CAMERON C. MCINTYRE

Duke University
Hudson Hall, Room 135
Durham, NC 27708

7204 Summer Tanager Trail
Raleigh, NC 27614
cell - (216) 288-0487

e-mail – cameron.mcintyre@duke.edu

CAREER HIGHLIGHTS

- Principal Investigator on >$22M in NIH funding, including 12 different R-level research awards.
- Author of >125 journal papers and >40 US patents, cited >21,000 times, with an h-index of 74.
- Co-Founder of 4 successful neurotechnology companies, and IP contributor to 3 others.
- Invention and translation of the GUIDE deep brain stimulation clinical software system.
- Scientific mentor of 9 academic professors and 7 neuromodulation industry leaders.

EDUCATION

BS - Biomedical Engineering	Case Western Reserve University, MAY 1997 Concentration: Biomechanical Prosthetic Systems
PhD - Biomedical Engineering	Case Western Reserve University, AUG 2001 Concentration: Neural Engineering Thesis: Model-Based Design of CNS Neuroprosthetic Interfaces Advisor: Warren M. Grill, PhD

CURRENT ACADEMIC POSITION

Professor
Department of Biomedical Engineering
Department of Neurosurgery
Duke University

ACADEMIC EXPERIENCE

AUG 2001 - AUG 2002	Whitaker Foundation Distinguished Post-Doctoral Fellow Johns Hopkins University School of Medicine Department of Biomedical Engineering Advisor: Nitish V. Thakor, PhD
SEPT 2002 - AUG 2003	Post-Doctoral Fellow Emory University School of Medicine Department of Neurology Advisor: Jerrold L. Vitek, MD, PhD
SEPT 2003 - SEPT 2007	Assistant Staff
OCT 2007 - DEC 2012	Associate Staff
MAY 2011 - DEC 2012	Accelerating Neuromodulation Endowed Chair Cleveland Clinic Foundation, Lerner Research Institute Department of Biomedical Engineering
JAN 2013 - JUNE 2015	Associate Professor (with tenure)
JAN 2013 - JUNE 2021	Tilles-Weidenthal Endowed Chair
JULY 2015 - JUNE 2021	Professor (with tenure) Case Western Reserve University, School of Medicine Department of Biomedical Engineering
JULY 2021 - present	Professor (with tenure) Duke University Department of Biomedical Engineering, School of Engineering (50% appointment) Department of Neurosurgery, School of Medicine (50% appointment)

COMMERCIALIZATION EXPERIENCE

Co-Founder of **IntElect Medical**, Inc. IntElect received over $21M in financing from the State of Ohio, Greatbatch Inc., and Boston Scientific Corp. IntElect was **purchased by Boston Scientific Neuromodulation in JAN 2011 in a deal totaling $78M**, which generated over **$28M in revenue** for the Cleveland Clinic Foundation. The technology primarily responsible for that transaction was the clinical deep brain stimulation (DBS) programming system (GUIDE) invented by the **McIntyre Laboratory**. GUIDE DBS was a Gold Award Winner in the 2014 Medical Design Excellence Awards.

Co-Founder of **Surgical Information Sciences**, Inc. SIS is a neuroimaging company, partnered with the University of Minnesota, focused on integrating high-field MRI technology into clinical applications for neurosurgical planning and neuromodulation device delivery. SIS raised >$3M in Series A funding in 2019 and has FDA approval for patient-specific STN & GPi localization.

Co-Founder of **Hologram Consultants**, Inc. Hologram Consultants is a software development firm and content provider, partnered with CWRU, focused on enabling group-based holographic visualization experiences in the neuromodulation and neurosurgery fields.

Co-Founder of **BrainDynamics**, Inc. BrainDynamics is a brain imaging and visualization company, partnered with the University of Texas and CWRU, focused on providing novel software solutions for the planning and analysis of stereotactic neurosurgical procedures for the treatment of epilepsy.

Co-Inventor of high frequency electrical nerve block technology that is the basis for CWRU spin-off company **Neuros Medical**, Inc. (neurosmedical.com). Neuros has raised over $30M in financing, completed successful clinical feasibilities studies, and currently directing a pivotal study for FDA approval of their Altius implantable stimulation device.

Co-Inventor of software tools for measuring neurological function that are the basis for CCF spin-off companies **Qr8 Health**, Inc. (qr8health.com) and **Ceraxis Health**, Inc. (ceraxishealth.com). They are digital health companies pioneering the use of patient self-administered, clinically-validated, digital outcome assessment tools for the measurement of neurological and motor function.

