cortical Map Plasticity as a Function of Vagus Nerve Stimulation Rate. Buell E, Loerwald KW, Engineer CT, Borland MS, Buell JM, Kelly CA, Khan II, Hays SA, Kilgard MP. *Brain Stimulation* (2018) 11:1218-1224.

Closed-loop Neuromodulation Restores Network Connectivity and Motor Control after Spinal Cord Injury. Ganzer PD, Darrow MD, Meyers EC, Solorzano BR, Ruiz AD, Robertson N, Adcock KS,

James J, Han JS, Becker A, Goldberg M, Pruitt DT, Hays SA, Kilgard MP, Rennaker RL. *eLife* (2018) 7:e32058.

Varying stimulation parameters to improve cortical plasticity generated by VNS-tone pairing. Loerwald KW, Buell E, Borland MS, Rennaker RL, Hays SA, Kilgard MP. *Neuroscience* (2018) 388:239-247.

Vagus nerve stimulation paired with tactile training improved sensory function in a chronic stroke patient. Kilgard MP, Rennaker RL, Alexander J, Dawson J. *NeuroRehabilitation*. (2018) 42:159-165.

The Interval Between VNS-Tone Pairings Determines the Extent of Cortical Map Plasticity. Borland MS, Engineer CT, Vrana WA, Moreno NA, Engineer ND, Vanneste S, Sharma P, Pantalia MC, Lane MC, Rennaker RL, Kilgard MP. *Neuroscience*. (2018) 369:76-86.

Shank3-deficient rats exhibit degraded cortical responses to sound. Engineer CT, Rahebi KC, Borland MS, Buell EP, Im KW, Wilson LG, Sharma P, Vanneste S, Harony-Nicolas H, Buxbaum JD, Kilgard MP. *Autism Research*. (2018) 11:59-68.

The M-Maze task: an automated method for studying fear memory in rats exposed to protracted aversive conditioning. Souza RR, Robertson NM, Pruitt DT, Noble LJ, Meyers EC, Gonzalez PA, Bleker NP, Carey HL, Hays SA, Kilgard MP, McIntyre CK, Rennaker RL. *J Neurosci Methods* (2018) 247:54-65.

Pairing sound with vagus nerve stimulation modulates cortical synchrony and phase coherence in tinnitus: An exploratory retrospective study. Vanneste S, Martin J, Rennaker RL Nd, Kilgard MP. *Scientific Reports*. (2017) 7:17345.

The interaction of pulse width and current intensity on the extent of cortical plasticity evoked by vagus nerve stimulation. Loerwald KW, Borland MS, Rennaker RL 2nd, Hays SA, Kilgard MP. *Brain Stimul*. (2018) 11:271-277.

Vagus Nerve Stimulation Paired with Tones for the Treatment of Tinnitus: A Prospective Randomized Double-blind Controlled Pilot Study in Humans. Tyler R, Cacace A, Stocking C, Tarver B, Engineer N, Martin J, Deshpande A, Stecker N, Pereira M, Kilgard M, Burrell C, Pierce D, Rennaker R, Vanneste S. *Scientific Reports*. (2017) 7:11960.

Effects of vagus nerve stimulation on extinction of conditioned fear and post-traumatic stress disorder symptoms in rats. Noble LJ, Gonzalez IJ, Meruva VB, Callahan KA, Belfort BD, Ramanathan KR, Meyers E, Kilgard MP, Rennaker RL, McIntyre CK. *Transl Psychiatry*. (2017) 7:e1217.

Vagus nerve stimulation as a potential adjuvant to behavioral therapy for autism and other neurodevelopmental disorders. Engineer CT, Hays SA, Kilgard MP. *J Neurodev Disord*. (2017) 9:20.

Cerebrolysin prevents deficits in social behavior, repetitive conduct, and synaptic inhibition in a rat model of autism. Cuevas-Olguin R, Roychowdhury S, Banerjee A, Garcia-Oscos F, Esquivel-Rendon E, Bringas ME, Kilgard MP, Flores G, Atzori M. *J Neurosci Res*. (2017) 95:2456-2468.



Traumatic Brain Injury Occludes Training-Dependent Cortical Reorganization in the Contralesional Hemisphere. Pruitt DT, Danaphongse TT, Schmid AN, Morrison RA, Kilgard MP, Rennaker RL 2nd, Hays SA. *J Neurotrauma*. (2017) 34:2495-2503.

Temporal plasticity in auditory cortex improves neural discrimination of speech sounds. Engineer CT, Shetake JA, Engineer ND, Vrana WA, Wolf JT, Kilgard MP. *Brain Stimul*. (2017) 10:543-552.

Median and ulnar nerve injuries reduce volitional forelimb strength in rats. Meyers EC, Granja R, Solorzano BR, Romero-Ortega M, Kilgard MP, Rennaker RL 2nd, Hays S. *Muscle Nerve*. (2017) 56:1149-1154

Parametric characterization of neural activity in the locus coeruleus in response to vagus nerve stimulation. Hulse DR, Riley JR, Loerwald KW, Rennaker RL 2nd, Kilgard MP, Hays SA. *Exp Neurol*. (2017) 289:21-30.

Pruitt DT, Schmid AN, Danaphongse TT, Flanagan KE, Morrison RA, Kilgard MP, Rennaker RL 2nd, Hays SA. Forelimb training drives transient map reorganization in ipsilateral motor cortex. *Behav Brain Res*. 313:10-6, 2016.

Hays SA, Ruiz A, Bethea T, Khodaparast N, Carmel JB, Rennaker RL 2nd, Kilgard MP. Vagus nerve stimulation during rehabilitative training enhances recovery of forelimb function after ischemic stroke in aged rats. *Neurobiol Aging*. 43:111-8, 2016.

Centanni TM, Booker AB, Chen F, Sloan AM, Carraway RS, Rennaker RL, LoTurco JJ, Kilgard MP. Knockdown of Dyslexia-Gene *Dcdc2* Interferes with Speech Sound Discrimination in Continuous Streams. *J Neurosci*. 36:4895-906, 2016.

Ganzer PD, Meyers EC, Sloan AM, Maliakkal R, Ruiz A, Kilgard MP, Robert LR 2nd. Awake behaving electrophysiological correlates of forelimb hyperreflexia, weakness and disrupted muscular synchronization following cervical spinal cord injury in the rat. *Behav Brain Res*. 307:100-11, 2016.

Meyers E, Sindhurakar A, Choi R, Solorzano R, Martinez T, Sloan A, Carmel J, Kilgard MP, Rennaker RL 2nd, Hays S. The supination assessment task: An automated method for quantifying forelimb rotational function in rats. *J Neurosci Methods*. 266:11-20, 2016.

Hulse DR, Hays SA, Khodaparast N, Ruiz A, Das P, Rennaker RL, Kilgard MP. Reorganization of Motor Cortex by Vagus Nerve Stimulation Requires Cholinergic Innervation. *Brain Stimulation*. 9:174-81, 2016.

Khodaparast N, Kilgard MP, Casavant R, Ruiz A, Qureshi I, Ganzer PD, Rennaker RL 2nd, Hays SA. Vagus Nerve Stimulation During Rehabilitative Training Improves Forelimb Recovery After Chronic Ischemic Stroke in Rats. *Neurorehabil Neural Repair*. 30:676-84, 2016.

Cortical Map Plasticity as a Function of Vagus Nerve Stimulation Intensity. Borland MS, Vrana WA, Moreno NA, Fogarty EA, Buell EP, Sharma P, Engineer CT, Kilgard MP. *Brain Stimulation*, 2016.

An Automated Task for the Training and Assessment of Distal Forelimb Function in a Mouse Model of Ischemic Stroke. Becker AM, Meyers E, Sloan A, Rennaker R, Kilgard M, Goldberg MP. *J Neuroscience Methods*, 2016.

Safety, Feasibility and Efficacy of Vagus Nerve Stimulation Paired with Upper Limb Rehabilitation Following Ischemic Stroke, Dawson J, Pierce D, Dixit A, Kimberley TJ, Robertson M, Tarver B, Hilmi O, McLean J, Forbes K, Kilgard MP, Rennaker RL, Cramer SC, Walters M, Engineer N. *Stroke*, 47:143-50, 2016.

Degraded neural and behavioral processing of speech sounds in a rat model of Rett syndrome. Engineer CT, Rahebi KC, Borland MS, Buell EP, Centanni TM, Fink MK, Im KW, Wilson LG, Kilgard MP. *Neurobiology of Disease*, 2015.

Vagus Nerve Stimulation Delivered with Motor Training Enhances Recovery of Function after Traumatic Brain Injury. Pruitt DT, Schmid AN, Kim LJ, Abe CM, Trieu JL, Choua C, Hays SA, Kilgard MP, Rennaker RL. *J Neurotrauma*, 2015.

Speech training alters consonant and vowel responses in multiple auditory cortex fields. Engineer CT, Rahebi KC, Buell EP, Fink MK, Kilgard MP. *Behavioral Brain Research*, 287:256-64, 2015.

Pairing Speech Sounds With Vagus Nerve Stimulation Drives Stimulus-specific Cortical Plasticity. Engineer CT, Engineer ND, Riley JR, Seale JD, Kilgard MP. *Brain Stimulation*, 8:637-44, 2015.

Placebo-controlled vagus nerve stimulation paired with tones in a patient with refractory tinnitus: a case report. De Ridder D, Kilgard M, Engineer N, Vanneste S. *Otology Neurotology*, 36:575-80, 2015.

Activation of the anti-inflammatory reflex blocks lipopolysaccharide-induced decrease in synaptic inhibition in the temporal cortex of the rat. Garcia-Oscos F, Peña D, Housini M, Cheng D, Lopez D, Cuevas-Olguin R, Sadari N, Salgado Delgado R, Galindo Charles L, Salgado Burgos H, Rose-John S, Flores G, Kilgard MP, Atzori M. *J Neuroscience Research*, 93:859-65, 2015.

Abnormal emotional learning in a rat model of autism exposed to valproic acid in utero. Banerjee A, Engineer CT, Sauls BL, Morales AA, Kilgard MP, Ploski JE. *Front Behavioral Neuroscience*, 8:387, 2014 .

