Seth A. Hays
University of Texas at Dallas
Erik Jonsson School of Engineering and Computer Science
Department of Bioengineering
[redacted]

Education:

Postdoctoral Fellow, 2012-2014, University of Texas at Dallas, Systems Neuroscience

Ph.D., 2012, University of Texas Southwestern Medical Center, Neuroscience

B.S., 2007, University of Texas at Austin, Biomedical Engineering

Employment:

2025 -	Professor, Department of Bioengineering, University of Texas at Dallas
2020 - 2025	Associate Professor, Department of Bioengineering, University of Texas at Dallas
2018 - 2025	Fellow, Eugene McDermott Endowed Professor, University of Texas at Dallas
2016 -	Director of Translational Research, Texas Biomedical Device Center
2014 - 2020	Assistant Professor, Department of Bioengineering, University of Texas at Dallas

Awards and Honors:

2026 Outstanding Professor, UTD Bioengineering Department

2025 Anthony Cerami Award for Translational Medicine, Molecular Medicine

2023 President's Undergraduate Teaching Excellence Award Nominee, UTD

2023 President's Graduate Teaching Excellence Award Nominee, UTD

2022 Outstanding Associate Professor, UTD Bioengineering Department

2022 Federal Research Innovation and Expenditures Dynamo Award, UTD

2021 Federal Research Innovation and Expenditures Dynamo Award, UTD

2020 President's Undergraduate Teaching Excellence Award Nominee, UTD

2020 Federal Research Innovation and Expenditures Dynamo Award, UTD

2019 Undergraduate Teaching Award, UTD Bioengineering Department

2019 High Impact Research Award, UTD Bioengineering Department

2019 President's Undergraduate Teaching Excellence Award Nominee, UTD

2018 Eugene McDermott Endowed Professorship, UTD

2018 Undergraduate Teaching Award, UTD Bioengineering Department

2015 Robert G. Siekert New Investigator for Stroke Award, American Heart Association

2015 Faculty Research Award Nominee, UTD Erik Jonsson School of Engineering

2015 Excellence in Research Award, UTD Bioengineering Department

2013 Rapid Response Innovation Award, Michael J Fox Foundation

2013 Research Fellow Award, Texas Biomedical Device Center

Peer-Reviewed Publications:

1. Kilgard MP, Epperson JD, Adehunoluwa A, Swank CD, Porter AL, Pruitt DT, Gallaway H, Stevens C, Gillespie J, Arnold D, Powers MB, Hamilton R, Naftalis RC, Foreman ML, Wigginton JG, **Hays SA**, Rennaker RL. Closed-loop Vagus Nerve Stimulation Aids Recovery from Spinal Cord Injury. *Nature.* 2025. https://doi.org/10.1038/s41586-025-09028-5
2. **Hays SA**, Adehunoluwa EA, Epperson JD, Malley KM, Porter AL, Gallaway HL, Swank C, Carrera AJ, Stevens C, Gillespie J, Arnold D, Kian S, Bynum ZS, Meyers EC, Bleker N, Naftalis RC, Foreman ML, Hamilton R, Rennaker RL, Kilgard MP, Wigginton JG. Closed-loop vagus nerve stimulation delivered with a miniaturized system produces lasting recovery in individuals with chronic stroke. *Stroke.* 2025. https://doi.org/10.1161/strokeaha.125.052937
3. Powers MB, **Hays SA**, Rosenfield D, Porter AL, Gallaway H, Chauvette G, Smits JAJ, Warren AM, Douglas M, Naftalis R, Wigginton JG, Foreman M, Kilgard MP, Rennaker RL. Vagus Nerve Stimulation Therapy for Treatment-Resistant PTSD. *Brain Stimulation.* 2025; 18(3):665-675.
4. Epperson JD, Foreman ML, Naftalis RC, Hamilton RG, Powers MD, Carey HL, **Hays SA**, Kilgard MP, Rennaker RL, Wigginton JG. Clinical experience implanting a miniature externally powered vagus nerve stimulator. *Neurotherapeutics.* 2025; e00625.
5. Malley KM, Epperson JD, Bynum ZS, Kian S, Adehunoluwa EA, Dunbar SM, Stanislav BT, Wright JM, Pruitt DT, Wigginton JG, Swank C, Rennaker RL, **Hays SA,** Kilgard MP. At-Home Delivery of Vagus Nerve Stimulation Paired with Task-Specific Training Improves Performance of High-Priority Activities in Persons with Chronic Spinal Cord Injury or Stroke. *American Journal of Physical Medicine and Rehabilitation.* 2025; 105(3S):p S57-S63.
6. Williams BM, Borland MS, Danaphongse TT, Pasapula L, Rajagopal JK, **Hays SA,** Engineer CT. Neuromodulator timing regulates adult cortical plasticity via the synaptic eligibility trace. *Brain Stimulation.* 2025; doi:10.1016/j.brs.2025.103004.
7. Sargusingh MJ, Addo JJA, Damaser M, Zimmern P, **Hays SA**, Hernandez-Reynoso AG. Enhancing Neuroplasticity via Vagus Nerve Stimulation to Improve Urinary Dysfunction After Spinal Cord Injury: A Perspective. *Bioelectronic Medicine.* 2025; 11(1):1-9.
8. **Hays SA**, Rennaker RL, Kilgard MP. Advice for translational neuroscience: move deliberately and build things. *Bioelectronic Medicine.* 2025; 11(1), 3.
9. Addo JJA, Neifert CL, Danaphongse TT, Abe ST, Ezhil V, Kilgard MP, **Hays SA**. Temporal Parameters Determine the Efficacy of Vagus Nerve Stimulation Directed Neural Plasticity. *Neurorehabilitation and Neural Repair.* 2025; doi:10.1177/15459683251360725
10. Williams BM, Tamaoki Y, Danaphongse TT, Myers IK, Kroon SL, Solano MP, Jacob AA, Giley JR, Chen M, **Hays SA,** Engineer CT. Speech paired vagus nerve stimulation restores neural sound processing in a rat model of autism. *Frontiers in Neuroscience.* 2025; 19; 1600024.
11. Schambra HM, **Hays SA**. Vagus nerve stimulation for stroke rehabilitation: neural substrates, neuromodulatory effects, and therapeutic implications. *Journal of Physiology.* 2025; https://doi.org/10.1113/JP285566