AWARDS AND HONORS

1994-97	Case Alumni Association Scholarship, CWRU
1997	Michelson-Morley Undergraduate Research Award, CWRU
1999	Graduate Dean's Instructional Excellence Award, CWRU
2010	Neurotechnology Researcher of the Year, Neurotech Reports
2010	Early Career Innovation Award, CCF
2011	Accelerating Neuromodulation Endowed Chair, CCF
2013	Tilles-Weidenthal Endowed Chair, CWRU
2016	American Institute for Medical and Biological Engineering (AIMBE) College of Fellows
2020	Javits Neuroscience Investigator Award, National Institute of Neurological Disorders & Stroke

SCIENTIFIC PUBLICATIONS

Total Citations: >21,000; h-index: 74; i10-index: 156 (as calculated by Google Scholar – May 2023)
* Journal Articles cited ≥100 times: 52
** Journal Articles cited ≥200 times: 26
*** Journal Articles cited ≥300 times: 18
Primary Affiliation: α - CWRU; β - JHU; γ - Emory; δ - CCF; ε - Duke

<u>Peer-Reviewed Journal Papers (126 total)</u>

1. * **McIntyre CC**$^{\alpha}$, Grill WM. Sensitivity analysis of a model of mammalian neural membrane. *Biol Cybern.* 79:29-37, 1998.

2. *** **McIntyre CC**$^{\alpha}$, Grill WM. Excitation of central nervous system neurons by non-uniform electric fields. *Biophys J.* 76:878-888, 1999.

3. *** **McIntyre CC**$^{\alpha}$, Grill WM. Selective microstimulation of central nervous system neurons. *Ann Biomed Eng.* 28:219-233, 2000.

4. ** Richardson AG, **McIntyre CC**[α], Grill WM. Modelling the effects of electric fields on nerve fibers: Influence of the myelin sheath. *Med & Biol Eng Comput.* 38:438-446, 2000.

5. ** **McIntyre CC**[α], Grill WM. Finite element analysis of the current-density and electric field generated by metal microelectrodes. *Ann Biomed Eng.* 29:227-235, 2001.

6. * Grill WM, **McIntyre CC**[α]. Extracellular excitation of central neurons: Implications for the mechanisms of deep brain stimulation. *Thalamus & Related Systems.* 1:269-277, 2001.

7. *** **McIntyre CC**[α], Richardson AG, Grill WM. Modeling the excitability of mammalian nerve fibers: Influence of afterpotentials on the recovery cycle. *J Neurophysiol.* 87:995-1006, 2002.

8. *** **McIntyre CC**[α], Grill WM. Extracellular stimulation of central neurons: Influence of stimulus waveform and frequency on neuronal output. *J Neurophysiol.* 88:1592-1604, 2002.

9. * **McIntyre CC**[β], Thakor NV. Uncovering the mechanisms of deep brain stimulation for Parkinson's disease through functional imaging, neural recording and neural modeling. *Crit Rev Biomed Eng.* 30:249-281, 2002.

10. * Moffitt MA, **McIntyre CC**[γ], Grill WM. Prediction of nerve stimulation thresholds: limitations of linear models. *IEEE Trans Biomed Eng.* 51:229-236, 2004.

11. *** **McIntyre CC**[γ], Mori S, Sherman DL, Thakor NV, Vitek JL. Electric field and stimulating influence generated by deep brain stimulation of the subthalamic nucleus. *Clin Neurophysiol.* 115:589-595, 2004.

12. *** **McIntyre CC**[β], Grill WM, Sherman DL, Thakor NV. Cellular effects of deep brain stimulation: model-based analysis of activation and inhibition. *J Neurophysiol.* 91:1457-1469, 2004.

13. *** **McIntyre CC**[δ], Savasta M, Walter BL, Vitek JL. How does deep brain stimulation work? Present understanding and future questions. *J Clin Neurophysiol.* 21:40-50, 2004.

14. *** **McIntyre CC**[γ], Savasta M, Kerkerian-LeGoff L, Vitek JL. Uncovering the mechanism(s) of action of deep brain stimulation: activation, inhibition, or both. *Clin Neurophysiol.* 115:1239-1248, 2004.

15. * Moffitt MA, **McIntyre CC**[δ]. Model-based analysis of cortical recording with silicon microelectrodes. *Clin Neurophysiol.* 116:2240-2250, 2005.

16. *** Butson CR, **McIntyre CC**[δ]. Tissue and electrode capacitance reduce neural activation volumes during deep brain stimulation. *Clin Neurophysiol.* 116:2490-2500, 2005.

17. *** Butson CR, Maks CB, **McIntyre CC**[δ]. Sources and effects of electrode impedance during deep brain stimulation. *Clin Neurophysiol.* 117:447-454, 2006.

18. *** Butson CR, **McIntyre CC**[δ]. Role of electrode design on the volume of tissue activated during deep brain stimulation. *J Neural Eng.* 3:1-8, 2006.

19. *** Miocinovic S, Parent M, Butson CR, Hahn PJ, Russo GS, Vitek JL, **McIntyre CC**[δ]. Computational analysis of subthalamic nucleus and lenticular fasciculus activation during therapeutic deep brain stimulation. *J Neurophysiol.* 96:1569-1580, 2006.

20. *** Butson CR, Cooper SE, Henderson JM, **McIntyre CC**[δ]. Patient-specific analysis of the volume of tissue activated during deep brain stimulation. *NeuroImage.* 34:661-670, 2007.

