

CURRICULUM VITAE  
Johns Hopkins University School of Medicine

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**William S. Anderson, Ph.D., M.D.**

## DEMOGRAPHIC AND PERSONAL INFORMATION

### Current Appointments

#### University

2021-present Professor of Neurosurgery, Johns Hopkins University School of Medicine  
2019-present The A. Earl Walker, MD Professorship in Functional Neurosurgery

#### Hospital

2011-present Attending Neurosurgeon, The Johns Hopkins Hospital

### Personal Data

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### Education and Training

#### Undergraduate

1990 B.S., (*summa cum laude*), Physics, Texas A&M University

#### Doctoral Graduate

1992 M.A., Physics, Princeton University  
1997 Ph.D., Physics, Princeton University  
2001 M.D., Johns Hopkins University

#### Postdoctoral

2001-2002 Intern, General Surgery, Johns Hopkins Hospital  
2002-2008 Resident, Neurosurgery, Johns Hopkins Hospital

### Professional Experience

2008-2010 Instructor of Surgery, Harvard Medical School  
2008-2010 Associate Surgeon, The Brigham and Women's Hospital  
2011-2013 Assistant Professor of Neurosurgery, Johns Hopkins University School of Medicine  
2011-present Attending Neurosurgeon, Johns Hopkins Hospital  
2012-present Core Faculty, Institute for Computational Medicine, Johns Hopkins University, Whiting School of Engineering  
2013-2021 Associate Professor of Neurosurgery, Johns Hopkins University School of Medicine  
2013-present Associate Professor of Biomedical Engineering, Johns Hopkins University

### PUBLICATIONS

#### Original Research [OR]:

1. **Anderson WS**, Armitage JC, Dunn E, Heinrich JG, Lu C, McDonald KT, Weckel J, Zhu Y. Electron attachment, effective ionization coefficient, and electron drift velocity for CF<sub>4</sub> gas mixtures. Nucl Instr Meth. 1992;A323:273-279.

2. Young AR, **Anderson WS**, Calaprice FP, Cates GD, Jones GL, Krieger DA, Vogelaar RB. Laser oriented 36K for time reversal symmetry measurements. *Phys Rev C*. 1995; 52:R464-R467.
3. **Anderson WS**. Development of a Test of Time Reversal Invariance in  $^{19}\text{Ne}$  Beta Decay. Doctoral dissertation. Princeton Univ. 1997.
4. **Anderson WS**, Sheth RN, Bencherif B, Frost JJ, Campbell JN. Naloxone increases pain induced by topical capsaicin in healthy human volunteers. *Pain*. 2002 Sep;99(1-2):207-16.
5. Kim JH, Veldhuijzen D, **Anderson WS**, Lee J-I, Lee H-T, Ohara S, Lenz FA. Pain and temperature encoding in the human thalamic somatic sensory nucleus (Ventral caudal): Inhibition-related bursting mediates sensations evoked by somatic stimuli. *Thal Rel Sys*. 2005; 3(4):305-314.
6. Ohara S, **Anderson WS**, Lawson HC, Lee HT, Lenz FA. Endogenous and exogenous modulators of potentials evoked by a painful cutaneous laser (LEPs). *Acta Neurochir*. 2006;99:77-79.
7. **Anderson WS**, Kudela P, Cho RJ, Bergey GK, Franaszczuk P. Studies of stimulus parameters for seizure disruption using neural network simulations. *Biol Cybern*. 2007;97:173-194.
8. **Anderson WS**, Lawson HC, Belzberg AJ, Lenz FA. Selective denervation of the levator scapulae muscle: an amendment to the Bertrand procedure for the treatment of spasmodic torticollis. *J Neurosurg*. 2008;108:757-763
9. **Anderson WS**, Kossoff EH, Bergey GK, Jallo GI. Implantation of a responsive neurostimulator in patients with refractory epilepsy. *Neurosurg Focus*. 2008;25(3):E12.
10. **Anderson WS**, Weinberg S, Kudela P, Bergey GK, Franaszczuk PJ. Phase dependent stimulation effects on bursting activity in a neural network cortical simulation. *Epi Res*. 2009;84:42-55.
11. **Anderson WS**, Weiss N, Lawson HC, Ohara S, Rowland L, Lenz FA. Demonstration of imagined- and phantom-movement related neuronal signals in human thalamus. *Neuroreport*. 2011;22(2):78-82.
12. Truccolo W, Donoghue J, Hochberg L, Eskandar E, Madsen JR, **Anderson WS**, Halgren E, Cash SS. Single neuron dynamics during in focal seizures. *Nature Neurosci*. 2011;14(5):635-641.
13. Santaniello S, Burns SP, Madsen J, Singer J, **Anderson WS**, Sarma SV. Quickest detection of seizure onsets in drug-resistant patients: An optimal control approach. *Epilepsy Behav*. 2011;22:49-60.
14. **Anderson WS**, Azhar F, Kudela P, Bergey GK, Franaszczuk PJ. Epileptic seizures from abnormal networks: Why some seizures defy predictability. *Epi Res*. 2012;99(3):202-213.
15. Peyrache A, Dehghani N, Eskandar E, Madsen J, **Anderson WS**, Donoghue J, Hochberg L, Halgren E, Cash S, Destexhe A. Spatio-temporal dynamics of neocortical excitation and inhibition during human sleep. *PNAS*. 2012 Jan 31;109(5):1731-6.
16. Chen LL, Madhavan R, Rapoport BI, **Anderson WS**. A method for real-time cortical oscillation detection and phase-locked stimulation. *Conf Proc IEEE Eng Med Biol Soc*. 2011:3087-3090.
17. Azhar F, **Anderson WS**. Prediction of single neuron spikes in sensorimotor cortex may reflect generic properties of locally connected networks. *Neural Comp*. 2012;24(10):2655-2677.
18. Bansal A, Singer J, **Anderson WS**, Golby A, Madsen J, Kreiman G. Temporal stability of visually selective responses in intracranial field potentials recorded from human occipital and temporal lobes. *J Neurophysiol*. 2012;108(11):3073-3086.
19. Lewis LD, Weiner VS, Mukamel EA, Donoghue JA, Eskandar EN, Hochberg L, Madsen JR, **Anderson WS**, Cash SS, Brown EN, Purdon PL. Rapid fragmentation of neuronal networks at the onset of propofol-induced unconsciousness. *PNAS*. 2012 Dec 4;109(49):E3377-86.
20. Hotson G, Fifer MS, Acharya S, **Anderson WS**, Thakor NV, Crone NE. Electrographic decoding of ipsilateral reach in the setting of contralateral arm weakness from a cortical lesion. *Conf Proc IEEE Eng Med Biol Soc*. 2012;4104-4107.
21. Burns SP, Sritharan D, Jouny C, Bergey G, Crone N, **Anderson WS**, Sarma SV. A network analysis of the dynamics of seizure. *Conf Proc IEEE Eng Med Biol Soc*. 2012:4684-4687.
22. Chen LL, Madhavan R, Rapoport BI, **Anderson WS**. Real-time brain oscillation detection and phase-locked stimulation using autoregressive spectral estimation and forward prediction. *IEEE Trans Biomed Eng*. 2013; 60(3):753-762. PMID: 21292589.
23. Fifer M, Hotson G, Wester BA, McMullen DP, Wang Y, Johannes MS, Katyal KD, Helder JB, Para MP, Vogelstein J, **Anderson WS**, Thakor NV, Crone NE. Simultaneous neural control of simple reaching and grasping with the modular prosthetic limb using intracranial EEG. *Trans Neural Systems Rehab Eng*. 2014;22(3):695-705.
24. McMullen D, Hotson G, Fifer MS, Katyal KD, Wester BA, McGee TG, Harris A, Johannes MS, Vogelstein RJ, **Anderson WS**, Thakor NV, Crone NE. Demonstration of a semi-autonomous hybrid brain-machine interface using human intracranial EEG, eye tracking, and computer vision to control a robotic upper limb prosthetic. *IEEE Trans Neural Sys Rehab Eng*. 2014;22(4):784-796.

25. Hao S, Subramanian S, Jordan A, Yaffe R, Santaniello S, Jouny C, Bergey G, **Anderson WS**, Sarma SV. Computing network-based features from intracranial EEG time series data: Application to seizure focus localization. *Conf Proc IEEE Eng Med Biol Soc.* 2014;5812-5815.
26. Basu I, Kudela P, **Anderson WS**. Determination of seizure propagation across microdomains using spectral measures of causality. *Conf Proc IEEE Eng Med Biol Soc.* 2014;6349-6352.
27. Tang H, Buia C, Madhavan R, Crone N, Madsen J, **Anderson WS**, Kreiman G. Spatiotemporal dynamics underlying object completion in human ventral visual cortex. *Neuron.* 2014;83(3):736-748.
28. Eliades S, Crone N, **Anderson W**, Ramadoss D, Lenz F, Boatman-Reich D. Adaptation of auditory high-gamma responses in human cortex. *J Neurophysiol.* 2014;112(9):2147-2163.
29. Burns SP, Santaniello S, Yaffe RB, Jouny C, Crone N, Bergey G, **Anderson WS**, Sarma SV. Network dynamics of the brain and influence of the epileptic seizure onset zone. *PNAS.* 2014; 111(49):E5321-E5330.
30. Madhavan R, Millman D, Tang H, Crone NE, Lenz FA, Tierney TS, Madsen JR, Kreiman G, **Anderson WS**. Decrease in gamma-band activity tracks sequence learning. *Front Syst Neurosci.* 2014;8:222.
31. Hotson G, Fifer MS, Acharya S, Benz H, **Anderson WS**, Thakor NV, Crone NE. Coarse electrocortico-graphic decoding of ipsilateral reach in patients with brain lesions. *PLOS One.* 2014;9(12):e115236.
32. Singer J, Madsen J, **Anderson W**, Kreiman G. Sensitivity to timing and order in human visual cortex. *J Neurophysiol.* 2015;113(5):1656-1669.
33. Veerakumar A, Cheng JJ, Sunshine A, Zorowitz RD, **Anderson WS**. Baclofen dosage after traumatic spinal cord injury: A multi-decade retrospective analysis. *Clin Neurol Neurosurg.* 2015;129:50-56.
34. Qureshi A, Cheng J, Sunshine A, Wu A, Pontone G, Cascela N, Lenz F, Grill S, **Anderson WS**. Post-operative symptoms of psychosis after deep brain stimulation in Parkinson's patients. *Neurosurg Focus.* 2015;38(6):E5.
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36. Kudela P, **Anderson WS**. Computational modeling of subdural cortical stimulation: A quantitative spatiotemporal analysis of action potential initiation in a high density multicompartiment model. *Neuromod: Tech Neural Interface.* 2015;18(7):552-565.
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46. Lozano AM, Fosdick L, Chakravarty MM, Leoutsakos JM, Munro C, Oh E, Drake KE, Lyman CH, Rosenberg PB, **Anderson WS**, Tang-Wai DF, Pendergrass JC, Salloway S, Asaad WF, Ponce FA, Burke A, Sabbagh M, Wolk DA, Baltuch G, Okun MS, Foote KD, McAndrews M, Giacobbe P, Targum SD, Lyketsos CG, Smith G. A phase II study of fornix deep brain stimulation in mild Alzheimer's disease. *J Alzheimers Dis.* 2016;54(2):777-787. doi:10.3233/JAD-160017.
47. Taylor J, **Anderson WS**, Brandt J, Mari Z, Pontone GM. Neuropsychiatric complications of Parkinson disease treatments: Importance of multidisciplinary care. *Am J Geriatr Psych.* 2016; doi: 10.1016/j.jagp.2016.08.017.

