CURRICULUM VITAE

Name/Position: Jerome N. Sanes
Professor of Neuroscience
Department of Neuroscience
Robert J. and Nancy D. Carney Institute for Brain Science
Brown University

Education:

1974	B. A.	State University of New York at Binghamton, Department of Psychology
1977	M. A.	University of Rochester, Department of Psychology, Neuroscience specialization.
1979	Ph. D.	University of Rochester, Department of Psychology, Neuroscience specialization.

Post-doctoral Training:

1979-1985	*Staff Fellow and Senior Staff Fellow*, Laboratory of Neurophysiology, National Institute of Mental Health. Mentor: Dr. Edward V. Evarts

Professional and Academic Appointments:

1978-1979	Instructor. Department of Psychology, University of Rochester. Department of Psychology, St. John Fisher College, Rochester, New York (1978).
1985	Visiting Scientist. Department of Neurology, University of Düsseldorf, Düsseldorf, Germany.
1985-1989	Special Expert and Senior Staff Fellow, Human Motor Control Section, Medical Neurology Branch, National Institute of Neurological Disorders and Stroke, National Institutes of Health.
1991-1995	Scientific Director. Brown University Parkinson's Disease and Motor Disorders Unit. (Unit disbanded in 1995)
1997-2000	Director, Laboratory of Functional Neuroimaging, Foundation Santa Lucia, Rome, Italy.
1989-2000	Assistant (1989-93) and Associate (1993-2000) Professor (Research). Department of Neuroscience (1993-2000) and Center for Neural Science (1989-92), Brown University.
2001-2004	Associate Professor. Department of Neuroscience, Brown University.
2004-present	Professor. Department of Neuroscience, Brown University.
2001-present	Director. Brown University Magnetic Resonance Imaging Research Facility.
2004-2013	Co-Director. Graduate Program, Department of Neuroscience, Brown University.
2007-2008	Visiting Professor, Département d'études cognitives, École normale supérieure, Paris, France.
2015-2016	Visiting Scientist, Institute for Brain and Spinal Cord, Paris, France

Completed Research and Scholarship

Refereed Journal Articles

1. Sanes, J., P. J. Donovick and R. G. Burright (1979) Consummatory behavior as a function of ambient temperature in septal-lesioned and control rats. Journal of Neuroscience Research 1:333-341.
2. Sanes, J. N. and J. R. Ison (1979) Conditioning auditory stimuli and the cutaneous eyeblink reflex in humans:Differential effects according to oligosynaptic or polysynaptic central pathways. Electroencephalography and Clinical Neurophysiology 47:546-555.
3. Sanes, J. N. and J. R. Ison (1980) A silent period in orbicularis oculi muscle of humans. Journal of Neurology, Neurosurgery and Psychiatry 43:504-509.
4. Gopinathan, G., H. Teräväinen, J. M. Dambrosia, C. D. Ward, J. N. Sanes, W. K. Stuart, E. V. Evarts and D. B. Calne, (1981) Lisuride in parkinsonism. Neurology 31: 371-376.
5. Morgan, N. T., J. N. Sanes, W. K. Stuart and W. S. Rasband (1981) A computerized system for determination of reaction time, movement time, and movement accuracy. Electroencephalography and Clinical Neurophysiology 51:563-566.
6. LeWitt, P. A., G. Gopinathan, C. D. Ward, J. N. Sanes, J. M. Dambrosia, R. Durso and D. B. Calne (1982) Lisuride versus bromocriptine in Parkinson's disease:A double blind study. Neurology 32:69-72.
7. Sanes, J. N., J. A. Foss and J. R. Ison (1982) Conditions that affect the thresholds of the components of the eyeblink reflex in humans. Journal of Neurology, Neurosurgery and Psychiatry 45:543-549.
8. Sanes, J. N. and E. V. Evarts (1983) Effects of perturbations on accuracy of arm movements. Journal of Neuroscience 3:977-986.
9. Sanes, J. N. and J. R. Ison (1983) Habituation and sensitization of components of the human eyeblink reflex. Behavioral Neuroscience 97: 833-866.
10. Sanes, J. N. and V. A. Jennings (1984) Centrally programmed patterns of muscle activity in voluntary motor behaviors of humans. Experimental Brain Research 54:23-32.
11. Sanes, J. N., K. -H. Mauritz, E. V. Evarts, M. C. Dalakas and A. Chu (1984) Motor deficits in patients with large-fiber sensory neuropathy. Proceedings of the National Academy of Science 81: 979-982.
12. Sanes, J. N. and E. V. Evarts (1984) Motor psychophysics. Human Neurobiology 2:217-225.
13. Sanes, J. N. (1984) Voluntary movement and excitability of cutaneous eyeblink reflexes. Psychophysiology 21:653-664.
14. Sanes, J. N. (1985) Information processing deficits in Parkinson's disease during movement. Neuropsychologia 23: 381-392.
15. Sanes, J. N. (1985) Absence of enhanced physiological tremor in patients without muscle or cutaneous afferents. Journal of Neurology, Neurosurgery and Psychiatry 48:645-649.
16. Sanes, J. N., K. -H. Mauritz, M. C. Dalakas and E. V. Evarts (1985) Motor control in humans with large-fiber sensory neuropathy. Human Neurobiology 4:101-114.
17. Sanes, J. N., T. R. Colburn and N. T. Morgan (1985) Behavioral motor evaluation for neurotoxicity screening. Neurobehavioral Toxicology and Teratology 4:329-337.
18. Sanes, J. N. (1986) Kinematics and end-point control of arm movements are modified by unexpected changes in viscous loading. Journal of Neuroscience 6:3120-3127.
19. Donoghue, J. P. and J. N. Sanes (1987) Peripheral nerve injury in developing rats reorganizes representation pattern in motor cortex. Proceedings of the National Academy of Science 84:1123-1126.