Vagus nerve stimulation during rehabilitative training improves functional recovery after intracerebral hemorrhage. Hays SA, Khodaparast N, Hulsey DR, Ruiz A, Sloan AM, Rennaker RL 2nd, Kilgard MP. *Stroke*, 45:3097-100. 2014 .

Speech sound discrimination training improves auditory cortex responses in a rat model of autism, Engineer CT, Centanni TM, Im KW, Kilgard MP. *Front. Syst. Neurosci.* doi: 10.3389, 2014 .

Vagal nerve stimulation blocks interleukin 6-dependent synaptic hyperexcitability induced by lipopolysaccharide-induced acute stress in the rodent prefrontal cortex. Garcia-Oscos F, Peña D, Housini M, Cheng D, Lopez D, Borland MS, Salgado-Delgado R, Salgado H, D'Mello S, Kilgard MP, Rose-John S, Atzori M. *Brain Behav Immun*, 43:149-58, 2015.

Controlled-cortical impact reduces volitional forelimb strength in rats. Pruitt D, Hays S, Schmid A, Choua C, Kim L, Trieu J, Kilgard MP, Rennaker RL 2nd. *Brain Research*, 1582:91-8, 2014.

Behavioral and neural discrimination of speech sounds after moderate or intense noise exposure in rats. Reed AC, Centannia TM, Borland MS, Matney CJ, Engineer CT, Kilgard MP. *Ear and Hearing*, 35:e248-61, 2014.

Speech sound processing deficits and training-induced neural plasticity in rats with dyslexia gene knockdown. Centanni TM, Chen F, Booker AM, Engineer CT, Sloan AM, Rennaker RL, LoTurco JJ, Kilgard MP. *PLoS One*. 9(5):e98439, 2014 .

The timing and amount of vagus nerve stimulation during rehabilitative training affect poststroke recovery of forelimb strength. Hays SA, Khodaparast N, Ruiz A, Sloan AM, Hulsey DR, Rennaker RL 2nd, Kilgard MP. *Neuroreport*. 25:676-82, 2014 .

Environmental acoustic enrichment promotes recovery from developmentally degraded auditory cortical processing. Zhu X, Wang F, Hu H, Sun X, Kilgard MP, Merzenich MM, Zhou X. *Journal of Neuroscience*, 34:5406-15, 2014 .

Degraded speech sound processing in a rat model of fragile X syndrome. Engineer CT, Centanni TM, Im KW, Rahebi KC, Buell EP, Kilgard MP, *Brain Research*, 1564:72-84, 2014 .

Degraded auditory processing in a rat model of autism limits the speech representation in non-primary auditory cortex. Engineer CT, Centanni TM, Im KW, Borland MS, Moreno NA, Carraway RS, Wilson LG, Kilgard MP. *Dev Neurobiol*. 74:972-86, 2014 .

Vagus Nerve Stimulation Delivered During Motor Rehabilitation Improves Recovery in a Rat Model of Stroke, Khodaparast N, Hays SA, Sloan AM, Fayyaza T, Hulsey DR, Rennaker RL II, Kilgard MP. *Neurorehabilitation and Neural Repair* 28:698-706, 2014 .

Speech training alters tone frequency tuning in rat primary auditory cortex, Engineer CT, Perez CA, Carraway RS, Chang KQ, Roland JL, Kilgard MP. *Behavioural Brain Research* 258: 166–178, 2014 .

Detection and Identification of Speech Sounds Using Cortical Activity Patterns, Centanni TM, Sloan AS, Reed AC, Engineer CT, Rennaker RL, Kilgard MP, *Neuroscience*, 258:292-306, 2013 .

Safety and Efficacy of Vagus Nerve Stimulation Paired With Tones for the Treatment of Tinnitus: A Case Series. De Ridder D, Vanneste S, Engineer ND, Kilgard MP. *Neuromodulation*. 2013 Nov 20.

Similarity of Cortical Activity Patterns Predicts generalization Behavior. Engineer CT, Perez CA, Carraway RS, Chang KQ, Roland JL, Sloan AM, Kilgard MP. *PLoS One*. 8(10), 2013.

Increasing diversity of neural responses to speech sounds across the central auditory pathway. Ranasinghe KG, Vrana WA, Matney CJ, Kilgard MP. *Neuroscience*. 252:80-97, 2013.

Vagus nerve stimulation during rehabilitative training improves forelimb strength following ischemic stroke. Khodaparast N, Hays SA, Sloan AM, Hulsey DR, Ruiz A, Pantoja M, Rennaker RL, Kilgard MP. *Neurobiology of Disease*, 60:80-88, 2013.

Cortical speech-evoked response patterns in multiple auditory fields are correlated with behavioral discrimination ability. Centanni TM, Engineer CT, Kilgard MP. *J Neurophysiol.* 110:177-89, 2013.

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Harnessing Plasticity to Understand Learning and Treat Disease, Kilgard MP, *Trends in Neuroscience* 35:715-22, 2012. (download supplement)

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Speech discrimination after early exposure to pulsed-noise or speech, Ranasinghe KG, Carraway RS, Borland MS, Moreno NA, Hanacik EA, Miller RS, Kilgard MP, *Hearing Research*, 289:1-12, 2012.

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Sensory Input Directs Spatial and Temporal Plasticity in Primary Auditory Cortex, M.P. Kilgard, P.K. Pandya, J.L. Vazquez, Gehi, A., C.E. Schreiner, M.M. Merzenich, *Journal of Neurophysiology*, 86: 339-353, 2001.

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Nucleus Basalis Activity Enables Cortical Map Reorganization, M.P. Kilgard, M.M. Merzenich, *Science* 279(5357): 1714-1718, 1998.

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Recessive Rab3 Mutations, M.P. Kilgard, M.L. Nonet, B.J. Meyer, *Worm Breeders Gazette*, 13(1), p39, 1993.

#### Patents and Patent Applications (28 issued patents in U.S.):

System for stimulating brain plasticity. M.P. Kilgard, M.M. Merzenich, United States Patent 6,221,908, 1998.

Computer-Implemented Methods and Apparatus for Alleviating Abnormal Behaviors. M.P. Kilgard, M.M. Merzenich, S. Bao, United States Patent 7,024,398, 2006.

Timing Control for Paired Plasticity, M.P. Kilgard, L.C. Cauller, N.D. Engineer, C. McIntyre, W. Rosellini, United States Patents 8,489,185; 9,272,145, 9,339,654, and 9,345,886.

Methods, Systems, and Devices for Treating Tinnitus with VNS Pairing, United States Patent Application, M.P. Kilgard, N.D. Engineer, Pierce DM, United States Patents 8,666,501; 9,204,998; 9,265,660; 9,265,661; 9,265,662; 9,265,663; and 9,522,085.

Methods, Systems, and Devices for Pairing Vagus Nerve Stimulation with Motor Therapy in Stroke Patients, M.P. Kilgard, N.D. Engineer, Pierce DM, Rennaker RL, United States Patents 8,700,145; 9,333,355; 9,474,904; 9,504,831; 9,522,272; 9,522,273; 9,522,274; and 9,533,152.

Systems, Methods And Devices For Paired Plasticity, M.P. Kilgard, L.C. Cauller, N.D. Engineer, C. McIntyre, W. Rosellini, United States Patent 9,089,707, 2015.

Systems, Methods And Devices For Treating Tinnitus, M.P. Kilgard, L.C. Cauller, N.D. Engineer, C. McIntyre, W. Rosellini, United States Patent 8,934,967, 2015.

Methods and systems for therapy of multiple sclerosis, MP Kilgard, RL Rennaker, United States Patent 10,029,094, 2018.

Methods for Enhancing Exposure Therapy Using Vagus Nerve Stimulation, C.M. Rodriguez, M.P. Kilgard, N.D. Engineer, United States Patent 10,213,577, 2019.

Methods, Systems, and Devices for Treating Tinnitus with VNS Pairing, M.P. Kilgard, N.D. Engineer, Pierce DM. United States Patent Application 20,100,004,705.

Methods, Systems, and Devices for Treating Tinnitus with VNS Pairing, M.P. Kilgard, N.D. Engineer, Pierce DM, United States Patent Application 13/934893.

Systems and Methods for Optimizing Targeted Neuroplasticity, United States Patent Application 62/333,982.

Stereognosis training system and method for patients with chronic stroke, spinal cord injury or neuropathy, M.P. Kilgard, United States Patent 11,344,727, 2022.

#### Dissertations Supervised (17):

Environmental and training-induced plasticity in primary auditory cortex, Navzer D Engineer, 2004. (Fall 1999 - Fall 2004)

Speech sound representation and experience-dependent plasticity in the rat auditory system, Pritesh K Pandya, 2005 (NIH predoctoral funding). (Fall 1999 – Spring 2005)

Long-Term and Short-Term Plasticity Induced by Experience with Spectrotemporally Complex Sounds in Rat Auditory Cortex, Raluca Moucha, 2006. (Spring 2001 - Spring 2006)

Environmental Enrichment Increases Response Strength and Paired Pulse Depression of Auditory Cortex Neurons, Cherie R Percaccio, 2006. (Fall 2001 - Spring 2006)

Plasticity in the Auditory Cortex and Changes in Perceptual Discrimination after Nucleus Basalis Stimulation in Rats, Amanda Reed, 2008. (Fall 2002 - Summer 2008)

Speech Sound Coding and Training-Induced Plasticity in Primary Auditory Cortex, Crystal Engineer, 2008. (Fall 2003 - Fall 2008)

Pharmacological and Sensory Stimulation of Auditory Cortex Plasticity in Adult Rats, Vikram Jakkamsetti, 2008. (Fall 2003 - Fall 2008)

Changes Caused by Cortical Damage and Event Paired Vagus Nerve Stimulation, Ben Porter, 2011. (Summer 2006 - Spring 2011)

Cortical Processing of Speech Sounds in Adverse Conditions, Jai Shetake, 2011 (Fall 2006 - Spring 2011)



Neural Mechanisms Supporting Robust Discrimination of Speech, Kamalini Ranasinghe, 2012.  
(Fall 2008 - Spring 2012)