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59. Sadashivaiah V, Sacré P, Guan Y, **Anderson WS**, Sarma SV. Studying the interactions in a mammalian nerve fiber: A functional modeling approach. *Conf Proc IEEE EMBS.* 2018;2018.
60. Sadashivaiah V, Sacré P, Guan Y, **Anderson WS**, Sarma SV. Selective relay of afferent sensory induced action potentials from peripheral nerve to brain and the effects of electrical stimulation. *Conf Proc IEEE EMBS.* 2018
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62. Palepu A, Premananthan CS, Azhar F, Vendrame M, Loddenkemper T, Reinsberger C, Kreiman G, Parkerson K, Sarma SV, **Anderson WS**. Development of an automated interictal spike detector. *Conf Proc IEEE EMBS.* 2018;
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64. Leoutsakos JS, Yan H, **Anderson WS**, Asaad WF, Baltuch G, Burke A, Chakravarty MM, Drake KE, Foote KD, Fosdick L, Giacobbe P, Mari Z, McAndrews MP, Munro CA, Oh ES, Okun MS, Pendergrass JC, Ponce FA, Rosenberg PB, Sabbagh MN, Salloway S, Tang-Wai DF, Targum SD, Wolk D, Lozano AM, Smith GS, Lyketsos CG. Deep brain stimulation targeting the fornix for mild Alzheimer dementia (the Advance Trial): A two year follow-up including results of delayed activation. *J Alzheimers Dis* 2018; doi: 10.3233/JAD-180121.
65. Kudela P, Boatman-Reich D, Beeman D, **Anderson WS**. Modeling neural adaptation in auditory cortex. *Front Neural Circ.* 2018;12:72.
66. Li A, Chennuri B, Subramanian S, Yaffe R, Gliske S, Stacey W, Norton R, Jordan A, Zaghloul KA, Inati SK, Agrawal S, Haagenen JJ, Hopp J, Atallah C, Johnson E, Crone N, **Anderson WS**, Fitzgerald Z, Bulacio J, Gale

- JT, Sarma SV, Gonzalez-Martinez J. Using network analysis to localize the epileptogenic zone from invasive EEG recordings in intractable focal epilepsy. *Netw Neurosci*. 2018;2(2):218-240.
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69. Palepu A, Premanathan S, Azhar F, Vendrame M, Loddenkemper T, Reinsberger C, Kreiman G, Parkerson KA, Sarma S, **Anderson WS**. Automating interictal spike detection: Revisiting a simple threshold rule. *Conf Proc IEEE EMBS*. 2018; 299-302.
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71. Sadashivaiah V, Sacre P, Guan Y, **Anderson WS**, Sarma SV. Selective relay of afferent sensory-induced action potentials from peripheral nerve to brain and the effects of electrical stimulation. *Conf Proc IEEE EMBS*. 2018; 3606-3609.
72. Madhavan R, Bansal AK, Madsen JR, Golby AJ, Tierney TS, Eskandar EN, **Anderson WS**, Kreiman G. Neural interactions underlying visuomotor associations in the human brain. *Cereb Cortex*. 2018; doi: 10.1093/cercor/bhy333.
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79. Abiola GO, Sheth NM, Zbijewski W, Jacobson MW, Bailey C, Filtes J, Kleinszig G, Vogt SK, Soellradl S, Bialkowski J, **Anderson WS**, Siewerdsen JH, Weiss CR. Evaluation of image quality and task performance for a mobile C-arm with a complementary metal-oxide semiconductor (CMOS) detector. *J Med Imaging*. 2019;7:015501.
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100. Wang J, Tao A, **Anderson WS**, Madsen JR, Kreiman G. Mesoscopic physiological interactions in the human brain reveal small-world properties. *Cell Rep 2021*;36(8):109585. doi: 10.1016/j.celrep.2021.109585.
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#### Review Articles [RA]

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## Case Reports [CR]

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9. McMullen DP, Rosenberg P, Cheng J, Smith GW, Rosenberg P, Lyketsos C, **Anderson WS**. Bilateral cortical encephalomalacia in a patient implanted with bilateral deep brain stimulation for Alzheimer's disease: Case Report. *Alzh Dis Assoc Disord*. Jan-Mar 2016;30(1):70-72.
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3. **Anderson WS**, James C, Carson BS. Trigeminal, glossopharyngeal, and geniculate neuralgias. In: *Encyclopedia of Pain*. Schmidt RE, Willis WD (eds). Springer Verlag, Heidelberg, 2007:20.
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19. Moosa S, Tierney TS, Lenz FA, **Anderson WS**, Elias WJ. Lesioning methods for movement disorders. In: Deep Brain Stimulation: Techniques and Practices. Anderson WS, SINN (eds). Thieme, New York, 2019;31-36.
20. Butala A, Wojtasiewicz T, Mills K, Purvis TE, **Anderson WS**. Deep brain stimulation for dystonia – Clinical review and surgical considerations. In: Deep Brain Stimulation: Techniques and Practices. Anderson WS, SINN (eds). Thieme, New York, 2019;79-92.
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#### **Books, Textbooks [BK]**

1. Deep Brain Stimulation: Techniques and Practices. Anderson WS, SINN (eds). Thieme, New York, 2019

#### **Editorials [ED]**

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3. **Anderson WS**. Riding the waves: Intrinsic theta generation in the hippocampus. Neurosurg. 2010;66(4):N15-16.
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5. **Anderson W**. Exciting neurons: Controversies in cortical stimulation. Neurosurg. 2010;67(2):N20-N21.
6. **Anderson S**. Motor cortex oscillations – Enhancements observed during motion preparation. Neurosurg. 2010;67(4):N22-N23.
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16. Cheng JJ, **Anderson WS.** Enhancing memory via stimulation: A promising new technique? *Neurosurg.* 2011;69(6):N14-N16.
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18. Madhavan R, **Anderson WS.** State of the art in subdural grid design: A new flexible active electrode array. *Neurosurg.* 2012;70(4):N16-18.
19. Cheng JJ, **Anderson WS.** Higher field magnetic resonance imaging studies of mesial temporal pathology: A pathology and imaging correlative study. *Neurosurg.* 2012;70(6):N14-N15.
20. Cheng JJ, **Anderson WS.** Deep brain stimulation of entorhinal cortex shows early promise for enhancement of memory function. *Neurosurg.* 2012;71(2):N24-25.
21. Cheng JJ, **Anderson WS.** The role of the basal ganglia in decision making: A new fMRI study. *Neurosurg.* 2012;71(4):N14-N15.
22. Hotson G, **Anderson WS.** Bypassing the spinal cord: Functional electrical stimulation guided by electrocorticography decoding. *Neurosurg.* 2012;71(6):N17.
23. **Anderson WS.** Robotic arm control using extracellular action potential recordings in tetraplegic patients. *Neurosurg.* 2013;72(2):N14-15.
24. **Anderson WS.** Seeing is believing? A study of signal distortion produced by commercial cortical microelectrode recording elements. *Neurosurg.* 2013;72(4):N14-N15.
25. **Anderson W.** Putting on the brakes: Evidence for seizure inhibition and resistance in human microelectrode recordings. *Neurosurg.* 2013;72(6):N13-N14.
26. **Anderson W.** A computational model of neuronal spiking and cognitive tasks. *Neurosurg.* 2013;73(2):N13-14.
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29. **Anderson WS,** Boatman D. Intrinsic cortical signal gain: Optogenetic silencing reveals active role of cortical amplification during sensory input. *Neurosurg.* 2014;74(2):N22-N23.
30. Basu I, **Anderson W.** Lies and statistics: Study advocates caution in interpreting tests of human neural responses. *Neurosurg.* 2014;74(4):N14-N15.
31. Basu I, **Anderson W.** Bilateral representation of sensory-motor transformations. *Neurosurg.* 2014;75(2):N15-N17.
32. Basu I, **Anderson W.** Bipolar vs monopolar stimulation for cortical mapping: Which is better? *Neurosurg.* 2014;75(4):N16-17.
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35. Şimşek H, **Anderson WS.** Review of: A case of lung cancer with brain metastases diagnosed after epileptic seizure. *J Clin Anal Med.* 2015;doi: 10.4328/JCAM.3530.
36. Boone C, Salimpour Y, **Anderson WS.** Boo! Fear generalization in the primate amygdala. *Neurosurg.* 2015;76(6):N11-N12.
37. Simsek H, **Anderson WS.** Cognitive impairment after deep brain stimulation surgery. *Neurosurg.* 2015;77(2):N12-N13.
38. Salimpour Y, **Anderson WS.** Deep brain stimulation therapy in Parkinson's disease: The role of cortical phase-amplitude coupling reduction. *Neurosurg.* 2015;77(4):N17-N19.
39. Boone C, **Anderson WS.** Single neuron markers of memory retrieval confidence. *Neurosurg.* 2015;77(6): N19-20.