Refereed Journal Articles. [continued]

20. Pullman, S. L., R. L. Watts, J. L. Juncos, T. N. Chase and J. N. Sanes (1988) Dopaminergic effects on simple and choice reaction time performance in Parkinson's Disease. Neurology 38:249-254.
21. Sanes, J. N., S. Suner, J. A. Lando and J. P. Donoghue (1988) Rapid reorganization of adult rat motor cortex somatic representation patterns after motor nerve injury. Proceedings of the National Academy of Science 85:2003-2007.
22. Sanes, J. N., P. L. LeWitt and K. -H. Mauritz (1988) Visual and mechanical control of cerebellar kinetic postural tremor. Journal of Neurology, Neurosurgery and Psychiatry 51:934-943.
23. Donoghue, J. P. and J. N. Sanes (1988) Organization of adult motor cortex representation patterns following neonatal nerve injury in rats. Journal of Neuroscience 8:3221-3232.
24. Dimitrov, B., M. Hallett and J. N. Sanes (1989) Differential influence of posture and intentional movement on human somatosensory evoked potentials evoked by different stimuli. Brain Research 496:211-218.
25. Sanes, J. N., B. Dimitrov and M. Hallett (1990) Motor learning in patients with cerebellar dysfunction. Brain 113: 103-120.
26. Sanes, J. N., S. Suner and J. P. Donoghue (1990) Dynamic organization of primary motor cortex output to target muscles in adult rats. I. Long-term patterns of reorganization following motor or mixed peripheral nerve lesions. Experimental Brain Research 79:479-491.
27. Donoghue, J. P., S. Suner and J. N. Sanes (1990) Dynamic organization of primary motor cortex output to target muscles in adult rats. II. Rapid reorganization following motor nerve lesions. Experimental Brain Research 79:492-503.
28. Pullman, S. L., R. L. Watts, J. L. Juncos, and J. N. Sanes (1990) Movement amplitude choice reaction time performance in Parkinson's disease may be independent of dopaminergic status. Journal of Neurology, Neurosurgery and Psychiatry, 53:279-283.
29. Ison, J. R., J. N. Sanes, J. A. Foss, L. A. Pinckney (1990) Facilitation and inhibition of the human startle blink reflexes by stimulus anticipation. Behavioral Neuroscience, 104:418-429.
30. Sanes, J. N. and M. Hallett (1990) Limb positioning and magnitude of essential tremor and other pathological tremors. Movement Disorders, 5:304-309.
31. Cohen L. G., J. Meer, I. Tarkka, S. Bierner, D. Lederman, R. M. Dubinsky, J. N. Sanes, B. Jabbari, B. Branscum, and M. Hallett (1991) Congenital mirror movements:abnormal organization of motor pathways in two patients. Brain, 114:381-403.
32. Donoghue, J. P., S. J. Leibovic, and J. N. Sanes (1992) Organization of the forelimb area in squirrel monkey primary motor cortex: Representation of individual digit, wrist, and elbow muscles. Experimental Brain Research, 89:1-19.
33. Sanes, J. N., J. Wang, J. P. Donoghue (1992) Immediate and delayed changes of rat motor cortical output representation with new forelimb configurations. Cerebral Cortex, 2: 141-152.
34. Sanes, J. N. and J. P. Donoghue (1992) Organization and adaptability of muscle representations in primary motor cortex. Experimental Brain Research, Supplement, 22:103-127.
35. Agostino, R., M. Hallett and J. N. Sanes (1992) Antagonist muscle inhibition before rapid voluntary movements of the human wrist. Electroencephalography and Clinical Neurophysiology, 85:190-196.
36. Sanes, J. N. and J. P. Donoghue (1993) Oscillations in local field potentials of the primate motor cortex during voluntary movement. Proceedings of the National Academy of Sciences (USA), 90:4470-4474.
37. Donoghue, J. P. and J. N. Sanes (1994) Motor areas of the cerebral cortex. Journal of Clinical Neurophysiology, 11:382-396.

Refereed Journal Articles. [continued]

38. Sanes, J. N. (1994) Neurophysiology of preparation, movement, and imagery. Behavioral and Brain Sciences, 17:221-223.
39. Labutta, R., R. B. Miles, J. N. Sanes, and M. Hallett (1994) Motor program memory storage in Parkinson's disease patients tested with a delayed response task. Movement Disorders, 9:218-222.
40. Sanes, J. N. and R. Shadmehr (1995) Sense of muscular effort in humans with large-fiber sensory neuropathy. Canadian Journal of Physiology and Pharmacology, 73:223-233.
41. Sanes, J. N., J. P. Donoghue, V. Thangaraj, R. R. Edelman and S. Warach (1995) Shared neural substrates controlling hand movements in human motor cortex. Science, 268:1775-1777.
42. Friedman, J. H. M. Epstein, J. N. Sanes, P. Lieberman, K. Cullen, C. Lindquist, M. Daamen (1996) Gamma knife pallidotomy in advanced Parkinson's disease. Annals of Neurology, 39:535-538.
43. Schlaug, G., J. N. Sanes, V. Thangaraj, D. G. Darby, L. Jäncke, R. R. Edelman, and S. Warach (1996) Cortical activation covaries with movement rate. NeuroReport, 7:879-883.
44. Agostino, R., Sanes, J. N., and Hallett, M. (1996) Movement skill learning in Parkinson's disease. Journal of the Neurological Sciences, 139:218-226.
45. Sanes, J. N. and J. P. Donoghue (1997) Dynamic motor cortical organization. The Neuroscientist, 3:158-165.
46. Donoghue J. P., J. N. Sanes, N. G. Hatsopoulos, and G. Gaál (1998) Neural discharge and local field potential oscillations in primate motor cortex during voluntary movements. Journal of Neurophysiology, 79:159-173.
47. Marzi, C. A., C. Miniussi, A. Maravita, L. Bertolasi, G. Zanette, J. C. Rothwell and J. N. Sanes (1998) Transcranial magnetic stimulation selectively impairs interhemispheric transfer of visuo-motor information in humans. Experimental Brain Research, 118:435-438.
48. Bhat, R. B. and J. N. Sanes (1998) Cognitive channels computing action distance and direction. Journal of Neuroscience, 18:7566-7580.
49. Maynard, E. M., N. G. Hatsopoulos, C. L. Ojakangas, B. D. Acuna, J. N., Sanes, R. A. Normann and J. P. Donoghue (1999) Neuronal interactions improve cortical population coding of movement direction. Journal of Neuroscience, 19:8083-8093.
50. Baker, J. T., J. P. Donoghue and J. N. Sanes (1999) Gaze direction modulates finger movement activation patterns in human cerebral cortex. Journal of Neuroscience, 19:10044-10052.
51. Sanes, J. N. and J. P. Donoghue (2000) Plasticity and primary motor cortex. Annual Review of Neuroscience. 23:393-415.
52. Sanes, J. N. (2000) Skill learning:Motor cortex rules for learning and memory. Current Biology, 10:R495-497.
53. Sanes J. N. (2000) The relation between human brain activity and hand movements. NeuroImage, 11:370-374.
54. Sanes J. N. and M. H. Schieber (2001) Orderly somatotopy in primary motor cortex: Does it exist? NeuroImage, 13:968-974.
55. Indovina I. and J. N. Sanes (2001) On somatotopic representation centers for finger movements in human primary motor cortex and supplementary motor area. NeuroImage, 13:1027-1034.
56. Galati, G., G. Committeri, J. N. Sanes and L. Pizzamiglio (2001) Spatial coding of visual and somatic sensory information in body-centered coordinates. European Journal of Neuroscience, 14:737-746.
57. Indovina I. and J. N. Sanes (2001) Combined visual attention and finger movement effects on human brain representations. Experimental Brain Research, 140:265-279.