12. Malley KM, Ruiz AD, Darrow MJ, Danaphongse TT, Shiers S, Ahmad FN, Beltran CM, Stanislav BT, Price TJ, Rennaker RL, Kilgard MP, **Hays SA**. Neural Mechanisms Responsible for Vagus Nerve Stimulation-Dependent Enhancement of Somatosensory Recovery. *Scientific Reports.* 2024; 14, 19448.
13. Carroll AM, Pruitt DT, Riley JR, Danaphongse TT, Rennaker RL, Engineer CT, **Hays SA**, Kilgard MP. Vagus nerve stimulation during training fails to improve learning in healthy rats. *Scientific Reports.* 2024; 14, 18955.
14. Epperson JD, Meyers EC, Pruitt DT, Wright JM, Hudson RA, Adehunoluwa EA, Nguyen-Duong Y, Rennaker RL, **Hays SA,** Kilgard MP. Characterization of an algorithm for autonomous, closed-loop neuromodulation during motor rehabilitation. *Neurorehabilitation and Neural Repair.* 2024; 38(7):493-505.
15. Carroll AM, Riley JR, Borland MS, Danaphongse TT, **Hays SA**, Kilgard MP, Engineer CT. Vagus nerve stimulation paired with auditory rehabilitation fails to improve auditory perception after hearing loss in rats. *iScience.* 2024; 27, 109527.
16. **Hays SA**, Rennaker RL, Kilgard MP. How to Fail with Paired VNS Therapy. *Brain Stimulation.* 2023; 16:1252-1258.
17. Ruiz AD, Malley KM, Danaphongse TT, Ahmed FN, Mota Beltran C, White ML, Baghdadi S, Pruitt DT, Rennaker RL, Kilgard MP, **Hays SA**. Vagus nerve stimulation must occur during tactile rehabilitation to enhance somatosensory recovery. *Neuroscience.* 2023; 532:79-86.
18. Ruiz AD, Malley K, Danaphongse TT, Ahmed F, Mota Beltran C, Rennaker RL, Kilgard MP, **Hays SA**. Vagus nerve stimulation requires many stimulations per session, many sessions per week, over many weeks to improve somatosensation recovery. *Neurorehabilitation and Neural Repair.* 2023; 37(9):652-661.
19. Pruitt DT, Duong-Nguyen Y, Meyers EC, Epperson JD, Wright JM, Hudson RA, Wigginton JG, Rennaker RL, **Hays SA**, Kilgard MP. Usage of RePlay as a Take-Home System to Support High-Repetition Motor Rehabilitation after Neurological Injury. *Games for Health Journal.* 2023; 12(1):73-85.
20. Souza RR, Powers MB, **Hays SA**, Rennaker RL, McIntyre CM, Kilgard MP. Timing of Vagus Nerve Stimulation During Fear Extinction Determines Efficacy in a Rat Model of PTSD. *Science Reports.* 2022; 12, 16526.
21. Adcock KS, Danaphongse TT, Jacob S, Rallapalli H, Torres M, Haider Z, Seyedahmadi A, Morrison RA, Rennaker RL, Kilgard MP, **Hays SA**. Vagus nerve stimulation does not improve recovery of forelimb motor or somatosensory function in a model of neuropathic pain. *Science Reports.* 2022; 12, 9696.
22. Morrison RA, Abe ST, Danaphongse TT, Ezhil V, Somaney A, Adcock KS, Rennaker RL, Kilgard MP, **Hays SA**. Common cholinergic, noradrenergic, and serotonergic drugs do not block vagus nerve stimulation-mediated plasticity. *Frontiers in Neuroscience.* 2022; 16:849291.
23. Bucksot JE, Chandler CR, Intharuck NM, Rennaker RL, Kilgard MP, **Hays SA**. Validation of a parameterized, open-source model of nerve stimulation. *Journal of Neural Engineering.* 2021; 18(4):042001.
24. Adcock KS, Hulsey DR, Danaphongse TT, Haider Z, Morrison RA, Kilgard MP, **Hays SA**. Radial nerve injury causes long-lasting forelimb sensory impairment and motor dysfunction in rats. *PAIN Reports*. 2021; 6(3):e957.
25. Morrison RA, **Hays SA**, Kilgard MP. Vagus nerve stimulation as a potential adjuvant to