40. Kudela P, **Anderson WS**. High-resolution computational modeling of somatosensory cortex. *Neurosurg.* 2016;78(4):N13-N14.
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42. Chien V J-H, Wojtasiewicz T, **Anderson WS**. Analytical tools for functional connectivity: A new review. *Neurosurg.* 2016;79(2):N16-N17.
43. Boone C, Wojtasiewicz T, **Anderson WS**. Characterization of a wearable dry electroencephalography system. *Neurosurg.* 2016;79(4):N10-N11.
44. Negoita S, Boone C, **Anderson WS**. Directionality of medial prefrontal cortex and hippocampal interactions is task-dependent. *Neurosurg.* 2016;79(6):N22-N24.
45. Purvis TE, Boone C, **Anderson WS**. Development of a clinically useful algorithm for tractography-based ventral intermediate nucleus targeting. *Neurosurg.* 80(5):N24-25.
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47. Duy PQ, Anderson WS. Two surgeries do not always make a right: Spinal cord stimulation for failed back surgery syndrome. *Yale J Biol Med.* 2018;91(3):323-331.

## FUNDING

### EXTRAMURAL FUNDING

#### Research Extramural Funding

##### Current

9/15/19-7/31/24      Imaging, Guidance, and QA for Emerging High-Precision Neurosurgical Techniques  
 U01-NX-107133  
 NIH-NINDS  
 \$419,571 X 5 years  
 PI: J. Siewerdsen  
 Role: Co-I, 5%

9/1/21-8/31/24      Neuronal Mechanisms of Human Episodic Memory  
 1U01NS117839  
 NIH-NINDS U01 (Brain Initiative)  
 \$122,137/yr X 5 years  
 PI: U. Rutishauser  
 Role: Co-PI, 5%

Pending              None

##### Previous

7/1/05-6/30/06      Studies of Stimulus Parameters for Seizure Disruption using Neural Network Simulations  
 Research and Training Fellowship for Clinicians  
 Epilepsy Foundation  
 \$50,000  
 Role: PI: 100%

4/1/10-3/31/12      The Impact of Interictal Spike Events on Visual Object Recognition  
 Charles H. Hood Foundation Child Health Research Award  
 The Charles H. Hood Foundation  
 \$150,000/yr  
 Role: PI: 1%

4/1/10-3/31/15      Computational Modeling of Epileptic Activity Using a Hybrid Compartment Technique  
 NIH-NINDS K08 (1K08NS066099-01A1)  
 NIH / NINDS  
 \$1,378,890

Role: PI: 50%

10/1/10-9/30/11 Memory Alteration through Theta Phase-Locked Electrical Stimulation  
 CIMIT Innovation Grant  
 Center for Integration of Medicine & Innovative Technology  
 \$70,000  
 Role: PI: 1%; Grant relinquished to G. Kreiman, Children's Hospital Boston upon move to Johns Hopkins

11/1/11-8/31/13 A Study of Spasticity and Pain in Spinal Cord Injury Patients  
 The Neurosurgery Pain Research Institute at Johns Hopkins Award  
 \$107,256  
 Role: PI: 0%

9/30/12-8/31/17 Deep Brain Stimulation for Alzheimer's Disease  
 1R01AG042165-01A1 PAR-11-100  
 NIH R01  
 \$461,561/yr X 5 years  
 PI: A.M. Lozano, C.G. Lyketsos  
 Role: Co-I, 8%

10/1/12-9/30/15 Biophysical Model of Cortical Dynamics  
 W911NF-12-R-0012  
 Department of the Army  
 \$276,390  
 Role: PI: 1%

1/1/14-12/31/15 Active Computational Modeling of Spinal Cord Stimulation  
 The Neurosurgery Pain Research Institute at Johns Hopkins Award  
 \$80,000/yr X 2 years  
 Role: PI: 0%

8/1/14-7/31/17 Multi-scale Dynamics of Cortical Adaptation for Human Auditory Detection  
 W911NF-12-R-0012-02 Proposal No. 65459-LS  
 \$58,580/yr X 3 years  
 Role: Co-PI (with D. Boatman): W.S. Anderson, 10%

9/1/14-8/31/15 A Novel Tool for Seizure Localization in Medically Refractive Epilepsy  
 Coulter Foundation Translational Research Award  
 \$100,000 X 1 year  
 Role: Co-PI (with S. Sarma & N. Crone): W.S. Anderson, 7.5%

8/1/16-5/31/20 Towards Pain Control: Synergizing Computational and Biological Approaches to Develop a Tractable Model of the Dorsal Horn Circuit  
 R01AT009401  
 NIH/NSF CRCNS  
 \$57,847/yr X 4 years  
 PI: S. Sarma  
 Role: Co-I (S. Sarma and Y Guan, PIs), 8%

9/1/16-8/31/19 Subthalamic and Corticosubthalamic Coding of Speech Production  
 1U01NS098969  
 NIH-NINDS U01 (Brain Initiative)  
 \$32,466/yr X 3 years  
 PI: M. Richardson  
 Role: Co-PI (with M. Richardson & N Crone), 5%

7/1/18-6/30/19 Development of a Focused Microwave NeuroAblation System  
 Johns Hopkins Discovery Award

\$100,000/yr X 1 year  
Role: PI: 5%

- 9/1/17-8/31/20      Neuronal Mechanisms of Human Episodic Memory  
1U01NS103792  
NIH-NINDS U01 (Brain Initiative)  
\$122,137/yr X 3 years  
PI: U. Rutishauser  
Role: Co-PI, 5%
- 10/27/20-9/27/21      Maryland Technology Development Corporation MII Phase I  
ePACStim: Biomarker Driven Adaptive Brain Stimulation System for Parkinson's Disease  
\$115,000  
Role: PI: 1%
- 7/1/20-3/31/21      Johns Hopkins Technology Ventures  
The Louis B. Thalheimer Fund for Translational Research  
ePACStim: Biomarker-Based Brain Stimulation System  
\$115,000  
Role: PI: 1%

### **Research Intramural Funding**

#### **Current**

- 1/1/11-1/1/13      Department of Neurosurgery Startup Fund  
Johns Hopkins Hospital Department of Neurosurgery  
\$200,000  
Role: PI: Funds to support the development of computational simulation work, novel neuromodulation techniques, and functional neurosurgery laboratory.

#### **Previous**

- 8/1/08-1/1/11      BWH Startup Fund (W. Stanley Anderson Research Fund)  
Brigham and Women's Hospital Department of Neurosurgery  
\$300,000  
Role: PI: 50%; Funds to support the development of computational simulation work, and functional neurosurgery laboratory.

### **CLINICAL ACTIVITIES**

#### **Clinical Focus**

Dr. Anderson focuses his clinical practice on the surgical treatment of epilepsy and movement disorders.

#### **Certification**

Medical, other state / government licensure

- 2005-present      Maryland Board of Physicians D62853; (2005-2008; 2010-present)  
2008-2011      Massachusetts Board of Registration in Medicine 235659, expired 1/22/11.

Boards, other specialty certification

- 2012      American Board of Neurological Surgery (Board Certified, FAANS).

#### **Clinical (Service) Responsibilities**

- 8/08-12/10      Associate Surgeon, The Brigham and Women's Hospital, Supervised the Functional Neurosurgery Program including movement disorder surgery, epilepsy surgery, and the surgical treatment of pain and spasticity.
- 6/15-present      Director – Functional Neurosurgery Division, Johns Hopkins Hospital; Division of Functional Neurosurgery, performing movement disorder surgery, epilepsy surgery, and the surgical treatment of pain and spasticity.

#### **Clinical Productivity**

FY 2017-2020 My average targeted clinical effort assignment is 4102 wRVU/yr. My real average clinical effort was 3355 wRVU/yr indicating that I am slightly below the target by 18%; in 2017-2020, I treated 664 new patients; and performed 836 procedures.

Clinical Draw from outside local/regional area (reflecting national/international reputation).

FY 2017-2020 212/664 patients came from other states such as DC, WV, PA, NY, DE, NJ, NC, SC, GA, FL  
21/664 patients came from Saudi Arabia, Kuwait, UAE, Bermuda, Panama, and Qatar.

Membership in or examiner for specialty board N/A

### **Clinical Program Building / Leadership**

Functional Neurosurgery has changed in technology tremendously over the past decade, and Dr. Anderson has been incorporating these technologies in the operating room.

2012-present Expanded the clinical use of the intraoperative MRI system (iMRIS) using it for DBS lead placements performed under general anesthesia. The iMRIS system is now used in over 50% of these cases at Johns Hopkins. Additionally, the iMRIS system is now used for Visualase epilepsy tissue ablations, which has largely supplanted the classical temporal lobectomy surgery in patients with temporal lobe epilepsy. These procedures utilize the MR-thermography capability of the sequences used in the iMRIS suite. Dr. Anderson also uses the system for NeuroPace depth electrode placements, a relatively newer form of neuromodulation for epilepsy.

2017-present Expanded the use of other intraoperative navigation platforms in his surgical procedures, including the use of the Medtronic O-Arm system for awake DBS lead placement procedures and for stereo-EEG (SEEG) depth electrode placement cases. Additionally, he has fostered the use of robotics at Johns Hopkins for intracranial procedures and now routinely employs the Zimmer Biomet Rosa system for both DBS lead placement and SEEG procedures. Working with Dr. Nick Theodore, he has also contributed to the conversion of the Globus spine robotic system for intracranial applications as well.

2016-present Dr. Anderson in his course of work with neuromodulation therapies identified a problem related to the use of the NeuroPace responsive neurostimulation system, which is a device used to treat epilepsy. This system is required to be implanted under the scalp which can lead to significant long term wound healing, and erosion and infection issues. This problem was identified in a manuscript detailing a series of these patients with osteomyelitis problems requiring the explantation of the system. Along with the Neuroplastics Division under the leadership of Dr. Chad Gordon, a novel customized cranioplasty element was designed to seat the NeuroPace RNS system under a smooth surface to hopefully mitigate these long-term device erosion issues. Dr. Anderson assisted Dr. Gordon in the implementation of similar cranioplasty techniques for other scalp and skull implants. This work has also been presented at national and international conferences.