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58. Hagberg, G. E., G. Zito, F. Patria F, and J. N. Sanes JN (2001) Improved detection of event-related functional MRI signals using probability functions. NeuroImage, 14:1193-1205.
59. Eliassen, J. C., T. Souza and J. N. Sanes (2001) Human brain activation accompanying explicitly directed movement sequence learning. Experimental Brain Research, 141:269-280.
60. Acuna, B. D., J. N. Sanes, and J. P. Donoghue (2002) Cognitive mechanisms of transitive inference. Experimental Brain Research 146:1-10.
61. Hagberg, G. E., I. Indovina, J. N. Sanes, and S. Posse (2002) Real time quantification of T2* changes using multi-echo planar imaging and numerical methods. Magnetic Resonance in Medicine, 48:877-882.
62. Acuna, B. D., J. C. Eliassen, J. N. Sanes, and J. P. Donoghue (2002) Frontal and parietal lobe activation during transitive inference in humans. Cerebral Cortex 12:1312-1321.
63. Sanes, J. N. (2003) Neocortical mechanisms in motor learning. Current Opinion in Neurobiology, 13:225-231.
64. Eliassen, J. C., T. Souza and J. N. Sanes (2003) Experience-dependent activation patterns in human brain during visual-motor associative learning. Journal of Neuroscience, 23:10540-10547.
65. Kim J. A., J. C. Eliassen, and J. N. Sanes (2005) Movement quantity and frequency coding in human motor areas. Journal of Neurophysiology 94:2504-2511. PMID: 15944229
66. Bédard, P., A. Thangavel, and J. N. Sanes (2008) Gaze influences finger movement-related and visual-related activation across the human brain. Experimental Brain Research, 188:63-75. PMCID: PMC3065111
67. Thaut, M, M. Demartin, and J. N. Sanes (2008) Brain networks for integrative rhythm formation. PLoS ONE, 3:e2312. PMCID: PMC2386151
68. Philip B. A., Y. Wu, J. P. Donoghue, J. N. Sanes (2008) Computational predictions of performance differences in visually- and internally-guided continuous manual tracking movements. Experimental Brain Research 190:475-491. PMCID: PMC2574818
69. Bédard, P. and J. N. Sanes (2009) Gaze and hand position effects on finger-movement related human brain activation. Journal of Neurophysiology, 101:834-842. PMCID: PMC2657059
70. Sheinkopf S. J., B. M. Lester, J. N. Sanes, J. C. Eliassen, E. R. Hutchison, R. Seifer, L. L. LaGasse, S. Durston, and B. J. Casey (2009) Functional MRI and response inhibition in children exposed to cocaine in utero: preliminary findings. Developmental Neuroscience 31:159–166. PMCID: PMC2951722
71. Bédard P. and J. N. Sanes (2009) On a basal ganglia role in learning and rehearsing visual-motor associations, NeuroImage, 47:1701-1710. PMCID: PMC3065103
72. Fiecas M., H. Ombao, C. Linkletter, W. Thompson, and J. N. Sanes (2010) Functional connectivity: shrinkage estimation and randomization test. NeuroImage 49:3005–3014. PMCID: PMC3128923
73. Böhm H., H. Ombao, R. von Sachs, and J. N. Sanes (2010) Classification of multivariate non-stationary signals: the SLEX-shrinkage approach. Journal of Statistical Planning and Inference, 140:3754–3763.
74. Bédard P. and J. N. Sanes (2011) Basal ganglia-dependent processes in short-term recall of visual-motor skills. Experimental Brain Research, 209:385-393. PMCID: PMC3065111
75. Bédard P., M. Wu, and J. N. Sanes (2011) Brain activation related to combinations of gaze position, visual input and goal-directed hand movements. Cerebral Cortex, 21:1273-1282. PMCID: PMC3097986

Refereed Journal Articles. [continued]