Speech-Coding and Training-Induced Plasticity in Auditory Cortex of Normal and Dyslexia Model Rats, Tracy Centanni, 2013. (Fall 2009 - Spring 2013)

Delivering Vagus Nerve Stimulation with Automated Motor Forelimb Tasks to Enhance Stroke Recovery in Rats, Navid Khodaparast. (Spring 2009 - Summer 2013)

Understanding and Optimizing Vagus Nerve Stimulation Directed Cortical Plasticity, Michael Borland (Fall 2011 - Fall 2017)

Targeting Auditory Cortex Plasticity Using Vagus Nerve Stimulation, Elizabeth Buell (Fall 2012 - Fall 2018)

Neuromodulatory Pathways Required for Targeted Plasticity Therapy, Daniel Hulseley (Fall 2013 - Spring 2018)

Vagus Nerve Stimulation Intensity Regulates Targeted Plasticity, Robert Morrison (Fall 2016-Spring 2021)

Improving Auditory Responses after Hearing Loss, Jonathan Riley (Fall 2017-Spring 2022)

#### INVITED SCIENTIFIC PRESENTATIONS (118):

2022 – University of Texas System-wide Brain Research Summit, Austin, Texas, “Industry Partners – Taking Devices from Concept to FDA Approval”

2022 – Walter Reed Center for the Study of Traumatic Stress, Bethesda, Maryland, “Vagus Nerve Stimulation During Therapy to Improve Synaptic Plasticity and Enhance Recovery”

2022 – American Society of Neurorehabilitation, St. Louis, Missouri, “Enhancing Recovery from Chronic Stroke and Spinal Cord Injury through Vagus Nerve Stimulation during Rehabilitative Training”

2022 – American Spinal Injury Association, New Orleans, Louisiana, “Promoting Recovery from Spinal Cord Injury by Pairing Rehabilitation with Vagus Nerve Stimulation”

2022 – Wings for Life Foundation, Salzburg, Austria, “Promoting Recovery in People with Chronic Cervical Spinal Cord Injury by Pairing Rehabilitation with Vagus Nerve Stimulation”

2022 – American Laryngological Association, Dallas, Texas, “Vagus Nerve Stimulation during Rehabilitation to Improve Synaptic Plasticity and Recovery”

2021 – European Society of Swallowing Disorders Congress, “Enhancing Recovery from Chronic Stroke and Spinal Cord Injury through Vagus Nerve Stimulation during Rehabilitative Training”.

2021 – Baylor University Medical Center Physical Medicine and Rehabilitation Grand Rounds, Dallas, Texas, “Enhancing Recovery from Chronic Stroke and Spinal Cord Injury through Vagus

Nerve Stimulation during Rehabilitative Training”.

2021 – Miami Project to Cure Paralysis, University of Miami, Emerging Neurotechnology Symposium: Neuromodulation for Regaining Lost Function, “Enhancing Recovery from Spinal Cord Injury through Vagus Nerve Stimulation”.

2021 – Texas Health Resources Physical Medicine and Rehabilitation Grand Rounds, Fort Worth, Texas, “Enhancing Recovery from Chronic Stroke and Spinal Cord Injury through Vagus Nerve Stimulation during Rehabilitative Training”.

2021 – University of Connecticut, Department of Biomedical Engineering, “Promoting Recovery from Stroke, SCI, and PTSD by Pairing Rehabilitation with Vagus Nerve Stimulation”

2021 – University of Texas Southwestern Medical Center, Physical Medicine and Rehabilitation Grand Rounds, Dallas, Texas, “Enhancing Recovery from Chronic Stroke and Spinal Cord Injury through Vagus Nerve Stimulation during Rehabilitative Training”.

2020 – International Spinal Cord Society, Annual Meeting, Wings for Life Lecture on Translational Science, Yokohama, Japan, “Directing Synaptic Plasticity to Treat Chronic Spinal Cord Injury”.

2020 – Baylor University Medical Center Trauma Grand Rounds, Dallas, Texas, “Enhanced Recovery from Trauma using Vagus Nerve Stimulation during Rehabilitation”.

2020 – Wings for Life Scientific Meeting, Salzburg, Austria, “Enhancing Recovery in Spinal Cord Injury Patients with Vagus Nerve Stimulation”.

2019 – University of California, San Francisco, San Francisco, California, “Directing Synaptic Plasticity to Treat Neurological and Psychiatric Disease” – Endowed Discovery Lecture

2019 – NIDA-NIAAA: Frontiers in Addiction Research, Chicago, Illinois, “Directing Synaptic Plasticity to Treat Neurological and Psychiatric Disease”

2019 – Heidelberg University Hospital, Heidelberg, Germany, “Directing Synaptic Plasticity to Treat Spinal Cord Injury”

2019 – Heidelberg Orthopaedie, Heidelberg, Germany, “Directing Synaptic Plasticity to Treat Chronic Spinal Cord Injury”.

2019 – Wings for Life Research Foundation, Salzburg, Austria, “Directing Neural Plasticity to Treat Spinal Cord Injury”

2018 - Center for Neuroscience and Regenerative Medicine, Uniformed Services University Of The Health Sciences, Rockville, Maryland, “Directing Neural Plasticity to Treat Sensory, Motor and Cognitive Impairments caused by TBI”

2018 - National Center for Adaptive Neurotechnologies, Wadsworth Center, Albany, New York, “Directing Neural Plasticity to Understand and Treat Neurological Disease”

2018 - University of Minnesota, Entertainment Software and Neurotherapeutics Society,

Minneapolis, Minnesota “Directing Neural Plasticity to Treat Disease”

2018 - Targeted Neuroplasticity Training Ethics: Training Optimization Through Peripheral Nerve Stimulation, Lincoln Center for Applied Ethics, Washington, DC, “Directing Neural Plasticity to Understand and Treat Neurological Disease”.

2018 - Baylor University Medical Center, Dallas, Texas, “Directing Neural Plasticity to Treat Post-Traumatic Stress Disorder”.

2018 - Wings for Life Foundation, Salzburg, Austria, “Directing Neural Plasticity to Treat Spinal Cord Injury”.

2018 - American Congress of Rehabilitation Medicine, Dallas, Texas, “Clinical Translation of VNS Therapy for Stroke Patients”.

2018 - Defense Advanced Research Projects Agency, Denver, Colorado. “Accelerating Speech Learning with VNS”.

2018 - Frontiers of BrainHealth, Dallas, Texas, “Directing Neural Plasticity to Treat Disease”.

2018 - Spinal Cord Plasticity in Motor Control, National Center of Neuromodulation for Rehabilitation, San Diego, California, “Closed-loop vagus nerve stimulation during rehabilitation restores network connectivity and motor control after cervical spinal cord injury”.

2017 - Feinstein Institute for Medical Research, New York, New York, “Directing Neural Plasticity to Treat Disease”.

2017 - Harvard Medical School, Department of Otolaryngology, Massachusetts Eye and Ear Hospital, Boston, Massachusetts, “Directing Neural Plasticity to Treat Disease”.

2017 - International Conference on Neurology and Neuroimmunology, Dallas, Texas. “Directing Neural Plasticity To Understand And Treat Neurological Disease”.

2017 - University of Texas at Austin, Clinically Applied Rehabilitation Engineering, Austin, Texas, “Directing Neural Plasticity to Treat Neurological and Psychiatric Disease”.

2017 - University of Texas Southwestern Medical Center, Basic Neuroscience Seminar Series, Dallas, Texas, “Directing Neural Plasticity to Understand and Treat Neurological Disease”.

2017 - Wings for Life Foundation, Salzburg, Austria, “Directing Neural Plasticity to Treat Spinal Cord Injury”.

2017 - University of Texas Southwestern Medical Center, Physical Medicine and Rehabilitation, Dallas, Texas, “Directing Neural Plasticity to Treat Disease”.

2016 - University of Ghent, Ghent, Belgium, “Directing Neural Plasticity to Treat Neurological Diseases”

2016 - BRAIN Initiative Investigators Meeting, Bethesda, Maryland, “Directing Neural Plasticity to Treat Disease”

2016 - DARPA Targeted Neuroplasticity Training Kick-Off Meeting, San Diego, California, "Targeted Neuroplasticity Training to Accelerate Complex Skill Learning"

2016 - Neuromodulation: The Science, San Francisco, California, "Directing Neural Plasticity to Understand and Treat Neurological Disease"

2016 - DARPA Targeted Neuroplasticity Training Proposer's Day Meeting, Arlington, Virginia, "Targeted Neuroplasticity: Science and Medical Applications"

2016 - Posit Scientific, San Francisco, California, "Directing Neural Plasticity to Treat Stroke and Other Neurological Diseases"

2016 - Neuromuscular Plasticity Symposium, University of Florida, Gainesville, Florida, "Directing Neural Plasticity to Understand and Treat Neurological Disease"

2016 - DARPA Demo Day Meeting, Pentagon Courtyard, Arlington, Virginia, "Treating Brain Damage"

2015 - Sensory Motor Performance Program Seminar, Rehabilitation Institute of Chicago, Illinois, "Directing Neural Plasticity to Understand and Treat Neurological Disease"

2015 - Neuroscience Seminar, University of Illinois, Champaign, Illinois, "Directing Cortical Plasticity to Understand and Treat Neurological Disease"

2015 - DARPA ElectRx Meeting, Park City, Utah, "Directing Neural Plasticity to Treat Neurological and Psychiatric Disease"

2015 - Neural Control of Movement, Charleston, South Carolina, "Directing Neural Plasticity to Treat Stroke and Other Neurological Diseases"

2014 - Neuroscience and Cognitive Science Seminar, University of Maryland, College Park, Maryland, "Directing Cortical Plasticity to Understand and Treat Neurological Disease"

2014 - Neuroscience Research Institute, University of Manchester, Manchester, United Kingdom, "Directing Neural Plasticity to Treat Stroke and Other Neurological Disorders"

2014 - National Institute on Deafness and other Communication Disorders, Bethesda, Maryland, "Directing Cortical Plasticity to Understand and Treat Neurological Disease"