Clinical Demonstration Activities to external audience, on or off campus N/A

Development of nationally/internationally recognized clinical standard of care N/A

### **EDUCATIONAL ACTIVITIES**

#### **Educational Focus**

Dr. Anderson's educational focus has consistently supported the teaching of functional neurosurgery techniques in the treatment of movement disorders and epilepsy. He supports a CAST/ACGME functional neurosurgery fellowship program and is active in resident training as well.

In addition to supporting residency and fellowship training in functional neurosurgery at Johns Hopkins, Dr. Anderson has been also involved in medical student, undergraduate, and graduate student educational programs. Dr. Anderson participated in Johns Hopkins University Undergraduate Tutorial Program from 2013-17, and still takes many shadowing students per semester. His operating room is packed with students interested in medical robotics and stereotactic and image-based guidance techniques. Dr. Anderson also participated in Dr. Jeff Siewerdsen's Surgineering Program (2018-present) which represents a hands-on technique for teaching Biomedical Engineering Graduate Students about surgical practice. Dr. Anderson published a manuscript detailing the student shadowing experience in Functional Neurosurgery at Johns Hopkins, and was an author on a manuscript describing the Surgineering Program.

## Teaching

### Classroom Instruction

#### JHMI/Regional

- 2009 The Surgical Treatment of Movement Disorders, Integrative Mind-Brain Medicine Lecture Series for Medical Students. 1 hour lecture. The Brigham and Women's Hospital, Boston.
- 2010 The Surgical Treatment of Epilepsy, Integrative Mind-Brain Lecture Series for Medical Students. 2-1 hour lectures. The Brigham and Women's Hospital, Boston.
- 2016 fall CME 580.432 JHU Introduction to Computational Medicine. 5-1 hour lectures on NeuroModeling with P. Kudela.
- 2019 spring Course No. 580.750 - Surgineering: Systems Engineering and Data Science in Interventional Medicine (Clinical Mentor / Project Supervisor) -This course provides engineering students with instruction and clinical case examples in systems engineering and data science pertaining to medical interventions, technology, information, workflow, quality, and safety complemented by deep clinical immersion in interventional medicine. Weekly class ("Rounds") led by the Course Director focuses on principles and case examples of systems engineering and data science as well as journal articles on emerging topics in technology, information science, and patient safety in interventional medicine. The course involves one-to-one matching of students with Clinical Faculty, who oversee the students' clinical immersion in patient care pathway and involvement on clinical teams. Students complete reports and course projects that address particular questions or challenges in technology integration, data-flow, workflow, patient safety, and/or quality assurance in one of the clinical areas covered in the course.
- 2019 fall Course No. 580.750 - Surgineering: Systems Engineering and Data Science in Interventional Medicine (Clinical Mentor / Project Supervisor)
- 2020 spring Course No. 580.750 - Surgineering: Systems Engineering and Data Science in Interventional Medicine (Clinical Mentor / Project Supervisor)
- 2021 fall Course No. 580.425 / 580.750 – Radiology for Engineers (Clinical Mentor / Project Supervisor)

National None

International None

### Clinical Instruction

#### Regional (at Harvard)

- 2008-2010 Temporal Lobe Anatomy, Cadaveric Course for Neurosurgery Residents. Two hour lecture and demonstration / year. Harvard Medical School.
- 2009-2010 Stereotactic Frame Placement. Clinical Course for Neurosurgery Residents. One hour lecture and demonstration / year. The Brigham and Women's Hospital, Boston.
- 2010 DBS Electrophysiology. Clinical Course for Neurosurgery Residents. One hour lecture and demonstration. The Brigham and Women's Hospital, Boston.

National None

International None

**Workshops / seminars** N/A

### Mentoring

#### Pre-Doctoral

- 2012-2013 Avi Sunshine, B.S., Research Assistant, funded by the Neurosurgery Pain Research Institute at Johns Hopkins (Anderson PI). Avi performed a retrospective analysis of the use of baclofen in patients suffering spinal cord injury. He is also performed a correlative study in deep brain stimulation patients, comparing the active electrode contact with postoperative psychotic symptoms. OR33,35

#### Post-Doctoral

- 2009-2012 Feraz Azhar, Ph.D., Post-doctoral scholar, funded under a Hood Foundation Award (Anderson PI). Dr. Azhar developed interictal spike detection algorithms, and assisted with computational modeling studies of epilepsy. OR15,18,64,71;
- 2010-2012 Radhika Madhavan, Ph.D., Post-doctoral scholar, funded under a NIH/NINDS K08 award (Anderson PI). Dr. Madhavan developed a real-time data acquisition and processing system for the study of intrinsic theta activity in the temporal lobe and surrounding structures. OR17,23,28,31,75; ED18

- 2012-2014 Ishita Basu, Ph.D., Post-doctoral scholar, funded under a NIH/NINDS K08 award (Anderson PI). Dr. Basu performed microelectrode recordings from human cortex during seizures, and compared the recordings with computational epilepsy models. OR27,38; ED30,31,32
- 2014-2016 Pierre Sacre, Ph.D. Post-doctoral scholar funded by the Neurosurgery Pain Research Institute at Johns Hopkins (Anderson PI). Performing a computational modeling study of spinal cord stimulation effects on dorsal column fiber activity. OR45,54,72,73
- 2015-2016 Yousef Salimpour Ph.D. Research Associate funded by the Dept. of Neurosurgery. Performs human recordings in epilepsy and movement disorder patients. Studying theta phase dependent stimulation and its effects on memory, and the subcortical effects of cortical stimulation. OR48,54,56,63,77; CR9; ED36, 38
- 2017-2019 Teresa Wojtasiewicz, M.D., currently a Neurosurgery Chief Resident at Johns Hopkins, completed an enfolded fellowship in Functional Neurosurgery. OR65; BC20; ED42,43
- 2019-pres Brian Hwang, M.D., currently a Neurosurgery Resident at Johns Hopkins completing an enfolded fellowship in Functional Neurosurgery. CR12, OR82
- 2020-pres Diana Ghinda, M.D. Ph.D., current Functional Neurosurgery Fellow at Johns Hopkins.

### Thesis committees

- 2015 Matthew S. Fifer, PhD, Biomedical Engineering, "Mapping Sensorimotor Function and Controlling Upper Limb Neuroprosthetics with Electrocorticography," Committee Member.
- 2016 Christine Boone, MD, PhD, Neuroscience, "Abnormal Sleep and Related Neural Activity in a Mouse Model of Fragile X Syndrome," Committee Member.
- 2016 Robert B. Yaffe, PhD, Biomedical Engineering, "Spatiotemporal Dynamics of Neural Reinstatement During Paired Associates Memory," Committee Member.
- 2019 Daniel Ehrens, PhD, Biomedical Engineering, "Using Feedback Control to Suppress Seizure Genesis in Epilepsy," Committee Member.

### Educational Program Building / Leadership

- 2017-present Co-Director (with Shenandoah Robinson) of the ABNS CAST accredited Functional Neurosurgery Fellowship Program.

### Educational Demonstration Activities to external audience on or off campus

N/A

## RESEARCH ACTIVITIES

### Research Focus

Key Words – Computational modeling, computational medicine, neuromodulation, closed loop stimulation.

Narrative - As a functional neurosurgeon at Johns Hopkins Hospital, Dr. Anderson specializes in the treatment of movement disorders, epilepsy, and pain and spasticity. My particular interests include neuromodulation treatments such as deep brain stimulation therapy and cortical stimulation for the treatment of epilepsy. Our laboratory is focused in particular on the computational modeling of seizures in the cortex, and comparing these studies with novel microelectrode recordings in epilepsy patients. The laboratory has additionally been active in studying memory encoding during cognitive testing in invasively monitored epilepsy patients, as well as novel stimulation and recording techniques during deep brain stimulation surgery. This has resulted in a new form of closed loop stimulation and led to several papers describing the implementation and utility of phase-dependent stimulation.

### Research Program Building / Leadership

- 8/08-12/10 Director of Epilepsy Research, Dept Neurosurgery, Brigham/Women's Hospital, Boston, MA
- 1/11-present Studies in Deep Brain Stimulation. Performing deep brain stimulation procedures for a variety of experimental protocols: (Obsessive Compulsive Disorder, Schizophrenia, Alzheimer's Disease, Tourette Syndrome, and Dystonia).
- 1/11-present Studies in Seizure Evolution and Dynamics. Performing computational modeling of evolving epileptiform activity in cortex. Comparative human brain recordings are being made using a wide variety of microelectrode recording systems in our Phase II invasively monitored epilepsy patient population.
- 1/11- present Studies on the development of phase-dependent stimulation. This work represents a novel neuromodulation technique with applications in Parkinson's disease and memory.

**IRB Activity:** PI: WS Anderson except where noted;



3/1/11-7/15/21	JHM IRB NA_00046436 Computational modeling of epileptic activity using a hybrid compartment technique.
12/16/11-2/22/22	JHM IRB NA_00068392 Retrospective determination of spasticity predictors in spinal cord injury patients.
2/2/12-2/17/22	JHM IRB NA_00068826 Humanitarian device exemption for deep brain stimulation for the treatment of dystonia.
3/15/12-12/8/21	JHM IRB NA_00037463 Reclaim DBS therapy for obsessive compulsive disorder
11/29/12-2/27/20	JHM IRB NA_00073086 Thalamic deep brain stimulation for the treatment of refractory Tourette syndrome. PI: transferred to S. Dean (KKI) 3/20. FDA IDE approval granted 9/6/12. IDE # G120131.
4/17/13-10/13/21	JHM IRB NA_00083392 Spike train and local field potential analysis of microelectrode recordings derived from deep brain stimulation surgeries.
11/21/14-4/29/21	JHM IRB00040308 Real time detection and phase locked stimulation during electrocorticographic rhythmic activity in invasively monitored epilepsy patients.
6/3/15-12/8/21	JHM IRB00068382 A retrospective review of spinal cord stimulation cases.
5/12/17-1/24/22	JHM IRB00129916 A survey-based study of dry-eye associated ocular pain occurring with other chronic pain syndromes.
11/20/19-11/4/21	JHM IRB00226527 Retrospective validation of computer assisted trajectory planning software for laser interstitial thermal therapy in epilepsy patients.
1/13/20-12/5/21	JHM IRB00232232 Offline analysis of 3D image data in image-guided surgery.
1/13/20-12/10/22	JHM IRB00234662 Retrospective outcome study of temporal epilepsy patients after laser interstitial ablation therapy (LiTT).
2/11/20-2/10/23	JHM IRB00240081 Use of optical coherence tomography for histological evaluation of amygdalohippocampus in mesial temporal epilepsy: Proof of context ex vivo study.
9/29/20-9/29/23	JHM IRB00245174 No food or water for hours: How does the 'OR Desert' affect surgical residents.
1/14/21-2/8/22	JHM IRB00254356 Neuronal mechanisms of human episodic memory.