76. Gorrostieta C., Ombao H., Bédard P. and J. N. Sanes (2012) Investigating brain connectivity using mixed effects vector autoregressive models. Neuroimage, 59:3347–3355. PMID: 22001164; PMCID: in progress.
77. Bédard P. and J. N. Sanes (2014) Brain representations of visual-motor adaptation learning and retention. Neuroimage, 101:225-235.
78. Sabbah S., Worden M.S., Laniado D., Berson D. M., and J. N. Sanes (2022) Luxotonic signals in human prefrontal cortex: A possible substrate for effects of light on mood and cognition. Proc Natl Acad Sci USA, 119:e2118192119.
79 Stroud L.R., Morningstar M., Vergara-Lopez C., Bublitz M.H., Lee S.Y., Sanes J.N., Dahl R.E., Silk J.S., Nelson E.E., Dickstein D.P. (2023). Neural activation to peer acceptance and rejection in relation to concurrent and prospective depression risk in adolescent girls. Biol Psychol, 181, 108618.
80 Murai S.A. Mano T., Sanes J. N. Watanabe T. (2024) Atypical intrinsic neural timescale in the left angular gyrus in Alzheimer's disease. Brain Communications, Brain Commun, 6(4), fcae199.

BIBLIOGRAPHY: PUBLICATIONS (REVIEW ARTICLES, COMMENTARIES, AND BOOK CHAPTERS)

1. Ward, C. D., J. N. Sanes, J. M. Dambrosia and D. B. Calne (1983) Methods for evaluating treatment in Parkinson's disease. In: Advances in Neurology, Volume 37, Experimental Therapeutics of Movement Disorders. Eds. S. Fahn, I. Shoulson and D. B. Calne. Raven Press, New York, pp. 1-7.
2. Sanes, J. N. and E. V. Evarts (1983) The regulatory role of proprioceptive input in motor control of phasic or maintained voluntary contractions in man. In: Motor Control Mechanisms in Health and Disease. Ed. J. E. Desmedt, Raven Press, New York, pp. 47-59
3. Sanes, J. N. and E. V. Evarts (1985) Psychomotor performance in Parkinson's disease. In: Clinical Neurophysiology in Parkinsonism. Eds. P. J. Delwaide and A. Agnoli, Elsevier Science Publishers B. V., Amsterdam, pp. 117-132.
4. Sanes, J. N. (1987) Neuromotor psychophysical aspects of central programming and peripheral regulation of movement in humans. In: Advances in Applied Neurological Science, vol. 4. Clinical Aspects of Sensory Motor Integration. Eds. A. Struppler and A. Weindl, Springer-Verlag, Berlin, 305-313.
5. Sanes, J. N. (1987) Proprioceptive afferent information and movement control. In: Encyclopedia of Neuroscience. Birkhäuser Boston Inc., Cambridge, Massachusetts, Volume II, 982-984.
6. Sanes, J. N. (1990) Motor representations in deafferented humans. A mechanism for disordered motor performance. In: Attention and Performance XIII. Ed. M. Jeannerod, Lawrence Erlbaum Associates, Hillsdale, NJ., pp. 714-735.
7. Sanes, J. N., R. Caminiti, J. P. Donoghue, G. W. Huntley, E. G. Jones, J. H. Martin, and M. H. Scheiber (1992) Representations in the primary motor cortex; Intrinsic circuitry of primate MI; Functional organization of MI arm area; Organization of muscle synergies in MI; MI and reaching; MI and skill learning. Neuroscience Facts 3(9) 1-4.
8. Donoghue, J. P., G. Hess and J. N. Sanes (1996) Motor cortical substrates and mechanisms for learning. Acquisition of Motor Behavior in Vertebrates, (ed.) J. R. Bloedel, T. J. Ebner, and S. P. Wise, MIT Press, Cambridge, pp. 363-386.
9. Sanes, J. N. and J. P. Donoghue (1997) Static and dynamic organization of motor cortex. Advances in Neurology, vol. 73, Brain Plasticity. H. -J. Freund, B. A. Sabel, O. W. Witte, eds. New York, Raven Press, 277-296.

Review articles, etc. [continued]

10. Donoghue, J. P. and Sanes, J. N. (2000). Motor system organization. Encyclopedia of Life Sciences, http://www.els.net, London: Nature Publishing Group.
11. Sanes J. N. (2001) Primary motor cortex and primary somatic sensory cortex. In: The Corsini Encyclopedia of Psychology and Behavioral Science, Third Edition. Ed. W. E. Craighead and C. B. Nemeroff. John Wiley & Sons, New York, pp. 1243-1245.
12. Sanes, J. N. and W. Truccolo (2003) Motor "binding:" Do functional assemblies in primary motor cortex have a role? Neuron 38:3-5.
13. Sanes, J. N. (2004) Primary motor cortex and primary somatic sensory cortex. In: Concise Corsini Encyclopedia of Psychology and Behavioral Science, Third Edition. Ed. W. E. Craighead and C. B. Nemeroff. John Wiley & Sons, New York, pp. 727-728.
14. Sanes, J. N. (2008) Cerebral Cortex: Motor Learning. In H.L. Roediger, III (Ed.), Cognitive Psychology of Memory. Vol. 3 of Learning and Memory: A Comprehensive Reference, 4 vols. (J. Byrne Editor). Oxford: Elsevier, pp. 423-440.
15. Sanes, J. N. (2008) Primary motor cortex and primary somatic sensory cortex. In: *Concise Corsini Encyclopedia of Psychology and Behavioral Science, Fourth Edition*. Ed. W. E. Craighead and I. Weiner. John Wiley & Sons, New York.
16. Sanes, J. N. (2017) Cerebral Cortex: Motor Learning. In H.L. Roediger, III (Ed.), Cognitive Psychology of Memory. Learning and Memory: A Comprehensive Reference 2E. (J. Byrne Editor). Oxford: Elsevier, pp. in press.
17. Sanes, J. N. (2021). Rhode Island COBRE Center for Central Nervous System Function: Progress and Perspectives. R I Med J (2013), 104(3), 36-40.