rehabilitation for post-stroke motor speech disorders. *Frontiers in Neuroscience.* 2021; 15:715928.

26. Souza RR, Robertson NM, McIntyre CM, Rennaker RL, **Hays SA**, Kilgard MP. Vagus nerve stimulation enhances fear extinction as an inverted-U function of stimulation intensity. *Experimental Neurology.* 2021; 341:113718.
27. Souza RR, Oleksiak CR, Tabet MN, Rennaker RL, **Hays SA**, Kilgard MP, McIntyre CM. Vagus nerve stimulation promotes extinction generalization across sensory modalities. *Neurobiology of Learning and Memory.* 2021; 181:107425.
28. Morrison RA, Danaphongse TT, Abe ST, Stevens ME, Ezhil V, Seyedahmadi A, Adcock KS, Rennaker RL, Kilgard MP, **Hays SA**. High intensity VNS disrupts VNS-mediated plasticity in motor cortex. *Brain Research.* 2021; 1756:147332.
29. Darrow MJ, Mian TM, Torres M, Haider Z, Danaphongse T, Seyedahmadi A, Rennaker RL, **Hays SA**, and Kilgard MP. The tactile experience paired with vagus nerve stimulation determines the degree of sensory recovery after chronic nerve damage. *Behavioural Brain Research.* 2021; 396:112910.
30. Adcock KS, Blount AE, Morrison RA, Alvarez-Dieppa A, Kilgard MP, Engineer CT, **Hays SA**. Deficits in Skilled Motor and Auditory Learning in a Rat Model of Rett Syndrome. *Journal of Neurodevelopmental Disorders.* 2020; 12, 27.
31. Pruitt DT, Danaphongse TT, Lutchman M, Patel N, Reddy P, Wang V, Prashar A, Rennaker RL, Kilgard MP, **Hays SA**. Optimizing dosing of vagus nerve stimulation for stroke recovery. *Translational Stroke Research.* 2020; 12:65-71.
32. Darrow MJ, Mian TM, Torres M, Haider Z, Danaphongse T, Rennaker RL, Kilgard MP, **Hays SA**. Restoration of somatosensory function by pairing vagus nerve stimulation with tactile rehabilitation. *Annals of Neurology*. 2020; 87(2):194-205.
33. Morrison RA, Danaphongse T, Pruitt DT, Adcock KS, Mathew JK, Abe ST, Abdulla DM, Rennaker RL, Kilgard MP, **Hays SA**. A limited range of vagus nerve stimulation intensities produce motor cortex reorganization when delivered during training. *Behavioral Brain Research.* 2020; 391:112705.
34. Darrow MJ, Torres M, Sosa MJ, Danaphongse TT, Haider Z, Rennaker RL, Kilgard MP, **Hays SA**. Vagus Nerve Stimulation Paired with Rehabilitative Training Enhances Motor Recovery after Bilateral Spinal Cord Injury to Cervical Forelimb Motor Pools. *Neurorehabilitation and Neural Repair*. 2020; 34(3):200-209.
35. Sachdeva R, Krassioukov AV, Bucksot JE, **Hays SA**. Acute Cardiovascular Responses to Vagus Nerve Stimulation Following Experimental Spinal Cord Injury. *Journal of Neurotrauma.* 2020; 34(9):1149-1155.
36. Bucksot JE, Castelan KM, Skipton SK, **Hays SA**. Parametric characterization of the rat Hering-Breuer reflex evoked with implanted and non-invasive vagus nerve stimulation. *Experimental Neurology.* 2020; 327, 113220.
37. Souza RR, Robertson NM, Mathew E, Tabet M, Bucksot JE, Pruitt DT, Rennaker RL, **Hays SA**, McIntyre CM, Kilgard MP. Efficient parameters of vagus nerve stimulation to enhance extinction learning in an extinction-resistant rat model of PTSD. *Progress in Neuropsychopharmacology & Biological Psychiatry*. 2020; 99(20), 109848.
38. Mathew E, Tabet M, Robertson NM, **Hays SA**, Rennaker RL, Kilgard MP, McIntyre CM, Souza RR. Vagus nerve stimulation produces immediate dose-dependent anxiolytic effect in rats. *Journal of Affective Disorders*. 2020; 265:552-557.