**Research Demonstration Activities to external audience, on or off campus** N/A

### **Inventions, Patents, Copyrights**

1/31/20 Co-Author [Salimpour Y, Mills K, Anderson WS]. Phase-dependent brain neuromodulation of cross-frequency coupling, Non-Provisional Patent Application.

### **Technology Transfer Activities**

10/19/15 Co-Founder/Board of Advisors, Longeviti Neuro Solutions, a company that produces custom cranioplasty systems for housing neuromodulation, CSF diversion, and drug delivery equipment.  
3/18/19 Board of Advisors, NeuroLogic, a company that develops software for seizure localization based on electrocorticography recordings.

### **SYSTEM INNOVATION AND QUALITY IMPROVEMENT ACTIVITIES**

System Innovation and Quality Improvement efforts outside of JHMI:

8/08-12/10 Brigham and Women's Hospital Department of Neurosurgery. Co-Chair (with Dr. Edward Laws, M.D.), New Equipment Evaluation and Approval Committee. Made recommendations on faculty requests for operating room equipment procurement and changes to the hospital administration. Recommendations based on equipment pricing, redundancy, safety issues. Streamlined procurement process, and centralized contact point for outside industry representatives to reduce their influence. 5% Effort.

System Innovation and Quality Improvement efforts within JHMI:

2015-2018 Served as Neurosurgery Department Representative on Neurosciences QI (Quality Improvement) Committee.  
2018-present Currently serving as Neurosurgery Department Representative on iMRIS (intraoperative MRI) QI Committee.

System Innovation and Quality Improvement Program Building / Leadership N/A

## **ORGANIZATIONAL ACTIVITIES**

### **Institutional Administrative Appointments**

2008-2009 Member, Neurosciences Clinical Planning Workgroup, Brigham and Women's Hospital, Boston, M  
2008-2010 Member, Work Life Committee, Brigham and Women's Hospital, Boston, MA

### **Editorial Activities**

Editorial Board appointments

2009-2017 Associate Editor, Neurosurgery, Science Times.

Journal Peer review activities

2006- IEEE Transactions on Biomedical Engineering  
2006- Brain Research  
2006- Journal of Neurophysiology  
2008- Physical Review Letters  
2008- Neurosurgery  
2008- Clinical Neurology and Neurosurgery  
2009- Epilepsy Research  
2009- Center for Integration of Medicine and Innovative Technology, Grant Review  
2010- Journal of Neurology, Neurosurgery, and Psychiatry  
2010- Indo-US Science & Technology Forum, Grant Review  
2011- Epilepsia  
2012- PLOS ONE.

Other peer review activities [non medico-legal] N/A

### **Advisory Committees, Review Groups/Study Sections**

2008-2012 Member, Congress of Neurological Surgeons Fellowship Committee  
2011-2012 Member, American Epilepsy Society Treatments Committee-Surgery Workgroup  
2013-2015 Reviewer, NIH/CSR ETTN(10) Small Business Review Panel

### **Professional Societies**

2002-2020 Member, Congress of Neurological Surgeons  
2002-present Member, American Association of Neurological Surgeons  
2007-present Member, American Epilepsy Society  
2009-present Member, American Society for Stereotactic and Functional Neurosurgery  
2012-present Diplomate, American Board of Neurological Surgery

### **Conference Organizer, Session Chair**

2014-present Organizer, Society for Innovative Neuroscience in Neurosurgery Meetings.

**Session Chair** N/A

### **Consultantships/Advisory Boards**

Longeviti, LLC  
NeuroLogic,  
Globus Medical

## **RECOGNITION**

### **Awards, Honors**

1986-1990 Lechner Fellow, undergraduate merit scholarship, Texas A&M University  
1988-1990 Gathright Scholar, undergraduate academic award, Texas A&M University  
1990-1993 National Science Foundation Fellowship, graduate school scholarship (Princeton University),  
National Science Foundation.  
2001 *Phi Beta Kappa*, honors society, Johns Hopkins University School of Medicine  
2001 *Alpha Omega Alpha*, honors society, Johns Hopkins University School of Medicine  
2005 William Gowers Fellowship, training research award, Johns Hopkins University School of Medicine,  
American Epilepsy Society

- 2005-2007 NIH Loan Repayment Program, medical school loan repayment stipend, Johns Hopkins Hospital Epilepsy Research Laboratory), National Institutes of Health.
- 2007 Harvey Cushing Hunterian Research Award, residency research recognition, Johns Hopkins Hospital Department of Neurosurgery.

### Conference Abstracts

1. Jones GL, **Anderson WS**, Calaprice FP, Lowry MM, Young AR. Measurement of the  $\beta$ -asymmetry of  $^{19}\text{Ne}$  as a search for right handed weak currents. *Bull Am Phys Soc* 1993;38:1803.
2. **Anderson WS**, Jones GL, Calaprice FP, Lowry MM, Young AR. A new test of time reversal invariance in  $^{19}\text{Ne}$  beta decay. *Bull Am Phys Soc* 1993;38:1803.
3. Shir Y, **Anderson WS**, Sheth RN, Raja SN, Belzberg AJ, Campbell JN. Soy enriched diets do not suppress hyperalgesia associated with inflammation in rats. Abstracts of the Society for Neuroscience, 30th Annual Meeting, 2000;26: Abstract ID#5799.
4. **Anderson WS**, Sheth RN, Bencherif B, Frost JJ, Campbell JN. Is acute pain modulated by endogenous opioid-mediated inhibition? Abstracts of the Society for Neuroscience, 30th Annual Meeting, 2000;26: Abstract ID#3815.
5. **Anderson WS**, Bergey GK, Kosoff E, Ritzl E, Jallo GI. Implantation of responsive neurostimulators in patients with refractory epilepsy. Abstracts of the Congress of Neurological Surgeons, 2005 Annual Meeting: Oral Poster.
6. **Anderson WS**, Lawson HC, Lenz FA. Selective denervation of the levator scapulae muscle: extension to the Bertrand procedure for spasmodic torticollis. Abstracts of the Congress of Neurological Surgeons (#525), 2006 Annual Meeting: Digital Poster.
7. **Anderson WS**, Kosoff E, Ritzl E, Jallo GI, Bergey GK. Two-year follow-up on a series of five patients with responsive neurostimulation implants for seizure control. Abstracts of the Congress of Neurological Surgeons (#112), 2006 Annual Meeting: Select Abstract.
8. **Anderson WS**, Franaszczuk P, Kudela P, Bergey GK. Neural network simulation of cortical stimulation for seizure control. Abstracts of the American Epilepsy Society, 2006 Annual Meeting. Poster Presentation, #1.088.
9. Kudela P, **Anderson WS**, Franaszczuk PJ, Bergey GK. Mechanism of recurrent neuronal bursting resulting from short-term synaptic depression. Abstracts of the American Epilepsy Society, 2006 Annual Meeting. Poster Presentation, #3.051.
10. **Anderson WS**, Kudela P, Bergey GK, Franaszczuk P. Neural network simulation of cortical stimulation for seizure control. Abstracts of the Congress of Neurological Surgeons (#146), 2007 Annual Meeting: Select Abstract.
11. Kudela P, **Anderson WS**, Franaszczuk PJ, Bergey GK. Studies of calcium current dysfunction in network models of epileptiform activity. Abstracts of the American Epilepsy Society, 2007 Annual Meeting. Poster Presentation, #IW.16.
12. **Anderson WS**, Kudela P, Bergey GK, Franaszczuk PJ. Spontaneous seizure onset, termination, and stimulation induced effects in a neural network cortical simulation. Abstracts of the American Epilepsy Society, 2007 Annual Meeting. Poster Presentation #3.152.
13. **Anderson WS**, Kiyofuji S, Conway JE, Busch C, North RB, Garonzik IM. Case of dysphagia and neuropathic facial pain treated with motor cortex stimulation. Abstracts of the North American Neuromodulation Society, 2008 Annual Meeting. Poster Presentation #2008-A-92-NANS.
14. Kudela P, **Anderson W**, Franaszczuk P, Bergey G. Network models of seizure dynamics: importance of calcium clearance systems. Abstracts of the American Epilepsy Society, 2008 Annual Meeting. Poster Presentation # IW.13 (8616).
15. Sure D, Dunn I, **Anderson WS**. Intracerebral hemorrhage secondary to thrombocytopenia in a patient treated with temozolomide. Abstracts of the Joint Meeting of the Society for Neuro-Oncology and the AANS/CNS Section on Tumors, 2009. Poster Presentation #563.
16. Azhar F, **Anderson WS**. The development of an intracranial, interictal spike event detection algorithm. CIMIT Innovation Congress 2009: Poster Competition. Boston, MA. October 28, 2009.
17. Azhar F, Kudela P, Franaszczuk P, **Anderson WS**. Epileptic seizures from abnormal neural networks: Impact on the existence of a preictal period and seizure predictability. Abstracts of the American Epilepsy Society, 2009 Annual Meeting. Poster Presentation # 3.148.
18. Kudela P, **Anderson WS**, Bergey G, Franaszczuk P. Simulations of epileptiform activity in neural network models of focal cortical pathology. *Epilepsia* 2009;50 (S11):36.