2014 - 41st Neural Interfaces Conferences, Dallas, Texas, "Directing Cortical Plasticity to Understand and Treat Neurological Disease"

2014 - Macro to Micro: The Role of Spike Timing Dependent Plasticity and Neural Hypersynchrony in Disease Symposium, Association for Research in Otolaryngology, San Diego, California, "Directing Cortical Plasticity to Understand and Treat Tinnitus"

2013 - Arnold Starr Lecture, University of California, Irvine, "Directing Cortical Plasticity to Understand and Treat Auditory Processing Disorders"

2013 - Neuroscience Program Retreat, University of Southern California, Lake Arrowhead, California, "Directing Neural Plasticity to Understand and Treat Neurological Disease"

2013 - IEEE Medical Device Symposium, Richardson, Texas, "Targeting Neural Plasticity to Treat Neurological Disease"

2013 - Neurology Grand Rounds, University of California, Irvine, "Targeting Neural Plasticity to Treat Neurological Disease"

2013 - Auditory Plasticity and Aging Workshop, National Institute for Ageing, Bethesda, Maryland, "Directing Plasticity to Treat Neurological Disease"

2013 - University of North Carolina Neuroscience Center Seminar Series, Chapel Hill, North Carolina, "Directed Neural Plasticity as a Research Tool and a Clinical Therapy"

2013 - Emotional Disorders and Their Neural Correlates, University of Wurzburg, Rödelsee, Germany, "Directed Neural Plasticity as a Research Tool and a Clinical Therapy"

2013 - Neurosurgery Grand Rounds, University of Texas Southwestern Medical Center, Dallas, Texas, "Directed Neural Plasticity as a Research Tool and a Clinical Therapy"

2012 - American College of Neuropsychopharmacology meeting in Hollywood, Florida, "Directing Neural Plasticity to Understand and Treat Neurological Disease"

2012 - Neuroscience Institute seminar series at the University of Tennessee Health Science Center, Memphis, "Directing Neural Plasticity to Understand and Treat Neurological Disease"

2012 - Bridging the Gap Symposium, School of Occupational Therapy, Texas Woman's University, Denton, Texas, "Directing Neural Plasticity to Treat Neurological Disease"

2012 - Neuroscience Institute seminar series at the University of Tennessee Health Science Center, Memphis, "Directing Neural Plasticity to Understand and Treat Neurological Disease"

2012 - Society for Neuroscience satellite symposium: Rat Models of Autism: New Insights from Novel Tools, New Orleans, "Speech sound processing impairments in FMR1 knockout rats"

2012 - Tinnitus: the art and science of innovation, Tinnitus Research Initiative Meeting, Bruges Belgium, "Optimizing VNS-Directed Neural Plasticity for the Treatment of Chronic Tinnitus"

2012 - University of North Texas Health Science Center Department of Pharmacology and Neuroscience seminar series, "Directing Cortical Plasticity to Understand and Treat Neurological Disease"

2011 - Mahoney Institute for Neurological Sciences seminar series at the University of Pennsylvania, "Directing Cortical Plasticity to Understand and Treat Neurological Disease"

2011 - Redwood Center for Theoretical Neuroscience seminar series at the University of California at Berkeley, "Directing Cortical Plasticity to Understand and Treat Neurological Disease"

2011 - Learning to Hear: The Influence of Experience and Training on Auditory Skill Conference at the Hugh Knowles Center of Northwestern University, "Directing Neural Plasticity to Understand and Treat Speech and Hearing Disorders"

2011 - Entertainment Software applied to Cognitive Neurotherapeutics Society Meeting, University of California at San Francisco, "Directing Cortical Plasticity to Understand and Treat Neurological Disease"

2011 - Tinnitus Research Initiative Meeting, Buffalo, New York, "Directing Cortical Plasticity to Understand and Treat Tinnitus"

2011 - Center for Neuroscience Seminar Series at the University of Pittsburgh, "Directing Cortical Plasticity to Understand and Treat Neurological Disease"

2011 - Winter Conference on the Neurobiology of Learning and Memory, Park City, Utah, "Cortical map plasticity improves learning but is not necessary for improved performance"

2010 – Crystal Charity Ball Autism Project, Dallas, Texas, "Speech Sound Processing in Autism"

2010 – University of Texas at Arlington Seminar in Bioengineering, Arlington, Texas, "New Tools to Rewire the Human Brain and Treat Neurological Disease"

2010 - Tinnitus Research Initiative Meeting, Dallas, Texas, "Reversing Pathological Neural Plasticity to Treat Tinnitus"

2009 - NIDCD Workshop: Brain Stimulation for Treatment of Tinnitus, Bethesda, Maryland, "Using vagus nerve stimulation to direct plasticity for the treatment of tinnitus".

2009 - International Conference on Auditory Cortex, Magdeburg, Germany, "Neural Coding and Plasticity in the Auditory System: From Tones to Speech".

2009 - University of California at San Francisco Neuroscience Seminar, "Neural Coding and Plasticity in the Auditory System: From Tones to Speech".

2009 - University of Michigan, Biology and Experience as Mediators of Neurodevelopmental Health Seminar Series, "Sensory Experience and Cortical Plasticity".

2009 - University of California at Los Angeles Neuroscience Seminar, "Neural Coding and Plasticity in the Auditory System: From Tones to Speech".

2008 - Advances and Perspectives in Auditory Neurophysiology, Washington D.C., "Speech Sound Categorization and Plasticity in the Central Auditory System".

2008 - University of Texas at Austin Neurobiology Seminar, Austin, Texas, "Neural Coding and Plasticity in the Auditory System: From Tones to Speech".

2008 - Pediatric Academic Societies Meeting, Honolulu, Hawaii, "Neural Plasticity in Animal Models".

2008 - Healthy Minds Conference, Sarasota, Florida, "Neural Processing of Speech Sounds".

2008 - Linking Auditory Neurophysiology to Perception Workshop, Computational and Systems Neuroscience, Snow Bird, Utah, "Cortical Activity Patterns Predict Speech Discrimination Ability".

2008 - Real-Time Processing and the Processing of Time Workshop, Computational and Systems Neuroscience, Snow Bird, Utah, "Effect of Neural Correlations on Speech Discrimination".

2007 - University of Texas at Houston Department of Neurobiology and Anatomy, Houston, Texas, "Neural Coding and Plasticity in the Auditory System: From Tones to Speech"

2007 - Advances and Perspectives in Auditory Neurophysiology, San Diego, California, "Activity Patterns in Awake Auditory Cortex Predict Speech Discrimination Ability in Rats"

2007 - International Dyslexia Association Annual Meeting, Dallas, Texas, "How Practice Changes the Brain's Response to Speech Sounds"

2007 - Behavioral Neuroscience Seminar, University of Connecticut. "Coding and Plasticity in Auditory Cortex: From Tones to Speech"

2006 - International Conference on the Auditory Cortex: The Listening Brain, Grantham, England. "Speech Processing and Plasticity"

2005 - Summer Institute In Cognitive Neuroscience at Dartmouth College, Hanover, New Hampshire, "Cortical Plasticity: from Tones to Speech"

2005 - UCSF Keck Center for Integrative Neuroscience, San Francisco, California, "Cortical Plasticity: from Tones to Speech"

2005 - Center for BrainHealth Symposia Reprogramming the Human Brain, Dallas, Texas, "Translating Plasticity Research into Clinical Practice"

2005 - Krieger Mind/Brain Institute at Johns Hopkins University, Baltimore, Maryland, "Perceptual Learning and Cortical Self-organization"

2004 - Federation for European Neuroscience conference- "Plasticity in Central Auditory Processing: From Neural Mechanisms to Behavioral Significance", Lisbon, Portugal, "Sensory Experience and Cortical Plasticity".

2004 - 21st Century Science Initiative, Palisades, New York, "Experience-Dependent Cortical Plasticity"

2003 - Neural Representation and Processing of Temporal Patterns, Banbury Conference, Cold Spring Harbor Laboratory, New York, "Sensory Experience and Temporal Plasticity"

2003 - International Conference on Auditory Cortex: towards a synthesis of human and animal research, Magdeburg, Germany, "Auditory Experience and Cortical Plasticity"

2003 - McDonnell Project in Philosophy and the Neurosciences, Heron Island, Australia, "Sensory Experience and Cortical Plasticity"

2003 - Association for Research in Otolaryngology, Daytona Beach, Florida, "Perceptual learning and cortical self-organization"

2003 - American Academy of Audiology, San Antonio, Texas, Perceptual Learning & Plasticity Preconference (Co-presenter Beverly Wright, Northwestern University)

2003 - 21st Century Science Initiative, Tarrytown, New York, "Sensory Experience and Cortical Plasticity"

2003 - UTD/UTSW Reprogramming the Human Brain Symposium, Dallas, Texas, "Targeted Manipulation of Neural Plasticity"

2002 - University of Pennsylvania Johnson Foundation for Molecular Biophysics, Department of Biochemistry and Biophysics, and Department of Neuroscience, Philadelphia, Pennsylvania, "Sensory Experience and Cortical Plasticity"

2001 - UT Southwestern Department of Psychiatry and Center for Basic Neuroscience Seminar Series, Dallas, Texas, "How Experience Shapes Brain Function"

2001 - Auditory Function and Dysfunction: Molecular and Physiological Mechanisms, Auckland, New Zealand, "Sensory Experience and Cortical Plasticity"

2001 - American Association for the Advancement of Science, San Francisco, "How Experience Rewires the Brain"

2000 - Summer Brain Institute, Doubletree Hotel Dallas, "How is the Brain like a Child? - a Neuroscience Perspective on Learning"

2000 - NICE2000: Neural Plasticity and Learning, Grindelwald, Switzerland, "Toward a General Theory of Cortical Plasticity"

1998 - Weizmann Institute, Rehovot, Israel, "Stimulation of the Nucleus Basalis Enables Plasticity of Spatial and Temporal Representations in Primary Auditory Cortex"

1998 - Max Planck Institute for Brain Research, Frankfurt, Germany, "Stimulation of the Nucleus Basalis Enables Plasticity of Spatial and Temporal Representations in Primary Auditory Cortex"