39. Meyers EC, Kasliwal N, Solorzano B, Lai E, Bendale G, Berry A, Ganzer PD, Romero-Ortega MR, Rennaker RL, Kilgard MP, **Hays SA**. Enhancing plasticity in central networks improves motor and sensory recovery after nerve damage. *Nature Communications*. 2019; 10(1):1-14.

40. Gonzalez D, Tomasek M, **Hays SA**, Sridhar V, Ammanuel S, Chang C, Pawlowski K, Huber KM, Gibson JR. Audiogenic seizures in the *Fmr1* knockout mouse are induced by *Fmr1* deletion in subcortical, vGlut2-expressing excitatory neurons and require deletion in the Inferior Colliculus. *Journal of Neuroscience*. 2019; 39(49), 9852-9863.

41. Bucksot JE, Wells AJ, Rahebi KC, Sivaji V, Romero-Ortego M, Kilgard MP, Rennaker RL, **Hays SA**. Flat Electrode Contacts for Vagus Nerve Stimulation. *PLoS One*. 2019; 14(11): e0215191.

42. Hulsey DR, Mian TM, Darrow MJ, **Hays SA**. Quantitative assessment of cortical somatosensory digit representations after median and ulnar nerve injury in rats. *Experimental Brain Research*. 2019; 237(9):2297-2304.

43. Hulsey DR, Shedd CM, Sarker SF, Kilgard MP, **Hays SA**. Norepinephrine and serotonin are required for vagus nerve stimulation directed cortical plasticity. *Experimental Neurology*. 2019; 320:112975.

44. Engineer ND, Kimberley TJ, Prudente CN, Dawson J, Tarver B, **Hays SA**. Targeted Vagus Nerve Stimulation for Rehabilitation after Stroke. *Frontiers in Neuroscience*. 2019; 13:280.

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

46. Buell EP, Boland MS, Loerwald KW, Chandler C, **Hays SA**, Engineer CT, Kilgard MP. Vagus nerve stimulation rate and duration determine whether sensory pairing produces neural plasticity. *Neuroscience*. 2019; 406:290-299.

47. Souza RR, Robertson NM, Pruitt DT, Gonzalez PA, **Hays SA**, Rennaker RL, Kilgard MP, McIntyre CM. Vagus nerve stimulation reverses the extinction impairments in a model of PTSD with prolonged and repeated trauma. *Stress*. 2019; 22(4):509-520.

48. Sivaji V, Grasse DW, **Hays SA**, Bucksot JE, Saini R, Kilgard MP, Rennaker RL. ReStore: a wireless peripheral nerve stimulation system. *Journal of Neuroscience Methods*. 2019; 320:26-36.

49. Rios M, Bucksot JE, Rahebi K, Engineer CT, Kilgard MP, **Hays SA**. Protocol for Construction of Rat Nerve Stimulation Cuff Electrodes. *Methods and Protocols*. 2019; 2(1):19.

50. Morrison RA, Hulsey DR, Adcock KS, Rennaker RL, Kilgard MP, **Hays SA**. Vagus Nerve Stimulation Intensity Influences Motor Cortex Plasticity. *Brain Stimulation*. 2018; 12(2):256-262.

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

52. Buell E, Loerwald KW, Engineer CT, Borland MS, Buell JM, Kelly CA, Khan II, **Hays SA**, Kilgard MP. Cortical Map Plasticity as a Function of Vagus Nerve Stimulation Rate. *Brain Stimulation*. 2018; 11(6):1218-1224.

53. Meyers EC, Solorzano BR, James JT, Ganzer PD, Lai E, Rennaker RL, Kilgard MP, **Hays SA**. Vagus Nerve Stimulation Enhances Stable Plasticity and Generalization of Stroke Recovery. *Stroke*. 2018; 47(2).