21. * Miocinovic S, Noecker AM, Maks CB, Butson CR, **McIntyre CC**[δ]. Cicerone: Deep brain stimulation neurosurgical navigation software system. *Acta Neurochir Suppl*. 97:561-567, 2007.

22. Butson CR, Noecker AM, Maks CB, **McIntyre CC**[δ]. StimExplorer: Deep brain stimulation parameter selection software system. *Acta Neurochir Suppl*. 97:569-574, 2007.

23. * Miocinovic S, Zhang J, Xu W, Russo GS, Vitek JL, **McIntyre CC**[δ]. Stereotactic neurosurgical planning, recording, and visualization for deep brain stimulation of non-human primates. *J Neurosci Methods.* 162:32-41, 2007.

24. * Butson CR, **McIntyre CC**[δ]. Differences among implanted pulse generator waveforms cause variations in the neural response to deep brain stimulation. *Clin Neurophysiol.* 118:1889-1894, 2007.

25. **McIntyre CC** δ, Miocinovic S, Butson CR. Computational analysis of deep brain stimulation. *Expert Rev Med Devices.* 4:615-622, 2007.

26. ** Butson CR, **McIntyre CC** δ. Current steering to control the volume of tissue activated during deep brain stimulation. *Brain Stimul*. 1:7-14, 2008. [PMC2621081]

27. * Nair DR, Burgess RC, **McIntyre CC** δ, Luders HO. Chronic subdural electrodes in the management of epilepsy. *Clin Neurophysiol.* 119:11-28, 2008.

28. * Guo Y, Rubin JE, **McIntyre CC** δ, Vitek JL, Terman D. Thalamocortical relay fidelity varies across subthalamic nucleus deep brain stimulation protocols in a data-driven computational model. *J Neurophysiol.* 99:1477-1492, 2008.

29. *** Johnson MD, Miocinovic S, **McIntyre CC** δ, Vitek JL. Mechanisms and targets of deep brain stimulation in movement disorders. *Neurotherapeutics.* 5:294-308, 2008. [PMC2517242]

30. * Hahn PJ, Russo GS, Hashimoto T, Miocinovic S, Xu W, **McIntyre CC** δ, Vitek JL. Pallidal burst activity during therapeutic deep brain stimulation. *Exp Neurol.* 211:243-251, 2008. [PMC2431132]

31. Lujan JL, Chaturvedi A, **McIntyre CC** δ. Tracking the mechanisms of deep brain stimulation for neuropsychiatric disorders. *Front Biosci.* 13:5892-5904, 2008. [PMC2859453]

32. * Johnson MD, **McIntyre CC** δ. Quantifying the neural elements activated and inhibited by globus pallidus deep brain stimulation. *J Neurophysiol.* 100:2549-2563, 2008. [PMC2585404]

33. ** Maks CB, Butson CR, Walter BL, Vitek JL, **McIntyre CC** δ. Deep brain stimulation activation volumes and their association with neurophysiological mapping and therapeutic outcomes. *J Neurol Neurosurg Psychiatry.* 80:659-666, 2009. [PMC2859444]

34. ** Miocinovic S, Lempka SF, Russo GS, Maks CB, Butson CR, Sakaie KE, Vitek JL, **McIntyre CC** δ. Experimental and theoretical characterization of the voltage distribution generated by deep brain stimulation. *Exp Neurol.* 216:166-176, 2009. [PMC2645000]

35. ** Lempka SF, Miocinovic S, Johnson MD, Vitek JL, **McIntyre CC** δ. In vivo impedance spectroscopy of deep brain stimulation electrodes. *J Neural Eng*. 6:046001, 2009. [PMC2861504]

36. Lujan JL, Noecker AM, Butson CR, Cooper SE, Walter BL, Vitek JL, **McIntyre CC** δ. Automated 3-dimensional brain atlas fitting to microelectrode recordings from deep brain stimulation surgeries. *Stereotact Funct Neurosurg.* 87:229-240, 2009. [PMC2836941]

37. Johnson MD, Vitek JL, **McIntyre CC** δ. Pallidal stimulation that improves parkinsonian motor symptoms also modulates neuronal firing patterns in primary motor cortex in the MPTP-treated monkey. *Exp Neurol.* 219:359-362, 2009. [PMC2730829]

38. Alberts JL, Hallahan K, Thota A, Noecker AM, Vitek JL, **McIntyre CC** δ. Reducing cognitive-motor declines associated with bilateral subthalamic deep brain stimulation through computational modelling in a parkinson's disease patient. *J Neurol Neurosurg Psychiatry*. 81:1170-1172, 2010. [PMC3086293]

39. ** Frankemolle AM, Wu J, Noecker AM, Voelcker-Rehage C, Ho JC, Vitek JL, **McIntyre CC** δ, Alberts JL. Reversing cognitive-motor impairments in Parkinson's disease patients using a computational modeling approach to deep brain stimulation programming. *Brain*. 133:746-761, 2010. [PMC2842509]