1998 - Hebrew University, Jerusalem, Israel, "Stimulation of the Nucleus Basalis Enables Plasticity of Spatial and Temporal Representations in Primary Auditory Cortex"

1997 - Ear Club, Department of Psychology, University of California, Berkeley, "Cholinergic Basal Forebrain Stimulation Guides Large-Scale Reorganization of Adult Primary Auditory Cortex"

Conference Abstracts (100):

Society for Neuroscience Annual Meeting, Moderate intensity vagus nerve stimulation promotes somatosensory recovery Malley K, Ruiz AD, Danaphongse T, Ahmad F, Baghdadi S, Mian M, Montefalcon J, Raphi R, Stanislav B, Sule A, Hays SA, Kilgard MP, 2022

Society for Neuroscience Annual Meeting, Analysis of the effect of varying vagus nerve stimulation frequency on plasticity in the motor cortex, JA Addo, Neifert CL, Danaphongse T, Abe ST, Ezhil V, Kilgard MP, Hays SA, 2022



Society for Neuroscience Annual Meeting, Varying temporal characteristics of vagus nerve stimulation to promote motor cortex plasticity, CL Neifert, JJA Addo, Danaphongse T, Abe ST, Ezhil V, Reyes A, Kilgard MP, Hays SA, 2022

Society for Neuroscience Annual Meeting, Accelerated learning in auditory, motor, and cognitive tasks using vagus nerve stimulation, Danaphongse T, Carroll A, Pruitt DT, Riley J, Engineer CT, Hays SA, Kilgard MP, 2022

Society for Neuroscience Annual Meeting, Timing of Vagus Nerve Stimulation During Fear Extinction Determines Efficacy in a Rat Model of PTSD Souza RR, Powers MB, Rennaker RL, Hays SA, McIntyre CK, Kilgard MP, 2022

Texas Surgical Society, Surgical Implantation of a Novel, Wireless, Implantable Pulse Generator for Vagal Nerve Stimulation (VNS) Preliminary Results for Enhanced Neuroplasticity in the Treatment of PTSD: A First-In-Human Pilot Study, Michael Foreman, Mark Powers, Michael Kilgard, Seth Hays, Jasper Smits, Jane Wigginton, Emma Turner, Gregory Chauvin, Madison McAuliffe, Ann Marie Warren, Richard Naftalis, Holle Carey, Victoria Warren, & Robert Rennaker, 2022

Wings for Life Scientific Meeting, Salzburg, Austria, "Enhancing Recovery in Spinal Cord Injury Patients with Vagus Nerve Stimulation", Mike Kilgard, Rob Rennaker, Seth Hays, Chad Swank, Jane Wigginton, Rita Hamilton, 2021.

American Congress of Rehabilitation Medicine, "Characterization of an Algorithm for Autonomous, Closed-Loop Neuromodulation During Stroke Rehabilitation", Joseph Epperson, Eric Meyers, David Pruitt, Joel Wright, Michael Kilgard, Seth Hays, 2021.

International Society for Traumatic Stress Studies. Targeted Plasticity Therapy for Posttraumatic Stress Disorder (PTSD): A Phase I Safety Trial Using Vagus Nerve Stimulation (VNS), Emma Turner, Kiara Leonard, Michael Kilgard, Seth Hays, Jane Wigginton, Mark Powers, Michael Foreman, Richard Naftalis, Ann Marie Warren, Jasper Smits, Robert Rennaker, 2020.

Society for Neuroscience Annual Meeting, Chicago, Illinois, R. A. Morrison, T. Danaphongse, S. T. Abe, M. Stevens, K. S. Adcock, M. P. Kilgard, S. A. Hays; Investigating the interaction of vagus nerve stimulation intensity and interval on motor cortex plasticity, 2019.

Society for Neuroscience Annual Meeting, Chicago, Illinois, M. Torres, M. Darrow, Z. Haider, M. Sosa, J. Tran, F. Smith, S. A. Hays, M. P. Kilgard; Enhancement of motor function with vagus nerve stimulation following a C7/C8 spinal cord injury, 2019.

Society for Neuroscience Annual Meeting, Chicago, Illinois, D. Hulsey, J. K. Mathew, M. P. Kilgard, S. A. Hays; Assessing plasticity of somatotopy and receptive field specificity of digit representations in primary somatosensory cortex after injury, 2019.

Society for Neuroscience Annual Meeting, Chicago, Illinois, K. S. Adcock, T. Danaphongse, Z. Haider, M. Torres, R. A. Morrison, S. A. Hays, M. P. Kilgard; Evaluating vagus nerve stimulation paired with rehabilitation for sensory and motor dysfunction after radial nerve injury, 2019.

Society for Neuroscience Annual Meeting, Chicago, Illinois, M. J. Darrow, T. Mian, M. Torres, Z.

Haider, E. Meyers, M. Romero-Ortega, M. Kilgard, S. Hays; Improving sensory function by utilizing vagus nerve stimulation after peripheral nerve injury, 2019.

Society for Neuroscience Annual Meeting, Chicago, Illinois, E. C. Meyers, D. T. Pruitt<sup>1</sup>, R. Affenit, Y.-N. Duong, J. Wright, J. Epperson, R. L. Rennaker, S. A. Hays, M. P. Kilgard; An At-Home and Clinical System for arm and hand rehabilitative therapy after stroke and spinal cord injury, 2019.

Society for Neuroscience Annual Meeting, Chicago, Illinois, T. Danaphongse, D. Pruitt, M. Lutchman, N. Patel, P. Reddy, V. Wang, A. Parashar, M. Kilgard, S. Hays; The Intensity of Vagus Nerve Stimulation Determines Efficacy In improving recovery or motor function after stroke, 2019.

Society for Neuroscience Annual Meeting, Chicago, Illinois, D. Pruitt, E. Meyers, Y.-N. Duong, J. Wright, J. Epperson, R. Affenit, S. Hays, M. Kilgard; Development of a novel system for motor and sensory rehabilitative therapy after neurological injury, 2019.

Timing and intensity of vagus nerve stimulation influences motor cortex plasticity, Morrison RA, Hulsey DR, Adcock KM, Tsang YY, Kuo A, John J, Rennaker RL, Kilgard MP, Hays SA, Society for Neuroscience Annual Meeting, San Diego, CA, 2018.

Vagus nerve stimulation intensity and frequency modulate cortical plasticity and motor recovery after brain injury, Pruitt DT, Danaphongse T, Lutchman M, Patel M, Le J, Reddy P, Rennaker RL, Kilgard MP, Hays Sam, Society for Neuroscience Annual Meeting, San Diego, CA, 2018.

Restoring central networks improves motor and sensory function after nerve damage, Meyer EC, Kasliwal N, Lai E, Romero-Ortega M, Rennaker RL, Kilgard MP, Hays SA, Society for Neuroscience Annual Meeting, San Diego, CA, 2018.

Parametric optimization of Vagus Nerve Stimulation for the enhancement of plasticity and recovery of forelimb motor function after peripheral nerve injury, Ruiz AD, Bilal M, Haider Z, Seyedamadi A, Abusomwan A, Parmar D, Tran J, Sheth M, Khan M, Hays SA, Rennaker RL, Kilgard MP, Society for Neuroscience Annual Meeting, San Diego, CA, 2018.

Flat electrodes for peripheral nerve stimulation and non-invasive dose-response curves of vagus nerve stimulation, Bucksot JE, Wells A, Rahebi KC, Kilgard MP, Rennaker RL, Hays SA, Society for Neuroscience Annual Meeting, San Diego, CA, 2018.

Myelinated axons are clustered in the rat cVN and localized stimulation reduces the off-target activation of A $\alpha$  motor axons in the recurrent laryngeal nerve, Wells A, Gonzalez-Gonzalez M, Hays SA, Kilgard MP, Rennaker RL, Romero-Ortega M, Society for Neuroscience Annual Meeting, San Diego, CA, 2018.

Vagus nerve stimulation therapy to restore auditory processing in a rat model of Rett syndrome, Adcock KN, Solorzano BR, Chandler C, Buell E, Loerwald KW, Berry A, Spurlin G, McLeod S, Hays SA, Kilgard MP, Society for Neuroscience Annual Meeting, San Diego, CA, 2018.

Neuromodulatory pathways required for targeted plasticity therapy, Hulsey DR, Sadmaan S, Abe S, Hays SA, Kilgard MP, Society for Neuroscience Annual Meeting, San Diego, CA, 2018.

Improving generalization of recovery using vagus nerve stimulation after peripheral nerve injury  
Darrow M, Ruiz AD, Bilal M, Zalloum A, Seyeda A, Sheth M, Parmar D, Tran J, Kilgard MP, Hays SA, Society for Neuroscience Annual Meeting, San Diego, CA, 2018.

Cortical Map Plasticity As A Function Of Vagus Nerve Stimulation Intensity Paired With Motor Training, R. A. Morrison, T. Danaphongse, S. Sarker, J. Mong, H. Zhang, D. Hulse, K. Adcock, S. A. Hays, M. P. Kilgard, R. L. Rennaker, Society for Neuroscience Meeting, San Diego, 2017.

Cortical Map Plasticity As A Function Of The Duration Of Vagus Nerve Stimulation Paired With An Auditory Stimulus, E. Buell, K. Loerwald, M. Borland, C. Kelly, J. Buell, M. Frech, E. Jensen, J. Kurvari, C. Chandler, M. P. Kilgard, Society for Neuroscience Meeting, San Diego, 2017.

Vagus Nerve Stimulation Dependent Enhancement Of Motor Cortex Plasticity Requires Noradrenergic Innervation, D. Hulse, M. Shedd, J. Mong, R. L. Rennaker, S. A. Hays, M. P. Kilgard, Society for Neuroscience Meeting, San Diego, 2017.

Biomarkers For Fiber Recruitment Within The Vagus Nerve and Impact of Cuff Geometry, J. Bucksot, J. Riley, K. Loerwald, K. Rahebi, M. Rios, M. Kilgard, R. Rennaker, S. Hays, Society for Neuroscience Meeting, San Diego, 2017.