BIBLIOGRAPHY: PUBLICATIONS (ARCHIVE SUBMISSIONS)

1. Tung N, Upfal E, Sanes JN, Elosyn A (2022) Neuro-Hotnet: A Graph theoretic approach for brain FC Estimation. ArXiv:2111.08118. https://arxiv.org/abs/2111.08118. (under peer review).
2. Murai, S.A., Mano T., Sanes J.N. and Watanabe T (2023) Atypical intrinsic neural timescale in the left angular gyrus in Alzheimer's disease. medRxiv, https://doi.org/10.1101/2023.06.12.23291278

Meeting Abstracts. (selected 2016-2023, from a total of >140 from 1975-present)

1. Zhao Y, Luo X, Upfal E, Bédard P, Sanes JN (2016) Identification of "hot" local brain networks during motor sequence learning. Society for Neuroscience Abstract. San Diego, CA. 271.07.
2. Zhao Y, Luo X, Upfal E, Bédard P, Sanes JN (2017) Identification of "hot" brain subnetworks during motor learning. Annual meeting of the Organization of Human Brain Mapping, Vancouver, Canada, June 2017.
3. Garnaat S, Bédard P, Greenberg B, Sanes JN (2017) Brain activation during changes in action intention in obsessive-compulsive disorder. Annual meeting of the Organization of Human Brain Mapping, Vancouver, Canada, June 2017.
4. Bédard P, Garnaat SL, Greenberg BD, Sanes JN (2017) Obsessive-compulsive disorder and brain activation during changes in action intention. Annual meeting of the Society for Neuroscience, Washington DC, November 2017.
5. Sabbah S, Worden MS, Berson DM, Sanes JN (2019) Luminance signals in the human brain. Annual meeting of the Organization of Human Brain Mapping, Rome, Italy, June 2019.
6. Worden MS, McEleney F, Gonsalves MA, Berson DM, Carpenter LL, Sanes JN (2022) Seasonal affective disorder and major depressive disorder reduce light-induced responses in human prefrontal cortex. Society for Neuroscience Abstract. San Diego, CA.

Meeting abstracts [continued]

7. Sanes JN, Worden MS, McEleny F, Gonsalves MA, Lorenc ES, Berson DM, Carpenter LL (2023) Depressive disorders reduce light-induced responses in human prefrontal cortex. IBRO World Congress, #3894. Granda, Spain.
8. Murai SA, Mano T, Sanes JN, Watanabe T (2023) Intrinsic neural timescales link structural and network abnormalities in Alzheimer's disease. Society for Neuroscience Abstract. Washington, DC.

Invited lectures: International and National Meetings

1. Frontal motor cortical representation in primates: Implications for Learning and Rehabilitation. "Brain Plasticity." Satellite Symposium of Brain 95. Düsseldorf, Germany. July, 1995.
2. Motor cortical representations of bodily motion. "Workshops in Sensorimotor Control: Measuring body motion". Bangor, Wales, UK. April, 1996.
3. Organizing principles of human and monkey motor cortex. "Sensorimotor '96: Dynamics, Adaptation and Representation in Motor Cortex" Workshop preceding the Annual Meeting of the Society for Neuroscience, Washington, DC, November 1996.
4. Dynamic motor cortical representations. McDonnell-Pew Program in Cognitive Neuroscience Workshop, Oxford, England, June 1997.
5. Motor cortical organization in humans. International Congress on Clinical Neurophysiology. Brain Imaging Symposium. Florence, Italy, August 1997.
6. Patterns of human motor cortical organization. Congress of Physiology and Neuropharmocology of Rehabilitation. Rome, Italy, August 1997.
7. Dynamic movements in the human brain. Second Berlin Workshop on Cortical Plasticity. Berlin, Germany, April, 1998..
8. Activation patterns of human brain during voluntary motor actions. Workshop on "Epilepsy and Movement Disorders in Children", IRCCS Stella Maris, INPE, Pisa, Italy, March 1998.
9. Functional magnetic resonance imaging of human brain during motor actions. European Clinical Neurophysiology Meeting, Llubyjana, Slovenia, June 1998.
10. Neural Information Processing. "McDonnell-Pew Program in Cognitive Neuroscience Workshop, Montreal, Canada, June 1998.
11. Patterns of cortical activation during cognitive and motor behavior. Eighth Congress on Neurological Rehabilitation. Milano, Italy, September, 1998
12. On the stability and modifiability of human cortical points revealed by functional magnetic resonance imaging. CNRS - Conference Jacques Monod : "Synaptic Plasticity, Assembly Dynamics and Flexibility of Cognitive Representations". Aussois (France). November 28–December 3, 1998.
13. Are there primitives for motor representations in the human brain? European Brain and Behavioral Society, 31st Annual Meeting. Rome, Italy. September, 1999.
14. Organization of the human brain revealed by functional MRI. First International Symposium on Cognitive Therapy, Perfetti Method. Staffelstein Clinic, Staffelstein, Baveria, Germany, September 1999.
15. Short-term plasticity of human movement brain representations. Third Berlin Workshop on Cortical Plasticity. Berlin, Germany, March, 2000.
16. Conscious and unconscious actions. Invited lecture. 7th Annual European Neurology Society, Paris, France, April 2001.
17. Cortical mechanisms of explicit and implicit learning. Invited Lecture. Satellite Symposium on Motor Learning, Neural Control of Movement. Annual Meeting, Barcelona, Spain, March 2004.

Invited lectures [continued]

18. MRI at Brown University. Toward Brain Health:The Present and the Future of Brain Data Sharing. Japanese Health Ministry, Geneva, Switzerland, March 2019.
19. Light intensity coding in the human prefrontal cortex. Keynote Speaker at Neuroscience: Breach the Research Barrier (NEURO-BRB 2023). Putrajaya, Malaysia, June 2023.
20. Publishing in a Society Journal. Workshop. Japanese Neuroscience Society meeting, Sendai, Japan. August 2023.
21. Light intensity coding in the prefrontal cortical regions of humans . Mongolian Neuroscience Society meeting. Ulaanbaatar, Mongolia. August 2023.