40. ** Chaturvedi A, Butson CR, Lempka SF, Cooper SE, **McIntyre CC** δ. Patient-specific models of deep brain stimulation: Influcence of field model complexity on neural activation predictions. *Brain Stimul*. 3:65-77, 2010. [PMC2895675]

41. *** **McIntyre CC** δ, Hahn PJ. Network perspectives on the mechanisms of deep brain stimulation. *Neurobiol Dis*. 38:329-337, 2010. [PMC2862840]

42. * Hahn PJ, **McIntyre CC** δ. Modeling shifts in the rate and pattern of subthalamopallidal network activity during deep brain stimulation. *J Comp Neurosci*. 28:425-441, 2010. [PMC2881193]

43. * Lempka SF, Johnson MD, Miocinovic S, Vitek JL, **McIntyre CC** δ. Current-controlled deep brain stimulation reduces in vivo voltage fluctuations observed during voltage-controlled stimulation. *Clin Neurophysiol*. 121:2128-2133, 2010. [PMC2928413]

44. * Foutz TJ, **McIntyre CC** [δ]. Evaluation of novel stimulus waveforms for deep brain stimulation. *J Neural Eng*. 7:066008, 2010. [PMC3018699]

45. * Mikos A, Bowers D, Noecker AM, **McIntyre CC** [δ], Won M, Chaturvedi A, Foote KD, Okun MS. Patient-specific analysis of the relationship between the volume of tissue activated during DBS and verbal fluency. *NeuroImage*. 54(S1):S238-46, 2011. [PMC2908727]

46. Xu W, Miocinovic S, Zhang J, Baker K, **McIntyre CC** [δ], Vitek JL. Dissociation of motor symptoms during deep brain stimulation of the subthalamic nucleus in the region of the internal capsule. *Exp Neurol.* 228(2):294-297, 2011. [PMC3536485]

47. * Butson CR, Cooper SE, Henderson JM, Wolgamuth B, **McIntyre CC** [δ]. Probabilistic analysis of activation volumes generated during deep brain stimulation. *NeuroImage*. 54(3):2096-2104, 2011. [PMC3008334]

48. Lee KH, Hitti FL, Chang SY, Lee DC, Roberts DW, **McIntyre CC** [δ], Leiter JC. High frequency stimulation abolishes thalamic network oscillations: an electrophysiological and computational analysis. *J Neural Eng*. 8(4):046001, 2011. [PMC3155385]

49. Taljan K, **McIntyre CC** [δ], Sakaie KE. Anatomical connectivity between subcortical structures. *Brain Connect*. 1:111-118, 2011. [PMC3621356]

50. * Lehman J, Greenberg BD, **McIntyre CC** [δ], Rasmussen SA, Haber SN. Rules ventral prefrontal cortical axons use to reach their targets: implications for DTI tractography and deep brain stimulation for psychiatric illness. *J Neurosci*. 31(28):10392-10402, 2011. [PMC3445013]

51. * Lempka SF, Johnson MD, Moffitt MA, Otto KJ, Kipke DR, **McIntyre CC** [δ]. Theoretical analysis of intracortical microelectrode recordings. *J Neural Eng*. 8(4):045006, 2011. [PMC3196618]

52. Cooper SE, Noecker AM, Abboud H, Vitek JL, **McIntyre CC** [δ]. Return of bradykinesia after subthalamic stimulation ceases: Relationship to electrode location. *Exp Neurol*. 231(2):207-213, 2011. [PMC3375109]

53. Lujan JL, Chaturvedi A, Malone DA, Rezai AR, Machado AG, **McIntyre CC** [δ]. Axonal pathways linked to therapeutic and non-therapeutic outcomes during psychiatric deep brain stimulation. *Hum Brain Mapp.* 33(4):958-968, 2012. [PMC5032841]

54. * Chaturvedi A, Foutz TJ, **McIntyre CC** [δ]. Current steering to activate targeted neural pathways during deep brain stimulation of the subthalamic region. *Brain Stimul.* 5(3):369-377, 2012. [PMC3360111]

55. Rubin JE, **McIntyre CC** [δ], Turner RS, Wichmann T. Basal ganglia activity patterns in parkinsonism and computational modeling of their downstream effects. *Eur J Neurosci*. 36(2):2213-2228, 2012. [PMC3400124]

56. Foutz TJ, Arlow RA, **McIntyre CC** [δ]. Theoretical principles underlying optical stimulation of a channelrhodopsin-2 positive pyramidal neuron. *J Neurophysiol.* 107(12):3235-3245, 2012. [PMC3378402]

57. Johnson MD, Zhang J, Ghosh D, **McIntyre CC** [δ], Vitek JL. Neural targets for relieving parkinsonian rigidity and bradykinesia with pallidal deep brain stimulation. *J Neurophysiol.* 108(2):567-577, 2012. [PMC3404794]

58. Foutz TJ, Ackermann DM, Kilgore KL, **McIntyre CC** [δ]. Energy efficient neural stimulation: coupling circuit design and membrane biophysics. *PLoS One*. 7(12):e51901, 2012. [PMC3521743]

59. Cooper SE, **McIntyre CC** [δ], Fernandez HH, Vitek JL. Association of deep brain stimulation washout effects with Parkinson disease duration. *JAMA Neurol*. 70(1):95-99, 2013.