IGF- and Behavioral Training As Potential Therapeutic Strategies To Improve Behavioral Deficits in a Rat Model of Rett Syndrome, K. Adcock, A. Berry, J. Riley, A. Alvarez-Dieppa, J. Bucksot, R. Herd, R. L. Rennaker, C. Engineer, S. A. Hays, M. P. Kilgard, Society for Neuroscience Meeting, San Diego, 2017.

Pairing Vagus Nerve Stimulation With Motor Training To Enhance Motor Recovery After Stroke: Effects of Parametric Variations of Stimulation Intensity, D. Pruitt, D. Pruitt, T. Danaphongse, M. Lutchman, R. L. Rennaker, M. P. Kilgard, S. A. Hays, Society for Neuroscience Meeting, San Diego, 2017.

Optimizing Vagus Nerve Stimulation Paired With Rehabilitation to Enhance Recovery Following Spinal Cord Injury, M. Darrow, A. D. Ruiz, P. D. Ganzer, L. Barron, A. Berry, M. Bilal, R. L. Rennaker, M. P. Kilgard, S. A. Hays, Society for Neuroscience Meeting, San Diego, 2017.

Vagus Nerve Stimulation Enhances Plasticity and Improves Recovery Following Peripheral Nerve Injury, E. Meyers, B. R. Solorzano, R. Granja-Vazquez, P. D. Ganzer, M. Darrow, M. I. Romero-Ortega, R. L. Rennaker, M. P. Kilgard, S. A. Hays, Society for Neuroscience Meeting, San Diego, 2017.

Vagus Nerve Stimulation Paired with Rehabilitation Improves Functional Recovery Following Peripheral Nerve Injury. E Meyers, R Granja, R Solorzano, P Ganzer, N Robertson, K Adcock, M Romero-Ortega, M Kilgard, R Rennaker, S Hays, Biomedical Engineering Society Meeting, Minneapolis, Minnesota, 2016.

Vagus nerve stimulation reverses extinction impairments and alters PTSD symptoms in the SPS animal model. LJ Noble, VB Meruva, MP Kilgard, CK McIntyre, FreshAir Conference: Grand Challenges In Neuroscience, Austin, 2016.

Enhancing plasticity and recovery following spinal cord injury. PD Ganzer, EC Meyers, BR Solorzano, KS Adcock, NM Robertson, JT James, A. Ruiz, AM Becker, MP Goldberg, DT Pruitt, JK Moy, SN Hassler, TJ Price, MA Lane, W, M, RL Rennaker, Society for Neuroscience Meeting, San Diego, 2016.

Varying frequency in vagus nerve stimulation to optimize plasticity in the rat auditory cortex. E Buell, M Borland, K Loerwald, M Kilgard, Society for Neuroscience Meeting, San Diego, 2016.

Vagus nerve stimulation paired with rehabilitation improves functional recovery following peripheral nerve injury. E Meyers, R Granja, R Solorzano, G Bendale, P Ganzer, N Robertson, K Adcock, M Romero-Ortega, M Kilgard, R Rennaker, S Hays, Society for Neuroscience Meeting, San Diego, 2016.

Vagus nerve stimulation reverses extinction impairments and alters PTSD symptoms in the SPS animal model. LJ Noble, IJ Gonzalez, VB Meruva, AK Hutchinson, TA Dam, SK Thomas, E Meyers, MP Kilgard, CK McIntyre, Society for Neuroscience Meeting, San Diego, 2016.

Vagus nerve stimulation directs both cortical and subcortical plasticity. M S Borland, N A Moreno, EP Buell, JM Buell, II Khan, AS Khan, NN Houshmand, CA Kelly, EK Jensen, AM Carroll, X Shen, MP Kilgard, Society for Neuroscience Meeting, San Diego, 2016.

Vagus nerve stimulation reverses extinction impairments and alters PTSD symptoms in the SPS animal model. LJ Noble, VB Meruva, MP Kilgard, CK McIntyre, Mikiten Graduate Research Symposium, San Antonio, 2016.

Vagus nerve stimulation reverses extinction impairments and alters PTSD symptoms in the SPS animal model. LJ Noble, VB Meruva, MP Kilgard, CK McIntyre, Pavlovian Society, Jersey City, 2016.

Targeted Plasticity Using Vagus Nerve Stimulation Promotes Sensorimotor Circuit Rewiring and Functional Recovery Following Chronic Cervical Spinal Cord Injury. Ganzer PD, Meyers EC, Becker A, Solorzano R, Ruiz A, Goldberg MP, Kilgard MP, Rennaker II RL, International Spinal Cord Repair, Barcelona, Spain, 2015 (Best Poster Award).

Awake behaving electrophysiological correlates of weakness and spasticity after cervical hemi-contusion in the rat, PD Ganzer, E Meyers, RL Rennaker, MP Kilgard, Society for Neuroscience Meeting, Chicago, 2015.

Vagus nerve stimulation drives neural activity in the locus coeruleus and nucleus basalis, D Hulsey, J Riley, M Iyengar, R Rennaker, S Hays, MP Kilgard, Society for Neuroscience Meeting, Chicago, 2015.

Physiological characteristics of multiple auditory fields in the tinnitus animal model, E Buell, MS Borland, MP Kilgard, Society for Neuroscience Meeting, Chicago, 2015.

Investigating vagus nerve stimulation paired with motor rehabilitation to enhance recovery on a novel task measuring supination and the generalization of recovery across different motor tasks in a rat model of ischemic stroke, E Meyers, S Hays, R Solorzano, R Choi, MP Kilgard, R Rennaker, Society for Neuroscience Meeting, Chicago, 2015.

Vagus nerve stimulation paired with rehabilitative training improves recovery of forelimb function in an aged model of ischemic stroke, AD Ruiz, SA Hays, DR Hulsey, N Khodaparast, RL Rennaker, MP Kilgard, Society for Neuroscience Meeting, Chicago, 2015.

Vagus nerve stimulation paired with motor training does not improve forelimb function or strength in 6-hydroxydopamine-lesioned rats, A Nguyen, A Ruiz, S Hays, M Kilgard, R Rennaker, Society for Neuroscience Meeting, Chicago, 2015.

Effects of vagus nerve stimulation paired with motor training on contralesional cortical plasticity after brain injury, D Pruitt, A Schmid, K Flanagan, B Baker, C Abe, R Morrison, J Trieu, S Shah, MP Kilgard, RL Rennaker, Society for Neuroscience Meeting, Chicago, 2015.

Moderate vagus nerve stimulation directs more cortical plasticity than more intense VNS, MS Borland, EP Buell, CT Engineer, NA Moreno, ZI Alam, MM Pantalia, P Sharma, MC Lane, CB Jost, ATT Do, MP Kilgard, Society for Neuroscience Meeting, Washington D.C., 2014.

Pairing vagus nerve stimulation with rehabilitative training enhances functional recovery after traumatic brain injury, D Pruitt, A Schmid, C Choua, L Kim, J Trieu, C Abe, K Flanagan, MP Kilgard, RL Rennaker, Society for Neuroscience Meeting, Washington D.C., 2014.

Vagus nerve stimulation dependent enhancement of cortical plasticity requires cholinergic innervation of the cortex, D Hulsey, S Hays, N Khodaparast, R Casavant, A Ruiz, P Das, E Nutting, X Carrier, M Iyengar, I Quareshi, S Sultana, R Rennaker, MP Kilgard, Society for Neuroscience Meeting, Washington D.C., 2014.

A novel automated method for isolating and quantifying supination performance in a rat model of ischemic stroke, E Meyers, A Sindhurakar, S Hays, A Sloan, J Carmel, MP Kilgard, R Rennaker, Society for Neuroscience Meeting, Washington D.C., 2014.

Vagus nerve stimulation and healthy limb training modify stroke recovery, A Nguyen, N Khodaparast, S Hays, MP Kilgard, RL Rennaker, Society for Neuroscience Meeting, Washington D.C., 2014.

Translational potential of vagus nerve stimulation to enhance recovery of motor function after stroke, N. Khodaparast, R Casavant, SA Hays, A Ruiz, N Jones, B Nguyen, M Thomas, C Le, R Rennaker, MP Kilgard, Society for Neuroscience Meeting, Washington D.C., 2014.

Vagus nerve stimulation paired with rehabilitative training improves recovery of forelimb function in clinically relevant models of stroke, SA Hays, N Khodaparast, A Ruiz, M Iyengar, P Das, E Nutting, I Kushner, V Land, N Houshmandi, R Rennaker, MP Kilgard, Society for Neuroscience Meeting, Washington D.C., 2014.

Auditory cortex speech sound processing impairments in a rat model of autism, CT Engineer, TM Centanni, KW Im, NA Moreno, WA Vrana, MS Borland, RS Carraway, JA Shetake, KG Ranasinghe, JR Riley, JD Seale, LG Wilson, MP Kilgard, Society for Neuroscience Meeting, San Diego, California, 2013

Emotional perturbations in an environmentally induced animal model of autism, A Banerjee, JA Luong, SK Lella, BL Sauls, CT Engineer, MP Kilgard, J E Ploski, Society for Neuroscience Meeting, San Diego, California, 2013

Speech sound processing deficits and training-induced neural plasticity in rats with dyslexia gene knockdown, TM Centanni, AB Booker, F Chen, CT Engineer, AM Sloan, K Trull, N Wasko, RL Rennaker, JJ Loturco, MP Kilgard, Society for Neuroscience Meeting, San Diego, California, 2013

Vagal nerve stimulation prevents stress-induced interleukin-6-dependent cortical hyperexcitability, F Garcia-Oscos, D Peña, M Housini, D Cheng, H Salgado, S D'mello, S Rose-John, MP Kilgard, M Atzori, Society for Neuroscience Meeting, San Diego, California, 2013.

Novel motor tasks reveal long-lasting impairment in a rat model of ischemic stroke, Hays SA, Khodaparast N, Sloan A, Fayyaz T, Cao D, Hulseley D, Pantoja M, Vu T, Alam N, Rennaker R, Kilgard MP, Society for Neuroscience, New Orleans 2012.