Papers Read: Invited Colloquia (Selected from Total of >100)

COLLOQUIA AT UNIVERSITIES AND RESEARCH INSTITUTIONS: (Selected from 1994-PRESENT)
Boston University; Harvard College; Johns Hopkins University; New York University; National Institutes of Health; University of Parma, Italy; Harvard Medical School; University of Roma, "La Sapienza"; University of Verona, Italy; Mount Sinai School of Medicine, NYC; University of Padova, Italy; Oxford University, Oxford, UK; Institute of Neurology and Wellcome Department of Cognitive Neurology, Queen Square, University College London; University of Düsseldorf, Düsseldorf, Germany; IRCCS Santa Lucia, Rome, Italy; Neurology Therapy Center, Düsseldorf, Germany; Brown University, Massachusetts Institute of Technology; Colorado State University; University of Minnesota; École normal supérieure, Paris, France; Radboud University of Nijmegen; École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland; Department of Motor Neuroscience, University College London; INSERM, Unit 864, Lyon, France, IRCCS San Camillo, Venice, Italy; Neuroscience Institute, Alicante Spain; Kyoto University, Kyoto, Japan; RIKEN, Tokyo, Japan; International Research Center for Neurointelligence, University of Tokyo, Japan, Tokyo Medical and Dental University, Japan, Okinawa Institute of Science and Technology.

Research Awards

Current Grants: (as Principal Investigator or Multiple PI)

2013-2025	National Institutes of Health, COBRE Center for Central Nervous System Function. IDeA NIGMS P20103645, ~$12,000,000 (Total costs).
2022-2024	Office of the Vice-President for Research and Carney Institute for Brain Science, Brown University. Development of a quantum-based sensor to detect brain magnetic fields. $100,000 (Direct costs).
2023-2028	National Institutes of Health, COBRE Center for Central Nervous System Function. IDeA NIGMS P30149405, $5,981,255 (Total costs).
2023-2028	National Institutes of Health, Development of Quantum Magnetic Tunneling Junction Sensor Arrays for Brain Magnetoencephalography (MEG) under Natural Settings. NIBIB UG3EB034695. Gang Xiao, lead PI, Jerome Sanes Multi-PI status, $3,303,268 (Total costs)

Current Grants: (as Co-Investigator)

2012-2028	US Veterans Administration, VA RR&D Service Center of Excellence, Center for Neurorestoration & Neurotechnology, RRDN9228C, Leigh Hochberg, Principal Investigator. Role: Co-Investigator (Neuroimaging Core).

Current Grants: (as Trainer or Mentor)

1999-2026 National Institutes of Health, *Interdisciplinary Predoctoral Neuroscience Training Program*. Diane Lipscombe, Principal Investigator.

Completed Grants (as Principle Investigator)

2019 National Institutes of Health, 1S10OD025181 , *Brain Science Compute Cluster,* $600,000.

2015-2016 BIBS Innovation Award, Identifying brain networks controlling movement planing and learning. Role: Co-Principal Investigator (with Eli Upfal and Xi Luo).

2014-2015 DEANS Award, Brown University, Alpert School of Medicine, $80,000. Role: Co-Principal Investigator (with Benjamin Greenberg)

2014 Brown Institute for Brain Science, *Purchase of MR Spectroscopic Imaging Software and Hardware*, $13,500.

2013 National Institutes of Health, 1S10OD016366, *Brain Science Compute Cluster,* $600,000.

2012 Brown Institute for Brain Science, *Establishment of a Non-invasive Brain Stimulation Facility*, $400,000 (David Badre, Co-PI)

2009-2012 National Science Foundation, 0843938, *Motor Intention*, $505,000.

2008-2013 National Institutes of Health, T32 NS062443, *Predoctoral Neuroscience Training*, $875,000.

2006-2008 Department of Energy, *MRI System and Facility,* $962,000.

2005-2009 National Institutes of Health, Research Grant, R01EY15451, *Visual Motor Integration*. $750,000.

2002-2009 Falk Medical Research Trust, *Parkinson's disease, Alzheimer's disease and spinal cord injury,* $1,000,000.

2002-2007 National Institutes of Health, Research Grant, R01 NS44834, *Cognition and Action*. $830,000.

2005-2006 National Science Foundation, Major Research Infrastructure Grant, *Purchase of a 3T MRI system*, $2,000,000.

2004-2006 DARPA (subcontract with VSM-Medical Systems. *MEG Brain Computer Interface*, ~$340,000.

1997-2003 National Institutes of Health, Research Career Development Award, KO2 NS01978, *Functional brain organization*. $250,000.

1996-1999 National Institutes of Health, Research Grant. *Functional brain organization*. ~$448,600.

1997 National Institutes of Health, Shared Instrumentation Program, *Compute Cluster,* $350,000.

1995-1998 McDonnell-Pew Program in Cognitive Neuroscience. Research Grant. *Neural Mechanisms of Preparation and Choice,* $105,000.

1991-2003 National Institutes of Health, Research Grant, R01AG10634-01, *Neural control of human voluntary movements*, $1,800,000.

1990-1995 Whitehall Foundation, Research Grant, *Cortical motor field neuronal network control of voluntary movements in monkeys*, $180,000.

1990-1993 Charles E. Culpeper Foundation, Research Grant, *Motor cortical contributions to motor learning, adaptation, and attention*, $157,600.

Completed Grants (as Co-Investigator or Trainer)

2005-2009 National Institutes of Health, Nicotine Dependence: Phenotype, Endophenotype and Contexts. ~$7,600,000 total grant, ~$62,000 for Co-I (Raymond Niaura, PI)

2012-2013 National Institutes of Health, Shared Instrumentation Program, *Brain Science Compute Cluster,* $600,000. John Donoghue, Principal Investigator.

2011-2016 National Institutes of Health, *HPA and Neural Response to Peer Rejection: Biomarkers of adolescent depression risk*, R01MH092450. Laura Stroud, Principal Investigator.