60. Lempka SF, **McIntyre CC** [δ]. Theoretical analysis of the local field potential in deep brain stimulation applications. *PLoS One.* 8(3):e59839, 2013. [PMC3610913]

61. Dietz J, Noecker AM, **McIntyre CC** [δ], Mikos A, Bowers D, Foote KD, Okun MS. Stimulation region within the globus pallidus does not affect verbal fluency performance. *Brain Stimul*. 6(3):248-53, 2013. [PMC3491090]

62. Arlow RA, Foutz TJ, **McIntyre CC** [α]. Theoretical principles underlying optical stimulation of myelinated axons expressing channelrhodopsin-2. *Neuroscience*. 248:541-51, 2013. [PMC4116477]

63. * Lujan JL, Chaturvedi A, Choi KS, Holtzheimer PE, Gross RE, Mayberg HS, **McIntyre CC** [δ]. Tractography-activation models applied to subcallosal cingulate deep brain stimulation. *Brain Stimul*. 6(5):737-39, 2013. [PMC3772993]

64. * Chaturvedi A, Lujan JL, **McIntyre CC** [α]. Artificial neural network based characterization of the volume of tissue activated during deep brain stimulation. *J Neural Eng*. 10(5):056023, 2013. [PMC4115460]

65. Gorniak SL, **McIntyre CC** [δ], Alberts JL. Bimanual force coordination in Parkinson's disease patients with bilateral subthalamic deep brain stimulation. *PLoS One*. 8(11):e78934, 2013. [PMC3823934]

66. Sweet JA, Walter BL, Gunalan K, Chaturvedi A, **McIntyre CC** [α], Miller JP. Fiber tractography of the axonal pathways linking the basal ganglia and cerebellum in Parkinson disease: implications for targeting in deep brain stimulation. *J Neurosurg*. 120(4):988-96, 2014.

67. *** Riva-Posse P, Choi KS, Holtzheimer PE, **McIntyre CC** [α], Gross RE, Chaturvedi A, Crowell AL, Garlow SJ, Rajendra JK, Mayberg HS.. Defining critical white matter pathways mediating successful subcallosal cingulate deep brain stimulation for treatment-resistant depression. *Biol Psychiatry.* 76(12):963-969, 2014. [PMC4487804]

68. Cheung T, Noecker AM, Alterman RL, **McIntyre CC** [α], Tagliati M. Defining a therapeutic target for pallidal deep brain stimulation for dystonia. *Ann Neurol*. 76(1):22-30, 2014.

69. Cooper SE, Driesslein KG, Noecker AM, **McIntyre CC** [α], Machado AM, Butson CR. Anatomical targets associated with abrupt versus gradual washout of subthalamic deep brain stimulation effects on bradykinesia. *PLoS One*. 9(8):e99663, 2014. [PMC4123847]

70. **McIntyre CC** [α], Chaturvedi A, Shamir RR, Lempka SF. Engineering the next generation of clinical deep brain stimulation technology. *Brain Stimul*. 8(1):21-26, 2015. [PMC4501497]

71. Bronstein JM, Tagliati M, **McIntyre CC** [α], Chen R, Cheung T, Hargreaves EL, Israel Z, Moffitt M, Montgomery EB, Stypulkowski P, Shils J, Denison T, Vitek J, Volkman J, Wertheimer J, Okun MS. The rationale driving the evolution of deep brain stimulation to constant-current devices. *Neuromodulation*. 18(2):85-9, 2015.

72. * Reich MM, Steigerwal F, Sawalhe AD, Reese R, Gunalan K, Johannes S, Nickl M, Matthies C, **McIntyre CC** [α], Volkmann J. Short pulse width widens the therapeutic window of subthalamic neurostimulation. *Ann Clin Transl Neurol.* 2(4):427-32, 2015. [PMC4402087]

73. * Lempka SF, **McIntyre CC** [α], Kilgore KL, Machado AG. Computational analysis of kilohertz frequency spinal cord stimulation. *Anesthesiology*. 122(6):1362-76, 2015.

74. Van Dijk K, Verhagen R, Chaturvedi A, **McIntyre CC** [α], Bour LJ, Heida C, Veltink PH. A novel lead design enables selective deep brain stimulation of neural populations in the subthalamic region. *J Neural Eng*. 12(4):046003, 2015.

75. Beste C, Mückschel M, Elben S, Hartmann CJ, **McIntyre CC** [α], Saft C, Vesper J, Schnitzler A, Wojtecki L. Behavioral and neurophysiological evidence for the enhancement of cognitive control under dorsal pallidal deep brain stimulation in Huntington's disease. *Brain Struct Funct*. 220(4):2441-8, 2015.