Movement-paired vagus nerve stimulation improves motor recovery following endothelin-1 ischemic brain damage, Khodaparast N, Hays SA, Sloan A, Fayyaz T, Cao D, Hulseley D, Pantoja M, Vu T, Alam N, Rennaker R, Kilgard MP, Society for Neuroscience, New Orleans 2012.

Neural and behavioral speech discrimination impairment in a rat model of dyslexia, Rosen TM, Booker AB, Chen F, Trull K, Wasko N, Khodaparast N, Sloan AM, Rennaker R II, Loturco JJ, Kilgard, MP Society for Neuroscience, New Orleans 2012.

Evaluating neural correlates of compressed speech discrimination in the adult rat, T. M. Rosen, A. M. Sloan, R. R. Rennaker, M. P. Kilgard, Society for Neuroscience, Washington D.C., 2011.

The effects of VNS paired with rehabilitative motor training on the behavioral recovery following ischemic brain damage, N. Khodaparast, T. Fayyaz, S. Ahmed, R. Cheung, C. May, F. Naqvi, D. Ratra, M. Javidnia, A. Ruiz, D. Cao, R. Rennaker, M. P. Kilgard, Society for Neuroscience, Washington D.C., 2011.

Animal model of the effects of early auditory experience on speech sound processing, K. Ranasinghe, R. Carraway, M. Borland, N. Moreno, C. Rohloff, D. Gunter, E. Hanacik, M. P. Kilgard, Society for Neuroscience, Washington D.C., 2011.

Animal Model of Speech Sound Processing in Autism, C.T. Engineer, T.M. Rosen, W.A. Vrana, J.R. Riley, J.A. Shetake, K.G. Ranasinghe, J.D. Seale, M.P. Kilgard, Brain Research Meeting: The Emerging Neuroscience of Autism Spectrum Disorders, San Diego, 2010.

Effects of inter-stimulus interval and presentation rate on speech discrimination in the adult rat, T. M. Rosen, A. M. Sloan, C. T. Engineer, R. J. Cheung, C. L. Mains, R. L. Rennaker, II, M. P. Kilgard, Society for Neuroscience, San Diego, California, 2010.

Stimulation of the vagus nerve paired with a skilled reaching task induces plasticity in rat motor cortex, N. Khodaparast, B. A. Porter, W. Vrana, H. Shepard, R. Cheung, M. Fayyaz, C. Rohloff, M. P. Kilgard, Society for Neuroscience, San Diego, California, 2010 .

Discrimination of Degraded Speech Sounds by Rats: Behavior and Physiology, K Ranasinghe, W Vrana, C Matney, G Mettalach, T Rosenthal, E Renfroe, T Jasti, M Kilgard, Association for Research in Otolaryngology, Anaheim, California, 2010.

Effect of Background White Noise and Speech Shaped Noise on Speech Discrimination Performance in Primary Auditory Cortex of Rats, Jai Shetake, Jordan Wolf, Ryan Cheung, Kinsey Ram, Will Vrana, Tara Rosenthal, Michael Kilgard, Association for Research in Otolaryngology, Anaheim, California, 2010.

Tinnitus percept in rats is associated with pathological auditory cortex plasticity, N. D. Engineer, J. R. Riley, J. D. Seale, J. A. Shetake, D. Vuppala, H. Rasul, M. Fink, M. P. Kilgard, Society For Neuroscience, Chicago, Illinois, 2009.

Bilateral auditory cortex lesions impair discrimination of brief speech sounds, B. A. Porter, T. R. Rosenthal, J. Wolf, A. C. Reed, W. A. Vrana, E. M. Renfroe, S. K. Ram, M. P. Kilgard, Society For Neuroscience, Chicago, Illinois, 2009.

Targeted Neuroplasticity to Treat TBI, Tinnitus, and PTSD, Michael Kilgard, Navzer Engineer, Will Rosellini, Crystal Engineer, Advanced Technology Applications for Combat Casualty Care, St. Pete Beach, Florida, 2009.

Cortical Responses to Spatio-Temporal Patterns Encode the Preceding Stimuli D.V. Buonomano, P.K. Pandya, N.D. Engineer, M. P. Kilgard, Society For Neuroscience, Washington D.C., 2008.

M1 Agonist Cevimeline (AF102B) Induces Input Specific Frequency Map Plasticity In Rat Primary Auditory Cortex. V Jakkamsetti, JA Shetake, KQ Chang, K Krishnan, RO Torres, KM Jordan, MP Kilgard, Society For Neuroscience, Washington D.C., 2008.

Effect of White noise on Speech Discrimination Ability in Primary Auditory Cortex of Rats J. A. Shetake, K. G. Ranasinghe, B. A. Porter, H. Mumtaz, E. Tran, J. Wolf, M. P. Kilgard, Society for Neuroscience, Washington D.C., 2008.

Speech sound discrimination in rats with primary auditory cortex lesions, B. A. Porter, T. K. Jasti, D. Kavikova, R. C. Frazier, M. P. Kilgard, Society for Neuroscience, Washington D.C., 2008.

Environmentally induced modification of the long term consolidation process of contextual fear memory, D. F. Pena, V. C. Roberts, K. Chang, M. P. Kilgard, C. K. McIntyre; Society for Neuroscience, Washington D.C., 2008.

Environmental Enrichment Increases Response Strength And Paired-Pulse Depression Of Auditory Cortex Neurons. C.R. Percaccio, A.L. Pruette, S.T. Mistry, Y.H. Chen, D.L. Rathbun, M.P. Kilgard, Acoustical Society of America, Paris, France, 2008.

Impaired Speech Discrimination in Rats in the Presence of White Noise, B Porter, J Alaniz, C Engineer, M Kilgard, Association for Research in Otolaryngology, 2008.

Acetylcholine Increases Time-Locking Without Increasing S/N Ratio in In Vivo Recordings from the Primary Auditory Cortex of the Anesthetized Rat J Nichols, B Roof, H Salgado, V Jakkamsetti, M Kilgard, M Atzori, Association for Research in Otolaryngology, 2008.

Speech Training Enhances Responses in Rat Primary Auditory Cortex. C. T. Engineer, C. A. Perez, R. S. Carraway, A. C. Puckett, K. Q. Chang, Y. H. Chen, M. P. Kilgard, Society For Neuroscience, San Diego, 2007.

Behavioral Correlates of NB-Stimulation Induced Frequency Map Plasticity in Primary Auditory Cortex Of Rats A. C. Puckett, R. S. Carraway, C. A. Perez, C. T. Engineer, V. Jakkamsetti, J. R. Riley, H. A. Fenus, V. Badhiwala, J. L. Choi, M. P. Kilgard, Society For Neuroscience, San Diego, 2007.

Unimpaired Speech Discrimination in Rats Following Bilateral Auditory Cortex Lesions B. A. Porter, O. R. Floody, L. Ouda, C. Skillern, T. Sharma, M. P. Kilgard, Society For Neuroscience, San Diego, 2007.

Rolipram Causes Frequency-Specific Map Reorganization in the Primary Auditory Cortex V. Jakkamsetti, K. Q. Chang, J. A. Shetake, G. L. Mettlach, M. G. Ditzler, J. G. Kalangara, M. P. Kilgard, Society For Neuroscience, San Diego, 2007.

Effect of Sensory Stimulation on the Neuronal Morphology in the Auditory Cortex M. Bose, V. P. Jakkamsetti, J. A. Nichols, R. Byrapureddy, B. A. Porter, M. P. Kilgard, M. Atzori, Society For Neuroscience, San Diego, 2007.

Activity Patterns in Awake Auditory Cortex Predict Speech Discrimination Ability in Rats. J. A. Shetake, C. T. Engineer, C. A. Perez, R. S. Carraway, G. L. Mettlach, R. L. Rennaker, M. P. Kilgard, Advances and Perspectives in Auditory Neurophysiology, San Diego, 2007.

Rolipram Enhances Cortical Plasticity in Primary Auditory Cortex (A1) of Rats, V. Jakkamsetti, R. Jain, K. Q. Chang, R. J. Nance, J. G. Kalangara, M. P. Kilgard, Society For Neuroscience, Atlanta, 2006.

Perceptual Consequences of Frequency Map Plasticity in Auditory Cortex, A. C. Puckett, C. T. Novitski, R. S. Carraway, C. L. Heydrick, A. L. McMenemy, C. A. Perez, M. P. Kilgard, Society For Neuroscience, Atlanta, 2006.

Neural Coding of Speech Sounds in Naïve And Trained Rat Primary Auditory Cortex, C. T. Novitski, C. A. Perez, A. C. Puckett, Y. H. Chen, V. Jakkamsetti, M. S. Perry, R. S. Carraway, M. P. Kilgard, Society For Neuroscience, Atlanta, 2006.

Discrimination Training of Speech Sounds in Rats, C. A. Perez, C. T. Novitski, A. C. Puckett, Y. H. Chen, M. S. Perry, R. S. Carraway, O. R. Floody, M. P. Kilgard, Society For Neuroscience, Atlanta, 2006.

The Effects of Long Term Auditory Experience on Surface Vasculature in Rat Auditory Cortex, D. M. A. E. Listhrop, K. J. Dominguez, P. Kan, R. Carrasco, T. Sharma, A. R. Moller, M. P. Kilgard, Society For Neuroscience, Atlanta, 2006.

Environmental Enrichment Selectively Increases Excitatory Synaptic Currents in Auditory Cortex Layers II/III vs. Layer V, J. A. Nichols, V. Jakkamsetti, L. Dinh, M. Kilgard, M. Atzori, Society For Neuroscience, Atlanta, 2006.



In Vivo Cortical Responses Compared with the Responses of Ensembles of Spectro-Temporal Fragments and a Simple Thalamo-Cortical Model, M. Coath, S.L. Denham, M.P. Kilgard, International Conference on the Auditory Cortex: The Listening Brain, England, 2006.

Discrimination Training and Neural Coding of Speech Sounds in Rat Primary Auditory Cortex, C.T. Novitski, A.C. Puckett., Y.H. Chen., C.A.Perez, V. Jakkamsetti, M.S. Perry, R.S. Carraway, M.P. Kilgard, COSYNE: Computational and Systems Neuroscience Meeting, Salt Lake City, Utah, 2006.