2017-2018 National Institutes of Health, NIGMS, Advance-CTR Mentored Research Awards (internal review within Rhode Island).

2015-2018 National Science Foundation. Post-doctoral Fellowship Program. Changes-of mind in target selection for action. John McCarthy, Principal Investigator. Role: Co-Mentor

2007-2022 National Eye Institute, NIH, *Predoctoral Visual Training Grant*. Michael Paradiso, Principal Investigator. [resubmission, May 2016, pending decision.

2019-2024 National Institutes of Health, COBRE Center for Neuromodulation. IDeA P20GM130452. Benjamin Greenberg, Principal Investigator. Role: Co-Investigator (Administrative Core).

2019-2024 National Institutes of Health, COBRE Center for Addiction and Disease Risk Exacerbation. IDeA P20GM130414. Peter Monti, Principal Investigator. Role: Mentor of a Project Leader.

Service:

To Brown University

Departmental and Program Activities

Organizer of Motor Control Journal Club (1989-1994)
Undergraduate Concentration Advisor, Neuroscience (1991-present).
Chair, Neuroscience Graduate Program Seminar Series (1991-1997; 2001-2006)
Organizer of Cognitive Neuroscience Journal Club (1994-1997)
Graduate Student doctoral advisor (1995-present).
Director, Brown University Magnetic Resonance Imaging Facility (2001-present)
Co-Director, Neuroscience Graduate Program, Brown University (2004-2013)
Member, Executive Committee, Carney Institute for Brain Science (2005-present)
Member, Department of Neuroscience's, Committee on Appointments, Reappointments and Promotions (2017-present)
Chair, Neuroscience Graduate Program Admissions Committee (Fall 2022 matriculation)

Research Activities

Supervision of undergraduate students in laboratory activities, some leading to Honors in Neuroscience (1989-present).
Scientific Director: Brown University, Parkinson's Disease and Motor Disorders Unit. (1989-1994, unit disbanded in 1994)

Service: [continued]

Supervision of Post-doctoral and Medical Fellows: Jonathan H. Martin, M. D., Medical Fellow (1990-1992); James C. Eliassen, Ph. D. (1997-2003; Patrick Bédard, Ph. D. (2002-2008); Richard Archibald (2004-2005); Michael Kositsky (2005-2007); Ashvin Shah (2009-2011).
Co-supervision of Post-doctoral Fellows: Gyöngyi Gaál (1992-1993); Nicholas Hatsopoulos, Ph. D., (1994-1996); Catherine Ojakangas, Ph. D., Post-doctoral Fellow (1994-1996).
Supervision of >50 undergraduate students in laboratory activities, some leading to Honors in Neuroscience (1989-present).

University Committees

Sigma Xi Selection Committee (1995-1996)
Committee on Behavioral and Brain Science Curriculum (2001–2004)
Tenure, Promotion and Appointments Committee (Spring 2006, Fall 2008 – Spring 2011, Vice Chair: 2009-2010; Chair: 2010-2011, Fall 2023)
Research Advisory Board (2013 - 2015)
Academic Priorities Committee (Academic years 2016-2019, Vice-Chair, 2018-2019)

To the Scientific Community

Grant and Fellowship Proposal Review Panels. (1989—present)

National:

National Institutes of Health: Musculoskeletal and Dental Sciences, IFCN-5, BBB-3, IFCN-8, NCRR-Regional Resource; Program Project Special Emphasis Study Sections; Biomedical Engineering Research Partnerships, Ad-hoc member of Study Section, NINDS T32 Review Panel; NIGMS COBRE Phase 1, 2 and 3 Review panels (2014, 2015, 2016, 2019, 2022 [Chair]; 2024).
National Science Foundation (2005-2015; 2022)
Spinal Cord Research Foundation.
Veterans Administration.
New York Academy of Sciences, Blavatnik Young Investigator Award

International:

Pan-national: Human Frontiers Science Program
France: CNRS; French Ministry of Research, Integrative and Computational Neuroscience Program; National Research Agency
Israel: United States-Israel Binational Science Foundation
Italy: Ministry of Research, Science and Technology; Italian Space Agency.
Switzerland: Swiss National Science Foundation
United Kingdom: Wellcome Trust-United Kingdom Medical Research Council, Joint Infrastructure Program; Wellcome Trust Review Panel for Laboratory Funding Renewal.

Scientific Journals: Editorial Board Member.

Neuroscience, Associate Editor-in-Chief, 2016-2021.
Neuroscience, Editorial Board, 2022-present.
Neuroscience, Section Editor, Cognitive, Behavioral and Systems Neuroscience: 2006-2012; 2014-2016.
IBRO Neuroscience Reports, Editorial Board, 2016-present
Neuropharmacology. Associate Editor, 2008-2016
Experimental Brain Research, Associate Editor, Neurophysiology Section: 1996–2017.

Service: [continued]

Journal of Neuroscience, Associate Editor, Behavioral/Systems/Cognitive Section: 2005-2010.
The Open Neuroimaging Journal, Associate Editor: 2007-2011
The Scientific World, Associate Editor: 2007-2011.
NeuroImage: Associate Editor, 2000-2005.

Scientific Journals: Reviewer
Annals of Neurology, Behavioral Neuroscience, Brain, Canadian Journal of the Neurological Sciences, Cerebral Cortex, Current Biology, Electroencephalography and Clinical Neurophysiology, European Journal of Neuroscience, European Journal of Physiology, Experimental Brain Research, Experimental Neurology, Journal of Cerebral Blood Flow and Metabolism, Journal of Gerontology, Journal of Motor Behavior, Journal of Neurophysiology, Journal of Neuroscience, Journal of Psychiatric Research, Journal of the International Neuropsychological Society, Nature, Nature Neuroscience, Neuroimage, Neuron, Neuropsychologia, Neuroscience, Pediatrics, Perceptual and Motor Skills, Psychobiology, Psychological Bulletin, Psychophysiology, Science.