54. 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. Closed-loop Neuromodulation Restores Network Connectivity and Motor Control after Spinal Cord Injury. *eLife*. 2018; 7:e32058.

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

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

57. Loerwald KW, Borland MS, Rennaker RL, **Hays SA**, Kilgard MP. The Interaction of Pulse Width and Current Intensity on the Extent of Cortical Plasticity Evoked by Vagus Nerve Stimulation. *Brain Stimulation*. 2017; 11(2):271-277.

58. **Hays SA**. Improving Stroke Rehabilitation with Vagus Nerve Stimulation. In: Lapchak P, Yang GY (eds.) *Translational Research in Stroke*. 2017; 503-515.

59. Pruitt DT, Danaphongse T, Morrison R, Rennaker RL, Kilgard MP, **Hays SA**. Traumatic Brain Injury Occludes Training-Dependent Cortical Reorganization in the Contralesional Hemisphere. *Journal of Neurotrauma*. 2017; 34:1-9.

60. Hulsey DR, Riley JR, Loerwald KW, Rennaker RL, Kilgard MP, **Hays SA**. Parametric Characterization of Neural Activity in the Locus Coeruleus in Response to Vagus Nerve Stimulation. *Experimental Neurology*. 2017; 289:21-30.

61. Engineer CT, **Hays SA**, Kilgard MP. Vagus Nerve Stimulation as a Therapy for Autism and other Neurodevelopmental Disorders. *Journal of Neurodevelopmental Disorders*. 2017; 9:20.

62. Meyers EC, Granja R, Solorzano BR, Romero-Ortega M, Kilgard MP, Rennaker RL, **Hays SA**. Median and Ulnar Nerve Injuries Reduce Volitional Forelimb Strength in Rats. *Muscle and Nerve*. 2017; doi:10.1002/mus.25590.

63. **Hays SA**. Enhancing Rehabilitative Therapies with Vagus Nerve Stimulation. *Neurotherapeutics*. 2016;13(2):382-94.

64. Westmark CJ, Chuang SC, **Hays SA**, Filon MJ, Ray BC, Westmark PR, Gibson JR, Huber KM, Wong RKS. APP Causes Hyperexcitability in Fragile X Mice. *Frontiers in Molecular Neuroscience.* 2016; 9:147.

65. Pruitt DT, Schmid A, Danaphongse T, Flanagan K, Morrison R, Kilgard MP, Rennaker RL, **Hays SA.** Forelimb Training Drives Transient Map Reorganization in Ipsilateral Motor Cortex. *Behavioral and Brain Research*. 2016; 313:10-16.

66. Meyers E, Sindhurakar A, Choi R, Solorzano R, Martinez T, Sloan AM, Carmel JB, Kilgard MP, Rennaker RL, **Hays SA.** The Supination Assessment Task: An Automated Method for Quantifying Forelimb Rotational Function in Rats. *Journal of Neuroscience Methods*. 2016; 266:11-20.

67. **Hays SA**, Ruiz A, Bethea T, Khodaparast N, Carmel JB, Rennaker RL, Kilgard MP. Vagus Nerve Stimulation during Rehabilitative Training Enhances Recovery of Forelimb Function after Ischemic Stroke in Aged Rats. *Neurobiology of Aging*. 2016; 43:111-8.

68. Guo W, Molinaro G, Collins K, **Hays SA**, Paylor R, Szumlinski K, Huber KM. Selective Disruption of Metabotropic Glutamate Receptor 5-Homer Interactions Mimics Phenotypes of Fragile X Syndrome in Mice. *Journal of Neuroscience*. 2016; 36(7):231-2147.

69. Hulsey 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*. 2016; 9(2):174-181.

70. Khodaparast N, Kilgard MP, Casavant R, Ruiz A, Qureshi I, Ganzer PD, Rennaker RL, **Hays SA.** Vagus Nerve Stimulation during Rehabilitative Training Improves Forelimb Recovery after Chronic Ischemic Stroke in Rats. *Neurorehabilitation and Neural Repair*. 2016; 30(7):676-684.

71. Sloan AM, Fink MK, Rodriguez A, Lovitz AM, Khodaparast N, Rennaker RL, **Hays SA.** A Within-Animal Comparison of Skilled Forelimb Assessments in Rats. *PLoS One*. 2015; 10(10):e0141254

72. Pruitt D, Schmid A, Kim L, Abe C, Trieu J, Choua C, **Hays SA**, Kilgard MP, Rennaker RL. Vagus nerve stimulation delivered with motor training enhances recovery of function after traumatic brain injury. *Journal of Neurotrauma*. 2015; 33(9):871-879.