19. Donoghue JA, Truccolo W, Hochberg LR, Eskandar EN, **Anderson WS**, Madsen JR, Halgren E, Cash SS. Heterogeneous single-unit spiking patterns during focal seizures in patients with intractable epilepsy. Program No. 150.25/I38. 2010 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2010. Online.
20. Azhar F, Franaszczuk P, **Anderson WS**. Predicting Cortical Neuron Spike Patterns: Point Process Modeling of an Epilepsy Computational Simulation. Abstracts of the American Epilepsy Society, 2010 Annual Meeting. Poster Presentation # 1.048.
21. Azhar F, Vendrame M, Loddenkemper T, Reinsberger C, Parkerson KA, **Anderson WS**. Intracranial Interictal Spike Detection: Use of a Novel Wavelet Based Detection Scheme. Abstracts of the American Epilepsy Society, 2010 Annual Meeting. Poster Presentation # 1.110.
22. Chen LL, Madhavan R, Rapoport BI, **Anderson WS**. A method for real-time cortical oscillation detection and phase-locked stimulation. Abstracts of the 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EBMC '11). Abstract # 2019. Boston, MA: 2011.
23. Madhavan R, Millman D, Madsen JR, Golby AJ, Kreiman G, **Anderson WS**. Temporal theta oscillation enhancement predicts successful memory encoding. Abstracts of the American Epilepsy Society, 2011 Annual Meeting. Poster Presentation # 1.035.
24. Azhar F, Vendrame M, Loddenkemper T, Reinsberger C, Parkerson KA, **Anderson WS**. Intracranial interictal spike detection using pattern adapted wavelet methods. Abstracts of the American Epilepsy Society, 2011 Annual Meeting. Poster Presentation # 2.125.
25. Madhavan R, Millman D, Madsen JR, Golby AJ, **Anderson WS**, Kreiman G. Temporal theta oscillation enhancement predicts successful memory encoding. Program No. 45.19.L7. 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2011. Online.
26. Dehghani N, Peyrache A, Eskandar E, Madsen J, **Anderson W**, Donoghue J, Halgren E, Destexhe A, Cash S. Relationship between excitatory and inhibitory neuronal activity and local field potentials during human sleep. Program No. 451.05.K11. 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2011. Online.
27. Peyrache A, Dehghani N, Eskandar E, Madsen J, **Anderson W**, Donoghue J, Halgren E, Cash SS, Destexhe A. Spatio-temporal dynamics of neocortical excitation and inhibition during human sleep. Program No. 451.06.K12. 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2011. Online.
28. Lewis L, Weiner V, Mukamel E, Donoghue J, Eskandar E, Madsen J, **Anderson W**, Hochberg L, Cash S, Brown EN. Human cortical neurons form functionally isolated networks during propofol-induced unconsciousness. Computational and Systems Neuroscience 2012. Abstract #469.
29. Subramanian S, Hao S, Santaniello S, Burns S, Jouny C, Bergey G, **Anderson S**, Sarma SV. Identifying signatures of epileptogenic zone using network centrality. Abstracts of the 34th Annual IEEE EMBS Conf, San Diego, CA. 2012.
30. Ahmed O, Truccolo W, Eskandar E, Madsen J, **Anderson W**, Cosgrove G, Potter N, Blum A, Hochberg L, Cash S. Human inhibitory single neurons switch off before dramatic increases in seizure amplitude. Abstracts of the American Epilepsy Society, 2012 Annual Meeting. Poster Presentation # 1.034.
31. Madhavan R, Madsen J, Eskandar E, Cash S, Kreiman G, **Anderson W**. Slow oscillations in the mesial temporal lobe predict successful short-term recall in a working memory task. Abstracts of the American Epilepsy Society, 2012 Annual Meeting. Poster Presentation # 1.078.
32. **Anderson W**, Bergey G, Franaszczuk P. Multicompartment computational model of laminar neocortex exhibiting epileptiform spiral waves. Abstracts of the American Epilepsy Society, 2012 Annual Meeting. Poster Presentation # 2.041.
33. Madhavan R, Tang H, Millman D, Crone N, Madsen J, **Anderson WS**, Kreiman G. Gamma band activity in the human parahippocampal gyrus predicts performance in a sequence task. Computational and Systems Neuroscience 2013. Abstract #139.
34. Sarma S, Burns S, Santaniello S, **Anderson WS**. State dynamics of the epileptic brain and the influence of seizure focus paper type. Computational and Systems Neuroscience 2013. Abstract #24.
35. Basu I, **Anderson W**. Study of seizure onset and propagation using intracranial EEG recorded using micro-electrodes. Abstracts of the American Epilepsy Society, 2013 Annual Meeting. Poster Presentation # 1.047.
36. McMullen D, Hotson G, Fifer M, Kaytal K, Wester B, Johannes M, McGee T, Harris A, Ravitz A, **Anderson WS**, Thakor N, Crone N. Demonstration of a semi-autonomous hybrid brain-machine interface using human intracranial EEG, eye tracking, and computer vision to control a robotic upper limb prosthetic. 6th International Brain-Computer Interface Conference, Graz, Austria. Sept. 18, 2014.
37. Basu I, **Anderson W**. Seizure propagation across microdomains in epileptic patients undergoing intracranial monitoring. Abstracts of the American Epilepsy Society, 2014 Annual Meeting. Poster Presentation # 1.064.

38. Groomes L, Madhavan R, **Anderson WS**, Kreiman G. Cognitive consequences of interictal spikes. Abstracts of the American Epilepsy Society, 2014 Annual Meeting. Poster Presentation # 2.025.
39. Santaniello S, Burns SP, **Anderson WS**, Sarma S. Brain state dynamics and the role of the epileptogenic zone. Abstracts of the American Epilepsy Society, 2014 Annual Meeting. Poster Presentation # 2.025.
40. Benz HL, Guo M, Milsap G, Boatman-Reich D, **Anderson WS**, Thakor NV, Crone NE. Multi-scale connectivity dynamics of human speech production. IEEE Eng in Med and Biol Soc, 37th Annual Mtg. Milano, Aug., 2015.
41. Eliades SJ, Korzeniewska A, **Anderson WS**, Ramadoss D, Sanders L, Crone NE, Boatman-Reich D. Attention modulates single-trial adaptation of human high-frequency cortical auditory responses. Abstracts of the American Epilepsy Society, 2014 Annual Meeting. Abstract 5634.
42. Kudela P, **Anderson WS**. A Realistic Computer Model of Cortical Stimulation. 2014 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2014. Online.
43. Tang H, Yu H-Y, Chou C-C, Madsen J, **Anderson WS**, Kreiman G. Dynamics of Human Anterior Cingulate Cortex Responses during Cognitive Control. 2014 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2014. Online.
44. Sacré P, **Anderson W**, Sarma S. Towards understanding mechanisms of pain transmission: A systems theoretic approach. Computational and Systems Neuroscience Meeting, 2014. Abstract ID 447.
45. Lyketsos CG, Smith G, Fosdick L, Leoutsakos J-M, Munro C, Oh E, Drake K, Rosenberg PB, **Anderson WS**, Salloway S, Pendergrass C, Burke A, Wolk DA, Tang-Wai DF, Ponce FA, Asaad WF, Sabbagh M, Okun MS, Baltuch G, Foote KD, Targum SD, Lozano AM. Deep brain stimulation targeting the fornix for mild Alzheimer's disease: Initial results of the ADvance randomized controlled trial. Alzheimer's Association International Conference, Platform Presentation, Washington, D.C., 2015.
46. Boothe DL, Yu AB, Kudela P, Vettel JM, **Anderson WS**, Franaszczuk PJ. Impact of blast-dependent cellular damage on the local field potential (LFP) in a large scale simulation of the cortex. 2015 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2015. Online.
47. Sacré P, Guan Y, **Anderson WS**, Sarma SV. Modulation of pain transmission in the dorsal horn circuit: From ionic channels to capabilities of information transfer. 2015 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2015. Online.
48. Sacré P, Sarma SV, Guan Y, **Anderson WS**. Electrical neurostimulation for chronic pain: On selective relay of sensory neural activities in myelinated nerve fibers. IEEE Eng in Med and Biol Soc, 37th Annual Mtg. Milano, Aug., 2015.
49. Lyketsos CG, Smith G, Fosdick L, Leoutsakos J-M, Munro C, Oh E, Drake K, Rosenberg PB, **Anderson WS**, Salloway S, Pendergrass C, Burke A, Wolk DA, Tang-Wai DF, Ponce FA, Asaad WF, Sabbagh M, Okun MS, Baltuch G, Foote KD, Targum SD, Lozano AM. Deep brain stimulation targeting the fornix for mild Alzheimer's disease: Initial results of the ADvance randomized controlled trial. Clinical Trials on Alzheimer's Disease (CTAD), Platform Presentation, Barcelona, Spain, Nov 5-7, 2015.
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51. Chien J-H, Lenz FA, Schmid A-C, Kim J-H, Cheng DT, **Anderson WS**, Liu C-C. Contextual fear conditioning in humans using painful laser. 2015 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2015. Online.
52. Salimpour Y, **Anderson WS**. Transcranial direct current stimulation on deeply stimulated brain: A computational approach. Neuromodulation 2015, New York City. Brain Stim 2017; doi: 10.1016/j.brs.2016.11.048.
53. Beeman D, Kudela P, Boatman-Reich D, **Anderson W**. Understanding adaptation in human auditory cortex with modeling. BMC Neuroscience 2017, **18**(Suppl 1):P5.
54. Beeman D, Kudela P, Boatman-Reich D, **Anderson W**. Effects of short term synaptic plasticity on stimulus specific adaptation in auditory cortex: A modeling study. 2017 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2017. Online.
55. Salimpour Y, Mills KA, **Anderson WS**. Investigating possible mechanisms of action of transcranial electric stimulation in Parkinson's disease. 2017 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2017. Online.
56. Salimpour Y, Mills KA, **Anderson WS**. Dynamic monitoring of phase-amplitude coupling for phase-dependent stimulation. 2017 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2017. Online.
57. Sheth NM, Jacobson MW, Zbijewski W, Kleinszig G, Vogt S, **Anderson WS**, Weiss C, Osgood G, Siewerdsen JH. Imaging performance of CMOS and a-Si:H flat-panel detectors for C-arm fluoroscopy and cone-beam CT. SPIE Medical Imaging 2018.