76. Shamir RR, Dolber T, Noecker AM, Walter BL, **McIntyre CC** [α]. Machine learning approach to optimizing combined stimulation and medication therapies for Parkinson's disease. *Brain Stimul.* 8(6):1025-32, 2015. [PMC5015434]

77. Hartmann CJ, Lujan JL, Chaturvedi A, Goodman WK, Okun MS, **McIntyre CC** [α], Haq IU. Tractography-activation patterns in dorsolateral prefrontal cortex suggest better clinical responses in OCD DBS. *Front Neurosci.* 9:519, 2016. [PMC4717315]

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79. * **McIntyre CC** [α], Anderson RW. Deep brain stimulation mechanisms: the control of network activity via neurochemistry modulation. *J Neurochem*. 139(S1):338-345, 2016. [PMC5358920]

80. Howell B, **McIntyre CC**[α]. Role of soft-tissue heterogeneity in computational models of deep brain stimulation. *Brain Stimul*. 10(1):46-50, 2017. [PMC5241242]

81. Hamel W, Köppen JA, Alesch F, Antonini A, Barcia JA, Bergman H, Chabardes S, Contarino MF, Cornu P, Demmel W, Deuschl G, Fasano A, Kühn AA, Limousin P, **McIntyre CC**[α], Mehdorn HM, Pilleri M, Pollak P, Rodríguez-Oroz MC, Rumià J, Samuel M, Timmermann L, Valldeoriola F, Vesper J, Visser-Vandewalle V, Volkmann J, Lozano AM. Targeting of the subthalamic nucleus for deep brain stimulation: a survey among Parkinson's disease specialists. *World Neurosurg*. 99:41-46, 2017.

82. Gunalan K, Chaturvedi A, Howell B, Duchin Y, Lempka SF, Patriat R, Sapiro G, Harel N, **McIntyre CC**[α]. Creating and parameterizing patient-specific deep brain stimulation pathway-activation models using the hyperdirect pathway as an example. *PLoS One*. 12(4):e0176132, 2017. [PMC5404874]

83. *** Riva-Posse P, Choi KS, Holtzheimer PE, Crowell AL, Garlow SJ, Rajendra JK, **McIntyre CC**[α], Gross RE, Mayberg HS. A connectomic approach for subcallosal cingulate deep brain stimulation surgery: prospective targeting in treatment-resistant depression. *Mol Psychiatry.* 23(4):843-849, 2018. [PMC5636645]

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85. Choi KS, Noecker AM, Riva-Posse P, Rajendra JK, Gross RE, Mayberg HS, **McIntyre CC**[α]. Impact of brain shift on subcallosal cingulate deep brain stimulation. *Brain Stimul*. 11(2):445-453, 2018. [PMC5803301]

86. Lempka SF, Howell B, Gunalan K, Machado A, **McIntyre CC**[α]. Characterization of the stimulus waveforms generated by implantable pulse generators for deep brain stimulation. *Clin Neurophysiol*. 129(4):731-742, 2018. [PMC5856638]

87. Gunalan K, Howell B, **McIntyre CC**[α]. Quantifying axonal responses in patient-specific models of subthalamic deep brain stimulation. *NeuroImage*. 172:263-277, 2018. [PMC5910209]

88. Anderson RW, Farokhniaee AA, Gunalan K, Howell B, **McIntyre CC**[α]. Action potential initiation, propagation, and cortical invasion in the hyperdirect pathway during subthalamic deep brain stimulation. *Brain Stimul*. 11(5):1140-1150, 2018. [PMC6109410]

89. Maling N, Lempka SF, Blumenfeld Z, Bronte-Stewart H, **McIntyre CC**[α]. Biophysical basis of subthalamic local field potentials recorded from clinical deep brain stimulation electrodes. *J Neurophysiol*. 120(4):1932-1944, 2018. [PMC6230781]

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91. *** Lozano AM, Lipsman N, Bergman H, Brown P, Chabardes S, Chang JW, Matthews K, **McIntyre CC**[α], Schlaepfer TE, Schulder M, Temel Y, Volkmann J, Krauss JK. Deep brain stimulation: current challenges and future directions. *Nat Rev Neurol*. 15(3):148-160, 2019. [PMC6397644]

92. Howell B, Gunalan K, **McIntyre CC**[α]. A driving-force predictor for estimating pathway activation in patient-specific models of deep brain stimulation. *Neuromodulation*. 22(4):403-415, 2019. [PMC6579680]

93. Beylergil SB, Ozinga S, Walker MF, **McIntyre CC**[α], Shaikh AG. Vestibular heading perception in Parkinson's disease. *Prog Brain Res*. 249:307-319, 2019.

94. * Cagnan H, Denison T, **McIntyre CC**[α], Brown P. Emerging technologies for improved deep brain stimulation. *Nat Biotechnol*. 37(9):1024-1033, 2019.

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120. Bingham CS, Petersen MV, Parent M, **McIntyre CC**[ε]. Evolving characterization of the human hyperdirect pathway. *Brain Struct Funct*. 228(2):353-365, 2023.