73. **Hays SA**, Khodaparast N, Hulsey DR, Ruiz A, Sloan AM, Rennaker RL, Kilgard MP. Vagus Nerve Stimulation during Rehabilitative Training Improves Functional Recovery after Intracerebral Hemorrhage. *Stroke*. 2014; 45(10):3097-3100.

74. Pruitt DP, **Hays SA**, Schmid A, Chou C, Kim L, Trieu J, Kilgard MP, Rennaker RL. Controlled-cortical impact reduces volitional forelimb strength in rats. *Brain Research*. 2014; 1582:91-98.

75. **Hays SA**, Khodaparast N, Ruiz A, Sloan AM, Hulsey DR, Rennaker RL, Kilgard MP. The timing and amount of vagus nerve stimulation during rehabilitative training affect post-stroke recovery of forelimb strength. *NeuroReport*. 2014; 25(9):676-682.

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

77. **Hays SA**, Rennaker RL, Kilgard MP. Targeting Plasticity with Vagus Nerve Stimulation to Treat Neurological Disease. *Progress in Brain Research*. 2013; 207:275-299.

78. Khodaparast N, **Hays SA**, Sloan AM, Hulsey DR, Ruiz AD, Pantoja M, Rennaker RL, Kilgard MP. Vagus Nerve Stimulation During Rehabilitative Training Improves Forelimb Strength Following Ischemic Stroke. *Neurobiology of Disease*. 2013; 60:80-88.

79. Patel AB, **Hays SA**, Bureau I, Huber KM, Gibson JR. A target cell-specific role for presynaptic *Fmr1* in regulating glutamate release onto neocortical fast-spiking inhibitory neurons. *Journal of Neuroscience*. 2013; 33(6):2593-2604.

80. **Hays SA**, Khodaparast N, Sloan AM, Fayyaz T, Hulsey DR, Ruiz AD, Pantoja M, Kilgard MP, Rennaker RL. The bradykinesia assessment task: An automated method to measure forelimb speed in rodents. *Journal of Neuroscience Methods*. 2013; 214(1):52-61.

81. **Hays SA**, Khodaparast N, Sloan AM, Hulsey DR, Pantoja M, Ruiz AD, Kilgard MP, Rennaker RL. The isometric pull task: A novel automated method for quantifying forelimb force generation in rats. *Journal of Neuroscience Methods*. 2012; 212(2):329-337.

82. Ronesi JA*, Collins KA*, **Hays SA***, Tsai NP, Guo W, Birnbaum SG, Hu JH, Worley PF, Gibson JR, Huber KM. Disrupted homer scaffolds mediate abnormal mGluR5 function in a mouse model of fragile X syndrome. *Nature Neuroscience*. 2012; 15(3):431-440. *equal contribution.

83. **Hays SA**, Huber KM, Gibson JR. Altered neocortical rhythmic activity states in *Fmr1* KO mice are due to enhanced mGluR5 signaling and involve changes in excitatory circuitry. *Journal of Neuroscience.* 2011; 31(40):14223-14234.

84. Gibson JR, Bartley AF, **Hays SA**, Huber KM. Imbalance of neocortical excitation and inhibition and altered UP states reflect network hyperexcitability in the mouse model of fragile X syndrome. *Journal of Neurophysiology.* 2008; 100(5):2615-2626.

Invited Presentations:

2026, U de Montreal Department of Neuroscience Seminar Series, Montreal, Canada

2026, Gordon Research Conference on Neuroelectronic Interfaces, Florence, Italy

2025, Rice University Neuroengineering Seminar Series, Houston, TX

2025, North American Neuromodulation Society/Neural Interfaces Conference, Arlington, VA

2025, Cerami Award Lecture; Bioelectronic Medicine Summit, New York, NY

2025, International Brain Stimulation Conference, Kobe, Japan

2025, Trauma Research and Combat Casualty Care Consortium (TRC4), Austin, TX

2024, American Society of Neurorehabilitation Controversies Session, San Antonio, TX

2024, International Neuromodulation Society Biannual Meeting, Vancouver, Cananda

2024, UT Southwestern Medical Center PM&R 25th Annual Scientific Day, Dallas, TX

2024, Trauma Research and Combat Casualty Care Consortium (TRC4), Austin, TX

2023, International Stroke Conference CED Talk, Dallas, TX

2023, National Center for Adaptive Neurotechnologies Lecture Series, Albany, NY [virtual]