58. Alexandre M, Luan S, Mari Z, **Anderson WS**, Salimpour Y, Constandinou TG, Grand LB. Embedded phase-amplitude coupling based closed-loop platform for Parkinson's disease. Biomedical Circuits and Systems Conf 2018.
59. Santiago G, Huang J, Bergey G, Liu S, Armand M, Brem H, **Anderson W**, Gordon C. 18-month outcome report for first-in-human neuromodulation device integrated within customized cranial implant. Paris, France: ISCFS 2019.
60. Strikwerda A, Sleasman T, Awadallah R, **Anderson WS**. Analysis and design of near-field plates in the presence of dielectric media. IEEE Inter Symp Antennas and Propagation 2019.
61. Nickl R, Thomas T, Thompson M, Anaya M, Candrea D, Fifer MS, McMullen D, Pohlmeier E, Tenore F, Wester B, **Anderson WS**, Crone N, Cantarero G, Celnik P. Modulation of M1 and S1 neurons to action observation, imagery, and execution for brain-machine interface training: Evidence from intracortical recordings. 2019 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2019. Online.
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63. Fifer MS, Thomas TM, Nickl R, Candrea DN, McMullen DP, Pohlmeier EA, Osborn LE, Thompson MC, Anaya M, Bensmaia SJ, Schellekens W, Ramsey NF, **Anderson WS**, Wester BA, Crone NE, Celnik P, Cantarero GL, Tenore FV. Intracortical microstimulation of bilateral human finger areas of S1 enabled by MRI, fMRI, and intra-operative ECoG mapping. 2019 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2019. Online.
64. Xiao Y, Yu H-Y, Chou C-C, Shih Y-C, Madsen JR, Reucroft I, Crone NE, **Anderson WS**, Kreiman G. Task invariant and task dependent neural processes of conflict resolution during cognitive control. 2019 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2019. Online.
65. Salimpour Y, Mills KA, **Anderson WS**. Phase-dependent electrical stimulation modulates cross-frequency coupling in Parkinson's disease. 2019 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2019. Online.
66. Kamiński J, Chandravadia N, Schjetnan AG, Salimpour Y, Reucroft I, Reed C, Chung JM, **Anderson W**, Valiante T, Mamelak AN, Rutishauser U. Persistent single-neuron activity during working memory predicts strength of long-term memory in humans. 2019 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2019. Online.
67. Mitchell K-A, **Anderson WS**, Shay T, Huang J, Luciano M, Suarez JI, Manson P, Brem H, Gordon C. First in-human experience: Integration of a wireless intracranial pressure monitoring device within a customized cranial implant. Chicago, IL: 2019 American Assoc Plas Surg, 99th Ann Mtg.
68. Kamiński J, Chandravadia N, Schjetnan AG, Salimpour Y, Reucroft IM, Reed C, Chung JM, Kalia S, **Anderson W**, Valiante TA, Mamelak AN, Rutishauser U. Activity of category-selective neurons during Working Memory maintenance predicts strength of Long-Term Memory in humans. The 6th Annual BRAIN Initiative Investigators Meeting, Washington DC, June 1-2, 2020.
69. Salimpour Y, Rutishauser U, **Anderson WS**. Phase-Amplitude Coupling in Human Hippocampus Correlates with Working Memory Performance. The 6th Annual BRAIN Initiative Investigators Meeting, Washington DC, June 1-2, 2020.
70. Salimpour Y, Rutishauser U, **Anderson WS**. Phase-amplitude Coupling Modulation in Human Hippocampus: A Phase-Dependent Stimulation Approach. The 6th Annual BRAIN Initiative Investigators Meeting, Washington DC, June 1-2, 2020.
71. Ketcha MD, Jones CK, Wu P, Han R, Uneri A, Lee AJ, Luciano M, **Anderson WS**, Siewerdsen JH. Deformable registration of MRI to cone-beam CT for neuro-endoscopic surgery: Initialization with MR-CT synthesis. RSNA Annual Meeting, 2020.
72. Wu P, Sisniega A, Uneri A, Ketcha M, Jones CK, Zhang X, Vagdargi P, Luciano M, **Anderson WS**, Siewerdsen JH. An accelerated artifacts correction pipeline for high-quality intraoperative cone-beam CT in neuro-navigation. RSNA Annual Meeting, 2020. (Accepted, Poster PH-1A-48)
73. Vagdargi P, Uneri A, Jones CK, Wu P, Han R, Luciano M, **Anderson WS**, Hager GD, Siewerdsen JH. Robot-assisted ventriculoscopic 3D reconstruction for guidance of deep-brain stimulation surgery. SPIE 2021 Medical Imaging, San Diego, CA.
74. Uneri A, Wu P, Jones CK, Ketcha MD, Vagdargi P, Han R, Helm PA, Luciano M, **Anderson WS**, Siewerdsen JH. Data-driven deformable 3D-2D registration for guiding neuroelectrode placement in deep brain stimulation. SPIE Medical Imaging 2021, MI104-88.
75. Kamiński J, Chandravadia N, Schjetnan AG, Salimpour Y, Reucroft IM, Reed C, Chung JM, Kalia S, **Anderson W**, Valiante TA, Mamelak AN, Rutishauser. Common neural substrate for Working Memory maintenance and Long-

Term Memory formation in humans. 2020 Neuroscience Meeting Planner. SFN Global Connectome: Society for Neuroscience, 2021. Online.

76. Wu P, Sisniega A, Uneri A, Han R, Jones CK, Vagdargi P, Zhang X, Luciano M, **Anderson WS**, Siewerdsen JH. "Using Uncertainty in Deep Learning Reconstruction for Cone-Beam CT of the Brain". Fully3D 2021, ID:186.

77. Nickl R, Anaya M, Thomas T, Fifer M, McMullen D, Thompson M, Candrea D, Osborn L, **Anderson W**, Wester B, Tenore F, Crone N, Celnik P, Cantarero G. Characteristics and stability of sensorimotor activity driven by isolated muscle activations in a human with incomplete tetraplegia – Blitz Talk. Neural Control of Movement Abstracts, NCM 30<sup>th</sup> Annual Mtg, 2021.

78. Kim MJ, Hwang BY, Mampre D, Negoita S, Tsehay Y, Kang JY, **Anderson WS**. Apparent Diffusion Coefficient As a Novel Radiographic Predictor of Seizure Outcome after Laser Interstitial Thermal Therapy for Mesial Temporal Lobe Epilepsy. 34th International Epilepsy Congress, 2021. Online. Accepted for Poster Presentation.

79. Han R, Jones CK, Wu P, Vagdargi P, Zhang X, Uneri A, Lee J, Luciano M, **Anderson WS**, Helm PA, Siewerdsen JH. Deformable registration of MRI to intraoperative cone-beam CT of the brain using a joint synthesis and registration network. SPIE Medical Imaging, 2022.

80. Han R, Jones CK, Wu P, Vagdargi P, Zhang X, Uneri A, Lee J, Luciano M, **Anderson WS**, Helm PA, Siewerdsen JH. Deformable Registration of MRI to Intraoperative Cone-Beam CT of the Brain Using a Joint Synthesis and Registration Network. SPIE Medical Imaging, 2022. SPIE Medical Imaging 2022, MI104-12034.

81. Butz I, Fernandez M, Uneri A, Theodore N, **Anderson WS**, Siewerdsen JH. A system for streamlined quality assurance of surgical trackers. Comp-Asst Rad & Surg (CARS) 2022.

82. Zhang X, Wu P, Zbijewski WB, Sisniega A, Han R, Jones CK, Vagdargi P, Uneri A, Helm PA, **Anderson WS**, Siewerdsen JH. DL-Recon: Combining 3D deep learning image synthesis and model uncertainty with physics-based image reconstruction. CT Meeting 2022.

83. Kim MJ, Shi Y, Salimpour Y, **Anderson WS**, Mills KA. Anatomical substrates for motor subcomponents of bradykinesia in Parkinson's disease after subthalamic nucleus deep brain stimulation. International Congress of Parkinson's Disease and Movement Disorders. 2022. Accepted for Abstract & Poster presentation. Madrid, Spain.

84. Daume J, Salimpour Y, Schjetnan AG, Salimpour Y, **Anderson W**, Valiante TA, Mamelak AN, Rutishauser U. A single cell correlate of theta-gamma amplitude coupling during working memory in the human hippocampus. 2022 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2022. Online.

85. Yebra M, Schjetan GP, Govindarajan LN, Mosher C, Salimpour Y, Valiante TA, Kalia S, **Anderson W**, Mamelak A, Rutishauser U. Evidence accumulation by single units in the human Medial Temporal Lobe (MTL) during memory-based decisions. 2022 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2022. Online.

86. Kim M, Salimpour Y, Kudela P, **Anderson WS**, Mills KA. In silico phase-targeted stimulation effect in the subthalamic nucleus on neurophysiology of Parkinson's disease. 2022 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2022. Online.

87. Vagdargi P, Uneri A, Jones CK, Zhang X, Wu P, Han R, Sisniega A, Lee J, Helm PA, Luciano M, **Anderson WS**, Hager GD, Siewerdsen JH. Real-Time 3D neuroendoscopic guidance using SLAM: First clinical studies SPIE Medical Imaging, 2023 (submitted).

## Invited Talks

### JHMI/Regional

1/29/08 Spontaneous seizure onset, termination, and stimulation induced effects in a neural network cortical simulation. Neurology Grand Rounds. National Institutes of Health, Bethesda, MD.

2/19/09 Neural Network Cortical Simulations-Studying Stimulation and Intrinsic Bursting Properties. Epilepsy Research Seminar, Division of Epilepsy & Clinical Neurophysiology, Children's Hospital, Boston, MA.

4/14/09 Spinal Cord Stimulation Restores Locomotion in Animal Models of Parkinson's Disease, Journal Club Discussion. Harvard NeuroDiscovery Center. Boston, MA.

9/9/10 The Surgical Treatment of Movement Disorders. Neurosurgery Grand Rounds, Brigham and Women's Hospital, Boston MA.

10/7/09 The Surgical Treatment of Movement Disorders. Harvard Medical School, Integrative Mind-Brain Medicine Lecture Series. Brigham and Women's Hospital, Boston, MA.

4/7/10 The Surgical Treatment of Epilepsy. Harvard Medical School, Integrative Mind-Brain Medicine Lecture Series. Brigham and Women's Hospital, Boston, MA.