121. Miller CPK, Muller J, Noecker AM, Matias C, Alizadeh M, **McIntyre CC**[ε], Wu C. Automatic segmentation of Parkinson disease therapeutic targets using nonlinear registration and clinical MR imaging: comparison of methodology, presence of disease, and quality control. *Stereotact Funct Neurosurg*. 101(2):146-157, 2023.

122. Petersen MV, **McIntyre CC**[ε]. Comparison of anatomical pathway models with tractography estimates of the pallidothalamic, cerebellothalamic, and corticospinal tracts. *Brain Connect*. 13(4):237-246, 2023.

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125. Ng PR, Bush A, Vissani M, **McIntyre CC**[ε], Richardson RM. Biophysical principles and computational modeling of deep brain stimulation. *Neuromodulation*. (in press), 2023

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Book Chapters

Lee DC, **McIntyre CC**[β], Grill WM. (2003) Extracellular electrical stimulation of central neurons: quantitative studies. In: Handbook of Neuroprosthetic Reseach Methods. Finn and Lopresti (eds.), CRC Press.

Miocinovic S, **McIntyre CC**[δ], Savasta M, Vitek JL. (2007) Mechanisms of deep brain stimulation. In: Deep Brain Stimulation in Neurological and Psychiatric Disorders. Tarsy et al. (eds.), Humana Press.

Schuele SU, **McIntyre CC** $^{\delta}$, Luders HO. (2007) General principals of cortical mapping by electrical stimulation. In: Textbook of Epilepsy Surgery. Bingaman et al. (eds.), Taylor & Francis.

McIntyre CC $^{\delta}$, Butson CR, Walter BL, Vitek JL. (2008) Rational for movement disorders surgery. In: Movement Disorder Surgery – The Essentials. Bakay (ed.), Thieme.

McIntyre CC $^{\delta}$. (2009) Deep brain stimulation. In: Encyclopedia of Neuroscience. Squire (ed.), Elsevier.

McIntyre CC $^{\delta}$. (2009) Computational modeling of deep brain stimulation. In: Neuromodualtion. Krames et al. (eds.), Academic Press.

Johnson MD, **McIntyre CC** $^{\delta}$, Vitek JL. (2010) Deep brain stimulation: Mechanisms of action. In: Youmans Neurological Surgery, 6th edition. Winn (ed.), Elsevier.

McIntyre CC $^{\delta}$. (2011). The electrode – Principals of the neural interface: Axons and cell bodies. In: Essential Neuromodualtion. Arle and Shils (eds.), Elsevier.

Lujan JL, **McIntyre CC** $^{\delta}$. (2013). Mechanisms of action of deep brain stimulation for the treatment of psychiatric disorders. In: Deep Brain Stimulation. Denys et al. (eds.), Springer-Verlag.

McIntyre CC $^{\alpha}$, Foutz TJ. (2013) Computational modeling of deep brain stimulation. In: Handbook of Clinical Neurology. Lozano and Hallett (eds.), Elsevier.

Rubin JE, **McIntyre CC** $^{\alpha}$. (2015) Computational models of deep brain stimulation. In: Encyclopedia of Computational Neuroscience. Jung and Jaeger (eds.), Springer.

Lempka SF, **McIntyre CC** $^{\alpha}$. (2015) Resistivity/conductivity of extracellular medium. In: Encyclopedia of Computational Neuroscience. Jung and Jaeger (eds.), Springer.

Maling N, **McIntyre CC** $^{\alpha}$. (2016) Local field potential analysis for closed loop neuromodulation. In: Closed Loop Neuroscience. El Hady (ed.), Elsevier.

McIntyre CC $^{\alpha}$. (2018) Patient-specific modeling of deep brain stimulation. In: Neuromodualtion 2nd Edition. Krames et al. (eds.), Academic Press.

Rubin JE, **McIntyre CC** $^{\alpha}$. (2020) Computational models of deep brain stimulation. In: Encyclopedia of Computational Neuroscience. Jung and Jaeger (eds.), Springer.

ACTIVE RESEARCH FUNDING

"Augmented Reality Platform for Deep Brain Stimulation"
Co-Principal Investigator: Cameron McIntyre, PhD (20% Effort)
Co-Principal Investigator: Mark Griswold, PhD
Agency: NINDS
Type: NIH R01 NS105690
Project Period: 04/01/18-03/31/23
Annual Direct Costs: $290,000
Total Award: $1,842,000
Goal: Develop holographic simulations of DBS in the subthalamic region for neurosurgical training.

"Application of Advanced Imaging and Visualization to Clinical Deep Brain Stimulation"
Principal Investigator: Cameron McIntyre, PhD (20% Effort)
Agency: NINDS
Type: NIH R37 NS116079
Project Period: 01/01/21-12/31/27
Annual Direct Costs: $256,000
Total Award: $1,590,000 (for Years 1-4)
Goal: Evaluate the clinical utility of magnetic resonance fingerprinting and holographic visualization in DBS.