Scientific Society: Meeting Abstract Reviewer
Organization of Human Brain Mapping (2000-2006).

Instruction
Fidia International School of Neuroscience, Adjunct Faculty, 1991.
Functional Magnetic Resonance Imaging. Faculty. CNRS Course, Marseille, France. 1999.

To Other Universities
Thesis Committees:
Deborah Claman, Massachusetts Institute of Technology, 1984.
John Pelligrini, State University of New York at Stony Brook, 1993.

Advocacy and Outreach
Rhode Island Chapter of Society for Neuroscience: Organizer and President (1992-present)
Neuroscience Contact with National Society of Biology Teachers (1993)
Governmental and Public Affairs Committee, Society for Neuroscience (2014-2017)
Public Education and Communication Committee, Society for Neuroscience (2019-2022)
Treasurer, International Brain Research Organization (2020 - 2025)

Professional Society Membership.
Society for Neuroscience
American Association for the Advancement of Science
Organization of Human Brain Mapping

Honors and Awards.

Academic Awards

1970-1974	New York State Regents Scholarship
1974-1977	United States Public Health Service Trainee
1974-1977	Rush Rhees Fellow, University of Rochester

1979	National Research Service Award
1995	Honorary Master of Arts, Brown University
2015-2016	Fulbright Scholar Award, Franco-American Commission
2018	President's Award for Excellence in Faculty Governance, Brown University

Teaching and Mentoring (1995-present: Note: Interrupted full-time employment at Brown October 1997 (on leave); resumed full-time employment January 2001; Role: Course Director unless otherwise noted)

Course Teaching (Academic Year and Semester)

1995-1996 I. BN 195 : Independent Study (1 student)
II. BN 192 : Systems and Cognitive Neuroscience (24 students)
BN 196 : Independent Study (2 students)

1996-1997 I. BN 195 : Independent Study (2 students)
II. BN 192 : Systems and Cognitive Neuroscience (23 students)
BN 196 : Independent Study (1 student)
EN 292 : Medical Image Analysis (Guest lecture)

2000-2001 I. Not present at University
II. EN 250 : Medical Image Analysis (Guest lecture)

2001-2002 I. BN 293 : Functional MRI: Theory and Practice (13 students. ~10 auditors)
BN 195 : Independent Study (2 students)
GISP : Functional MRI (7 students)
II. BN 193 : Topics in Neuroscience : Cognitive Neuroscience (8 students)
BN 196 : Independent Study (1 student)

2002-2003 I. BN 105 : Cognitive Neuroscience (18 students)
BN 195 : Independent Study (3 students)
II. BN 196 : Independent Study (1 student)
EN 250 : Medical Image Analysis (Guest lecture)

2002-2003 I. BN 105 : Cognitive Neuroscience (18 students)
BN 195 : Independent Study (3 students)
II. BN 196 : Independent Study (1 student)
EN 250 : Medical Image Analysis (Guest lecture)

2003-2004 I. BN 105 : Cognitive Neuroscience (13 students)
BN193 : Topics in Neuroscience, Motor Learning (6 students)
BN 195 : Independent Study (1 student)
II. BN 196 : Independent Study (1 student)

2004-2005 I. BN 105 : Cognitive Neuroscience (37 students)
2005-2006 I. BN205 : Advanced Systems Neuroscience (14 graduate students)
II. BN206 : Advanced Cognitive Neuroscience (16 graduate students)

2006-2007 I. BN205 : Advanced Systems Neuroscience (12 graduate students)
II. BN206 : Advanced Cognitive Neuroscience (10 graduate students)

2007-2008 Sabbatical Leave

2008-2009 II. NEUR2060 : Advanced Cognitive Neuroscience (14 graduate students)

2009-2010 I. NEUR2050 : Advanced Systems Neuroscience (15 graduate students)
II. NEUR2940: Neural Correlates of Consciousness (6 students)

2010-2011 I. NEUR2050 : Advanced Systems Neuroscience (10 graduate students)

2011-2012 I. NEUR2050 : Advanced Systems Neuroscience (12 graduate students)
II. NEUR2060 : Advanced Systems Neuroscience (15 students); Guest Lecturer

2012-2013 II. NEUR2060 : Advanced Systems Neuroscience (14 students)

2013-2014 I. NEUR1930 : Neural Correlates of Consciousness (15 students)
NEUR1970 : Independent Study (1 student)
II. NEUR2060 : Advanced Systems Neuroscience (14 students)
NEUR1970 : Independent Study (1 student)

2014-2015 II. NEUR2060 : Advanced Systems Neuroscience (10 students)

2015-2016 Sabbatical Leave

2016-2017 II. NEUR1940 : Neural Correlates of Consciousness (10 students)
NEUR2060 : Advanced Systems Neuroscience (13 students)

2017-2018 II. NEUR1930i: Neural Correlates of Consciousness (5 students)

2018-2019 II. NEUR1930i: Neural Correlates of Consciousness (6 students)

2019-2020 II. NEUR1930i: Neural Correlates of Consciousness (9 students)

2020-2021 II. NEUR1930i: Neural Correlates of Consciousness (11 students)

2022-2023 I. NEUR1930i: Neural Correlates of Consciousness (8 students)

2023-2024 II. NEUR1930i: Neural Correlates of Consciousness (9 students)

Advising:

Undergraduates

Concentration advising: > 100 students for Sc. B. in Neuroscience (1989-present)
Undergraduate research projects supervised: >30 since 1989
Undergraduate honors thesis (direct supervision or second reader): >15 since 1989

Graduates

Graduate student advisory committees
>20 since 1989 (at Brown and other Universities)
Doctoral thesis committees
>8 since 1989 (at Brown and other Universities)

Faculty

Faculty Mentor: Joo-Hyun Song, Department of Cognitive, Linguistic and Psychological Sciences (2011-2016)

Faculty Mentor: Matthew Nasser, Department of Neuroscience (2019-present)