2023, Duke Bioengineering Departmental Lecture Series, Raleigh, NC

2022, UT System Brain Research Summit, Austin, TX

2022, Paralyzed Veterans of America Annual Conference, Dallas, TX

2022, Whitaker Neuroengineering Conference, Cambridge, England

2022, American Society for Stereotactic and Functional Neurosurgery, Atlanta, GA

2022, American Spinal Injury Association Conference, New Orleans, LA

2022, Northeast Bioengineering Conference, New York, NY

2022, New York University Neurology Seminar, New York, NY

2022, American Society of Neurorehabilitation, St. Louis, MO

2022, Biology Seminar Series, Texas Women's University, Denton, TX

2021, American Congress of Rehabilitation Medicine, Dallas, TX [virtual]

2021, European Stroke Organization Conference, Helsinki, Finland [virtual]

2020, NIH Neuromodulation for Rehabilitation Conference (NM4R), Charleston, SC

2019, BRAINS Seminar, UT Health Science Center, Houston, TX

2019, UT System Chancellor's Council Great Minds Roundtable, Austin, TX

2019, International Brain Stimulation Conference, Vancouver, Canada

2018, Neuromodulation: The Science Conference, Cleveland, OH

2018, American Congress of Rehabilitation Medicine, Dallas, TX

2018, Military Health System Research Symposium, Kissimmee, FL

2018, UNAM Neural Engineering Methods and Applications, Queretaro, Mexico

2018, Feinstein Institute Visiting Professor Lecture Series, New York, NY

2018, University of Texas Southwestern Medical Center Graduate Career Advisement Lecture Series, Dallas, TX

2017, Mexican Society of Physiology Annual Conference, Monterrey, Mexico

2017, Perot Museum of Nature and Science Social Science Seminar Series, Dallas, TX

2017, University of Texas Southwestern Medical Center Division of Hypothalamic Research, Dallas, TX

2016, International Conference on Neurorehabilitation, Segovia, Spain

2016, Texas FreshAIR: Grand Challenges in Neuroscience Conference, Austin TX

2016, Innovation in Aging, Caregiving, and Technology, Dallas, TX

2015, Society for Neuroscience Annual Meeting, Nanosymposium Presentation, Chicago, IL

2015, University of Texas Behavioral Neuroscience Group, Austin, TX

2015, AHA International Stroke Conference, Robert G. Siekert New Investigator for Stroke Award Invited Presentation, Nashville, TN

2014, Michael J Fox Foundation, Rapid Research Innovation Award, New York, NY

Total Research Funding Received as PI/Co-PI: >$30M

<u>Ongoing Research Support</u>:

Enhancing recovery of lower limb function after spinal cord injury
Rennaker, **Hays**, Kilgard, Swank; Role: MPI
$2,341,089
National Institutes of Health UG3 NS131971
2024-2029

Targeted Plasticity Therapy for the Treatment of Post-Traumatic Stress Disorder
Hays, Wigginton, Smits; Role: PI
$499,924 ($126,691 to UTD)
DoD/UT System Trauma Research and Casualty Care Consortium (TRC4) 175181
2024-2025 (on NCE)

Targeted Plasticity Therapy for the Treatment of Post-Traumatic Stress Disorder
Hays, Powers, Smits; Role: PI
$2,317,051
Congressionally Directed Medical Research Program (CDMRP) TP220002
2023-2025 (on NCE)

Noradrenergic mechanisms of vagus nerve stimulation mediated stroke rehabilitation
Thorn, **Hays**; Role: Co-I
$2,391,918
National Institutes of Health R01 NS123074
2022-2027

Completed Research Support:

Restoring Sensory Function After Upper Limb Nerve Injury with Vagus Nerve Stimulation
Hays; Role: PI
$1,499,730
Congressionally Directed Medical Research Program (CDMRP) DM190663
2020-2023

Wireless Nerve Stimulation Device to Enhance Recovery After Stroke
Hays, Rennaker; Role: PI
$4,830,148
National Institutes of Health UG3/UH3 NS109497
2018-2023

Mechanisms of paired vagus nerve stimulation in human chronic stroke
Hays, Schambra, Zhong; Role: MPI
National Institutes of Health U01 HD112564
2024-2025

Enhancing Speech Processing in a Rat Model of Autism Using Vagus Nerve Stimulation
Engineer, Rennaker, **Hays**; Role: Co-I
$1,912,500
National Institutes of Health R01 DC017480
2018-2023

Targeted Neuroplasticity Training to Accelerate Complex Skill Learning
Kilgard, Rennaker, **Hays**, Vanneste; Role: Co-PI
$7,245,817
Defense Advanced Research Projects Agency (DARPA)
2016-2023

Closed Loop Neuromodulation to Treat PTSD
Rennaker, Kilgard, **Hays**; Role: Co-PI
$6,995,309
Defense Advanced Research Projects Agency (DARPA)
2015-2023