7/7/10 The Surgical Treatment of Epilepsy. Harvard Medical School, Integrative Mind-Brain Medicine Lecture Series. Brigham and Women's Hospital, Boston, MA.

9/9/10 The Surgical Treatment of Movement Disorders. Neurosurgery Grand Rounds, Department of Neurosurgery, Brigham and Women's Hospital, Boston, MA.

- 9/16/10 Hayes M, Anderson WS. Deep Brain Stimulation for Movement Disorders. Hospital Grand Rounds, South Shore Hospital, Weymouth, MA.
- 3/31/11 Neuroscience Buffet: Subcortical Recordings During Motor Imagery & Theta Phase-Specific Stimulation. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds. Baltimore, MD.
- 6/7/11 The Computational Modeling of Epilepsy and Cortical Stimulation. Johns Hopkins Hospital, Divisions of Neuroscience Critical Care and Neuroanesthesiology, Weekly Conference. Johns Hopkins Hospital, Baltimore, MD.
- 7/14/11 Resident Education Lecture: The Anterior Temporal Lobectomy. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds. Baltimore, MD.
- 11/12/11 Deep brain stimulation surgery. Johns Hopkins Medicine Symposium on Parkinson's Disease & Your Health. Martinsburg, WV.
- 11/21/11 The Computational Modeling of Seizures. Johns Hopkins University School of Medicine, Department of Neurology, Clinical Neuroscience Seminar.
- 4/12/12 A review of deep brain stimulation for Parkinson's Disease, Part I. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds.
- 5/3/12 A review of deep brain stimulation for Parkinson's Disease, Part II. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds.
- 6/5/12 DBS for essential tremor: Frameless and iMRI options. International Essential Tremor Foundation: Patient Educational Seminar. Sheraton Baltimore North, Towson, MD.
- 9/24/12 Clinical and therapeutic implications of cortical neural network modeling. Institute for Computational Medicine & Institute for Clinical and Translational Research – Symposium on Computational Medicine. Johns Hopkins Hospital.
- 6/12/13 Clinical and therapeutic implications of cortical neural network modeling. Johns Hopkins University Brain Science Institute Computational Neuroscience Working Group.
- 8/15/13 Update on new deep brain stimulation studies. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds.
- 8/20/13 Clinical and therapeutic implications of cortical neural network modeling. US Army Research Laboratory. Aberdeen Proving Grounds, MD.
- 10/1/13 Clinical and therapeutic implications of cortical neural network modeling. The Institute for Computational Medicine Distinguished Seminar Series. Johns Hopkins University.
- 5/13/14 Clinical and Therapeutic Implications of Cortical Computational Modeling. University of California at Davis, School of Medicine, Department of Neurosurgery, Grand Rounds.
- 7/25/14 Spinal Cord Stimulation Pearls, and the Failure Modes of the Baclofen Pump. CME Activity: Update in Functional Neurosurgery – 1<sup>st</sup> Meeting of the Migratory Functional Neurosurgery Society. Johns Hopkins Hospital.
- 11/1/14 Update in Functional Neurosurgery. CME Activity: Neurosurgery Updates Symposium. Suburban Hospital, Bethesda, MD.
- 11/6/14 The Anterior Temporal Lobectomy. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds.
- 11/14/14 Clinical and Therapeutic Implications of Cortical Computational Modeling. 2nd Human Single Neuron Conference, Johns Hopkins Hospital.
- 2/25/15 Computational Modeling of Epileptic Activity. The Inaugural Indo-US Translational Neuroscience Symposium: Biomarker Discovery and Validation, Johns Hopkins Hospital.
- 3/12/15 Computational Studies of Human Cortex. Combined Neurology Neurosurgery Grand Rounds, Georgetown University Hospital.
- 10/11/16 Computational modeling of cortex. NCCU Seminar Series, Johns Hopkins University School of Medicine, Baltimore, MD.
- 2/2/17 Applied Computational Modeling in Neurosurgery. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds.
- 12/14/17 Development of Phase-Dependent Stimulation Techniques. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds.
- 4/13/18 Deep Brain Stimulation for Parkinson's Disease. Neurosurgery Grand Rounds. Johns Hopkins Hospital, Baltimore, MD.
- 11/3/18 Neurostimulation for Epilepsy. 4th Annual Selected Topics in Craniomaxillofacial Surgery: Johns Hopkins University School of Medicine, Baltimore, MD.



- 2/14/19 Applied Computational Modeling in Neurosurgery. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds.
- 5/15/20 Computational Modeling of Applied Electric Fields in the Brain. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds. Baltimore, MD.
- 11/5/20 Development of Phase-Dependent Stimulation Techniques. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds. Baltimore, MD.
- 3/17/22 Computational Modeling of Applied Cortical Stimulation. Johns Hopkins Hospital, Neurosurgery Grand Rounds.
- 7/14/22 Development of a Phase Dependent Stimulation Technique. Johns Hopkins Hospital, Neurosurgery Grand Rounds.

#### National

- 2/7/08 Neural network studies of seizure dynamics and cortical stimulation. Neurosurgery Grand Rounds, Brigham and Women's Hospital, Boston MA.
- 12/6/08 Neural Network cortical simulations – Studying stimulation and intrinsic bursting properties. Special Interest Group on Engineering and Epilepsy. American Epilepsy Society Annual Meeting, Seattle, WA.
- 1/27/10 The Computational Modeling of Epilepsy and Cortical Stimulation. University of Chicago School of Medicine, Department of Neurosurgery, Grand Rounds. Chicago, IL.
- 4/15/10 The Computational Modeling of Epilepsy and Cortical Stimulation. Johns Hopkins University School of Medicine, Department of Neurosurgery, Grand Rounds. Baltimore, MD.
- 2/0/13 Computational modeling of the brain: exploring epilepsy and its treatment. Neuroscience Academic Conference, Neurology Grand Rounds. Winthrop-University Hospital, Mineola, New York.
- 7/17/15 DBS Clinical Trials: Johns Hopkins Experience. CME Activity: Neuroscience Updates in Functional Neurosurgery – 2nd Meeting of the Migratory Functional Neurosurgery Society. University of Pittsburgh Medical Center, Pittsburgh, PA.
- 2/29/16 Modeling techniques for studies of brain oscillations. Cosyne Workshop: Biophysical principles of brain oscillations and their meaning for information processing. Snowbird UT.
- 7/16/16 Computational modeling of neocortex. 3<sup>rd</sup> Annual Migratory Functional Neurosurgery Meeting, Columbia University Medical Center, New York, NY.
- 8/25/17 Development of Phase-Dependent Stimulation Techniques. 4th Annual Functional Neurosurgery Meeting, Brown Alpert Medical School, Providence, RI.
- 11/4/17 Neurostimulation for Epilepsy. 3rd Annual Selected Topics in Craniomaxillofacial Surgery: Shriners Hospital for Children, Boston, MA.
- 8/3/18 Applied Computational Modeling in Functional Neurosurgery. 5th Annual Society for Innovative Neuroscience in Neurosurgery Meeting, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA.
- 5/9/19 Development of Phase-Dependent Stimulation Techniques. Univ. of California Davis Symposium: Functional significance of oscillatory brain activity and Closed-loop stimulation”, Davis, CA.
- 9/13/19 Development of Phase-Dependent Stimulation Techniques. 5<sup>th</sup> Annual Meeting of the Society for Innovative Neuroscience in Neurosurgery. Yale University School of Medicine, New Haven, CT.
- 11/2/19 Cranioplasty techniques in the context of functional neurosurgery. 5th Annual Selected Topics in Craniomaxillofacial Surgery: Harvard University School of Medicine, Boston, MA.
- 11/16/19 Treatment strategies in epilepsy and surgical management of epilepsy. DHR Health Neuroscience in Clinical Practice: 2019 Update: Edinburg Conf Cent at Renaissance, Edinburg, TX.
- 11/16/19 Parkinson's disease surgical approach: Surgical management of movement disorders. DHR Health Neuroscience in Clinical Practice: 2019 Update: Edinburg Conf Cent at Renaissance, Edinburg, TX.
- 9/17/21 Development of Phase-Dependent Stimulation Techniques. 6th Annual Meeting of the Society for Innovative Neuroscience in Neurosurgery. SUNY Stony Brook, Stony Brook, NY.
- 12/11/21 Neuroplastics Techniques in the Context of Functional Neurosurgery. 1st Annual South Florida Neuroplastic and Reconstructive Surgery Course. MARC Center, Miami, FL.
- 7/14/22 Development of a Phase Dependent Stimulation Technique. Montefiore/Albert Einstein College of Medicine, Neurosurgery Grand Rounds.

## International

- 1993 Anderson WS, Calaprice FP, Jones GL, Lowry MM, Young AR. A new test of time reversal invariance in  $^{19}\text{Ne}$  beta decay. Workshop on Symmetry Tests in Semi-Leptonic and Leptonic Weak Interactions, Louvain-la-Neuve, Belgium.
- 2007 The computer as a tool in understanding the brain. *Congreso Neurociencias*, Hospital Metropolitano, Quito, Ecuador. Presentations also included: Neurosurgical treatment of spasmodic torticollis, Deep brain stimulation in Parkinson's disease, and Neurostimulation in epilepsy.
- 10/8/16 iMRIS in Functional Neurosurgery: Stereotactic Laser Ablation and DBS Lead Placement Techniques. 11<sup>th</sup> International MRI Symposium, Baltimore, MD.
- 11/5/16 Cranioplasty techniques in the context of functional neurosurgery. 2<sup>nd</sup> International Cranioplasty Symposium, Johns Hopkins School of Medicine, Baltimore, MD.
- 11/10/16 Applied computational modeling of neocortex. 3<sup>rd</sup> International Meeting on Human Single Neuron Recordings. California Institute of Technology, Pasadena, CA.
- 9/16/19 Cranioplasty techniques in the context of functional neurosurgery. 18<sup>th</sup> Congress of International Soc of Craniofacial Surgery. Paris, France.
- 11/5/21 Phase-dependent neuromodulation technology. SBMT 8<sup>th</sup> Annual G20 Conf (Virtual). Rome, Italy.