Effect of Enriched Environment on Synaptic Transmission in the Rat Auditory Cortex. J. Nichols, V. Jakkamsetti, R. Byrapureddy, B. Roof, H. Bui, T. Thompson, M.P. Kilgard, M. Atzori, Association for Research in Otolaryngology, Baltimore, 2006.

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Environmental Influence in Cortical Map Reorganization Generated by Basal Forebrain Activation, R. Carrasco, A. Puckett, P. Pandya, R. Jain, A. McMenemy, J. Gibbons, R. Moucha, C. Heydrick, M.P. Kilgard, Association for Research in Otolaryngology, New Orleans, 2005.

Frequency Map Reorganization in Rat Primary Auditory Cortex Enabled by Basal Forebrain Activation Endures for at Least 20 Days R.A.Carrasco, A.Puckett, P.K.Pandya, A.McMenamy, J.Gibbons, C.Heydrick, R.Moucha, R.Jain, M.P.Kilgard, Society for Neuroscience, San Diego, 2004.

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Progressive Decay of Cortical Map Reorganization Induced by Basal Forebrain Activation in Rat A1 R.A. Carrasco, A. Puckett, P.K. Pandya, A. McMenemy, J. Gibbons, R. Moucha, R. Jain, M.P. Kilgard, Association for Research in Otolaryngology, Florida, 2004.

Representation of Frequency Modulation: Comparison Between Thalamic, Primary and Posterior Auditory Field, R. Moucha, D.L. Rathbun, P.K. Pandya, N.D. Engineer, and M.P. Kilgard International Conference on Auditory Cortex, Magdeburg, Germany, 2003.

Nucleus Basalis Induced Plasticity in Primary and Posterior Auditory Fields, A. Puckett, P.K. Pandya, W. Dai, N. Engineer, R. Moucha, D.L. Rathbun, and M.P. Kilgard, International Conference on Auditory Cortex, Magdeburg, Germany, 2003.

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Representation of Complex Sounds in Auditory Thalamus, Primary and Non-Primary Cortex, P. K. Pandya, D. L. Rathbun, N. D. Engineer, R. Moucha, R.L. Rennaker, M. P. Kilgard, Association for Research in Otolaryngology, Florida, 2003.

Cholinergic Modulation of Auditory Evoked Potentials, C. R. Percaccio, S. T. Mistry, L. J. Cauller, M.P. Kilgard, Association for Research in Otolaryngology, Florida, 2003.

Dynamic Filtering in Rat Auditory Cortex, R.L. Rennaker, H.H., P. Kilambi, M.P. Kilgard, Association for Research in Otolaryngology, Florida, 2003.

Representational Remodelling Induced by Distributed Spatial Inputs in Auditory Cortex. P.K. Pandya, R. Moucha, D.L. Rathbun, N.D. Engineer, J.L. Vazquez, M.P. Kilgard, Society for Neuroscience. Orlando, 2002.

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Characterization of Response Properties in Rat Posterior Auditory Cortex D. L. Rathbun, N.D. Engineer, R. Moucha, P.K. Pandya, M.P. Kilgard, Association for Research in Otolaryngology, Florida, 2002.

Auditory experience improves response characteristics in rat primary auditory cortex neurons, N.D. Engineer, J. Vasquez, P.K. Pandya, R. Moucha, D. Rathbun, M.P. Kilgard, Society for Neuroscience. San Diego, 2001.

Cortical Synchronization changed by Experience-Dependent Plasticity in Rat A1, J.L. Vazquez, P.K. Pandya, N.D. Engineer, R. Moucha, D. Rathbun, M.P. Kilgard, Society for Neuroscience. San Diego, 2001.

Background Stimuli Contribute to Cortical Plasticity in Rat Primary Auditory Cortex, Moucha R, Pandya PK, Vazquez J, Engineer ND, Rathbun D, Kilgard MP, Society for Neuroscience. San Diego, 2001.

Enriched auditory experience increases selectivity, threshold and response strength of rat primary auditory cortex neurons, N.D. Engineer, J. L. Vazquez, P.K. Pandya, R. Moucha, D. Rathbun, M.P. Kilgard, Association for Research in Otolaryngology, Florida, 2001.

Parametric changes in the cross correlation strength in rat primary auditory cortex as a function of experience, J. L. Vazquez, P.K. Pandya, D. Rathbun, R. Moucha, N.D. Engineer, M.P. Kilgard, Association for Research in Otolaryngology, Florida, 2001.

Plasticity of spectrotemporal coding in primary auditory cortex enabled by cholinergic modulation, R. Moucha, P.K. Pandya, J.L. Vazquez, D. Rathbun, N.D. Engineer, M.P. Kilgard, Association for Research in Otolaryngology, Florida, 2001.

Frequency tuning plasticity in rat primary auditory cortex, P.K. Pandya, J. Vazquez, D. Rathbun, N.D. Engineer, R. Moucha, M.P. Kilgard, Association for Research in Otolaryngology, Florida, 2000.

Order Selective Plasticity in Primary Auditory Cortex, M.P. Kilgard, M.M. Merzenich, Association for Research in Otolaryngology, Florida, 1999.

Plasticity of Temporal Information Processing in the Primary Auditory Cortex, M.P. Kilgard, M.M. Merzenich, Society for Neuroscience, Washington D.C., 1998.

Cholinergic Forebrain Mechanism in Cortical Map Reorganization, M.P. Kilgard, M.M. Merzenich, Society for Neuroscience, Washington D.C., 1996.

Audiogenic Seizures in 5-HT<sub>2c</sub> Receptor Mutant Mice, T.J. Brennan, M. Kilgard and L.H. Tecott, Society for Neuroscience, Washington D.C., 1996.

Rab3a and Synaptic Release in *C. elegans*. M.P. Kilgard, M.L. Nonet, B.J. Meyer, International *C. elegans* Meeting, Madison, Wisconsin, 1993.

#### **TEACHING EXPERIENCE:**

2001-present – Faculty Advisor for the Eugene McDermott Scholars Program.

1999-present – UTD Graduate Courses - Cellular Neuroscience, Developmental Neuroscience, Information Processing in the Auditory Cortex, Cortical Plasticity, Neural Basis of Speech Sound Processing, and Matlab for Brain Sciences.

1999-present – UTD Undergraduate Courses - Cellular Neuroscience, Developmental Neuroscience, Behavioral Neuroscience, Auditory Neuroscience, and Cortical Plasticity

2013 – Invited lecturer on biomedical engineering, Erik Jonsson School of Engineering & Computer Science, UTD.

2000 – UT Southwestern Medical Center, Psychiatric Genetics guest lecture “Toward a General Theory of Cortical Plasticity”.

1996-1998 – Invited lecturer on cortical plasticity, City College of San Francisco.

1994 – Teaching assistant, Neuroscience for Pharmacists, UC San Francisco.

1994-1998 – Volunteer neuroscience instruction for high school, middle school, and elementary schools throughout the San Francisco Unified School District.

**PUBLIC PRESENTATIONS (13):**

2019 – UT System Chancellor’s Council Executive Committee

2018 – UT Dallas Executive Committee

2016 – American Tinnitus Association Webinar, “Retuning the Tinnitus Brain”

2016 – Vocational Nurses Association, Caring Society Lunch and Learn, “Healing the Human Brain: The Next Medical Revolution”, Dallas Texas.

2013 – Innovations in Neuro Technology... From Hearing to Strokes, Dallas Texas.

2012 – Summer Intensive Auditory Rehabilitation Conference, Richardson, Texas, “New Brain-Based Therapies for Auditory Problems”

2011 – Texas Instruments Alumni Association and UT Dallas Retiree Association, Richardson, Texas, “Helping the Brain Heal Itself”

2010 – Bodies the Exhibition, Dallas, Texas, “The Brain: An Owner’s Guide”

2009 – The Brain: An Owner’s Guide, Center for BrainHealth, Dallas, Texas, “New Tools for Brain Repair”

2006 – Center for BrainHealth lecture series, Presbyterian Hospital of Dallas, Texas. “Healing the Human Brain: The Next Medical Revolution”

2003 – The Brain: An Owner’s Guide, Center for BrainHealth Lecture Series, Dallas, Texas, “How Your Brain Learns”.

2003 – Brain Health, Glen Mitchell Show, Public Radio Station KERA Dallas, Texas.

2003 – Discoveries & Hope for Brain Health, The McCuiston Program, Public Television, Dallas, Texas.

2001 - Learning Brain Expo (keynote speaker), San Antonio, Texas, "Learning and Brain Plasticity"

1999 - Alief Independent School District, Houston, "How is the Brain like a Child? - a Neuroscience Perspective on Learning"

**PROFESSIONAL ACTIVITIES:**

Interim Director of the Texas Biomedical Device Center

Associate Director of the Texas Biomedical Device Center

Faculty Advisory Council of the Eugene McDermott Scholars Program

UT Dallas Research Advisory Committee, Chair

Biology Promotion review committee

Founders Fellows review committee

Regents' Outstanding Teaching Award Committee

Consultant for MicroTransponder, Inc.

Scientific reviewer for Nature, Proceedings of the National Academy of Sciences , Neuron, Lancet Neurology, Brain Research, Journal of the Association for Research in Otolaryngology, Behavioral Neuroscience, Journal of the American Academy of Audiology, Ear and Hearing, Psychological Sciences , Cerebral Cortex , Hearing Research, Journal of Neurophysiology, Trends in Cognitive Neuroscience, European Journal of Neuroscience, Frontiers in Neuroscience, PLOSone, Neurorehabilitation & Neural Repair, and Journal of Neuroscience.

Grant Reviewer for the National Institute for Deafness and Other Communicative Disorders (AUD Study Section) and the National Institute for Neurological Disorders and Stroke (ANIE Study Section), National Science Foundation, U.S. Department of Veterans Affairs, Alberta Heritage Foundation, Research Foundation Flanders, Royal National Institute for Deaf People, National Sciences and Engineering Research Council of Canada, MRC Institute of Hearing Research, and DoD Joint Warfighter Medical Research Program.