Evaluation of the Neuromodulatory Mechanisms of Vagus Nerve Stimulation to Improve Motor Rehabilitation after Stroke
Hays; Role: PI
$1,867,185
National Institutes of Health R01 NS094384
2016-2021

Hearing Restoration Through Synaptic Plasticity Directed by Vagus Nerve Stimulation
Hays, Kilgard; Role: Co-I
$895,266
Congressionally Directed Medical Research Program (CDMRP) HRRP
2018-2020

Evaluation of a Novel Therapeutic Intervention to Improve Motor Function in Rett Syndrome
Hays; Role: PI
$145,104
International Rett Syndrome Foundation
2016-2019

Platform Technology for Sensory, Motor and Affective Disorders
Kilgard, Rennaker, McIntyre, **Hays**; Role: Co-PI
$632,609
Defense Advanced Research Projects Agency (DARPA)
2015-2016

Evaluation of Targeted Plasticity Therapy as a Treatment for Motor Dysfunction in Parkinson's Disease
Hays, Kilgard; Role: PI
$75,000
Michael J Fox Foundation
2013-2014

Graduate Student Advisement:

Eric Meyers	Bioengineering	Awarded Ph.D. in 2017
Michael Darrow	Bioengineering	Awarded Ph.D. in 2019
Robert Morrison	Neuroscience	Awarded Ph.D. in 2021
Katherine Adcock	Neuroscience	Awarded Ph.D. in 2021
Jesse Bucksot	Bioengineering	Awarded Ph.D. in 2021
Phillip Gonzalez	Bioengineering	Awarded M.S. in 2021
Sina Kashef	Bioengineering	Awarded M.S. in 2021
Andrea Ruiz	Bioengineering	Awarded Ph.D. in 2023
Joseph Epperson	Bioengineering	Awarded Ph.D. in 2024
Juliet Addo	Bioengineering	Awarded Ph.D. in 2025
Brendan Williams	Neuroscience	Awarded Ph.D. in 2025
Connor Niefert	Bioengineering	2021-present
Spencer Stinson	Bioengineering	2023-present
Pariya Zare	Bioengineering	2023-present
Ruchita Kumar	Bioengineering	2023-present
Daniel Brobston	Bioengineering	2026-present

Noor Amous	Bioengineering	2026-present

Grant Review:

2025 NIH BTEN (previously BVNT) Study Section Chair

2021- NIH BTEN (previously BVNT) Study Section Member

2025 Paralyzed Veterans of American Design & Development Panel Chair

2022 Congressionally-Directed Medical Research Program Autism Research Program Panel

2021 NIH Translational Neural Devices Special Emphasis Panel

2021 British Association of Neurologists Clinical Research Training Fellowship

2021 Michael J Fox Foundation, Biomarkers for Parkinson's Disease

2020 NIH BVNT Study Section February, October

2020 European Science Foundation, Research Foundation Postdoctoral Fellowship (FWO)

2019 Michael J Fox Foundation, Applied Technology for Parkinson's Disease

2019 Michael J Fox Foundation, Biomarkers for Parkinson's Disease

2018 NIH SPARC Program

2018 Michael J Fox Foundation, Non-Pharmacological Interventions for Gait and Balance

2016 The Netherlands Brain Foundation, The Next Step 2016 – Stroke

External Professional Service:

2021- NIH BTEN (previously BVNT) Study Section Standing Member, Chair since 2025

2026 Working Group Member for NIH Stroke Rehabilitation Dosing and Intensity Research Workshop

2020- American Society for Neurorehabilitation Education Committee Member

2022 Chaired session "Vagus Nerve Stimulation for Stroke and SCI" at the American Society of Neurorehabilitation annual meeting

2019 Co-chaired session "Enhancing Rehabilitation with Vagus Nerve Stimulation" at International Brain Stimulation Conference

2018 Panelist for NIH Bridging the Translational Gap in Stroke Recovery & Rehabilitation Research Workshop

Reviewer for several leading clinical, biomedical engineering, and neuroscience journals, including *The Lancet, Nature Reviews Neurology, Current Biology, Journal of Neural Engineering*, *Brain Stimulation, Bioelectronic Medicine, Cerebral Cortex, Neurorehabilitation and Neural Repair, Clinical Neurology and Neurosurgery, Hypertension, and Frontiers in Neuroscience.*

Internal Professional Service:

2024 - Institutional Review Board (IRB) Vice Chair

2023 -	Institutional Review Board (IRB) Member
2024	Bioengineering Faculty Search Committee
2016 - 2024	Institutional Animal Care and Use Committee (IACUC) Member
2020	Research Advisory Committee Member
2020	Bioengineering 10 Year Anniversary Committee Member
2020	Bioengineering Faculty Search Committee Member