“Biophysical Characterization of Subthalamic Local Field Potentials in Parkinson's Disease"
Principal Investigator: Cameron McIntyre, PhD (20% Effort)
Agency: NINDS
Type: NIH R01 NS119520

Project Period: 02/01/21-01/31/25
Annual Direct Costs: $353,000
Total Award: $1,890,000
Goal: Apply patient-specific LFP modeling to the analysis of recordings from DBS electrodes in PD patients.

“Pathway-Specific Targeting in Subcallosal Cingulate Deep Brain Stimulation for Depression”
Principal Investigator: Cameron McIntyre, PhD (20% Effort)
Agency: NIMH
Type: NIH R01 MH102238
Project Period: 12/01/20-11/30/25
Annual Direct Costs: $428,000
Total Award: $2,022,000
Goal: Use patient-specific DBS computer models to study treatment resistant depression.

"Morris K. Udall Centers of Excellence for Parkinson's Disease Research at Emory University"
Principal Investigator: Thomas Wichmann, MD
“Cortical electrophysiology of response inhibition and implications for DBS therapy in patients”
Project 4 PI: Svjetlana Miocinovic, MD, PhD
Co-Investigator: Cameron McIntyre, PhD (5% Effort)
Agency: NINDS
Type: NIH P50 NS123103
Project Period: 09/29/21-07/31/26
Goal: Udall center grant, where Project 4 will examine changes in cortical activity in PD patients.

"Optimizing Patient-Specific Deep Brain Stimulation Models Using Electrophysiology"
Principal Investigator: Svjetlana Miocinovic, MD, PhD
Co-Investigator: Cameron McIntyre, PhD (10% Effort)
Agency: NINDS
Type: NIH R01 NS125143
Project Period: 01/01/22-12/31/26
Goal: Evaluate and optimize the accuracy of computational imaging-based DBS models.

PENDING RESEARCH FUNDING

"Human Scale Model of Subthalamic Nucleus Neural Elements"
Co-Principal Investigator: Cameron McIntyre, PhD
Co-Principal Investigator: Martin Parent, PhD
Agency: NINDS
Type: NIH R01 NS105690
Project Period: pending
Goal: Create anatomically realistic population models of STN neurons and their afferent inputs.

“Holographic Stereotactic Neurosurgery Research Resource”
Principal Investigator: Cameron McIntyre, PhD
Agency: NINDS
Type: NIH U24 NS129892
Project Period: pending
Goal: Support brain neuromodulation device clinical trials with advanced patient-specific modeling.

“Defining the Role of Structural and Functional Networks in Deep Brain Stimulation for Parkinson's Disease”
Principal Investigator: Chen Wu, MD, PhD
Co-Investigator: Cameron McIntyre, PhD
Agency: NINDS
Type: NIH R01 NS130332
Project Period: pending
Goal: Evaluate the relative contribution of cerebellar, basal ganglia, cortical pathway activation in DBS for PD.

COMPLETED RESEARCH FUNDING (as PI)

NIH Funding:

“Tractography-Activation Models for Neuropsychiatric Deep Brain Stimulation”
Principal Investigator: Cameron McIntyre, PhD
Agency: NIMH
Type: NIH R01 MH102238
Project Period: 09/01/14 - 07/31/20
Total Award: $1,978,000
Goal: Use patient-specific DBS computer models to study treatment resistant depression.

“Patient-Specific Models of Local Field Potentials in Subcallosal Cingulate”
Principal Investigator: Cameron McIntyre, PhD
Agency: NIMH
Type: NIH R01 MH106173
Project Period: 09/15/14 - 07/31/20
Total Award: $1,964,000
Goal: Use patient-specific LFP computer models to study treatment resistant depression.

"Understanding the Effects of Deep Brain Stimulation on Cortical Processing"
Co-Principal Investigator: Cameron McIntyre, PhD
Co-Principal Investigator: Dawn Taylor, PhD
Agency: NINDS
Type: NIH R01 NS086100
Project Period: 06/01/14 - 04/30/19
Total Award: $2,205,000
Goal: Couple experimental recordings in monkeys with computer models of cortical activity.

"Pathway Targeted Deep Brain Stimulation for Parkinson’s Disease"
Co-Principal Investigator: Cameron McIntyre, PhD
Co-Principal Investigator: Noam Harel, PhD
Agency: NINDS
Type: NIH R01 NS085188
Project Period: 09/01/13 - 08/31/18
Total Award: $3,410,000
Goal: Use patient-specific DBS models to define stimulation parameter settings for clinical evaluation.

"Systems-Level Model of Deep Brain Stimulation"
Principal Investigator: Cameron McIntyre, PhD
Agency: NINDS
Type: NIH R01 NS047388
Project Period: 04/01/05 - 04/30/15 (successful competitive renewal in 2009)
Total Award: $3,010,000
Goal: Address the therapeutic mechanisms of DBS using detailed computational models.

"Model-Based Optimization of Clinical Deep Brain Stimulation"
Principal Investigator: Cameron McIntyre, PhD
Agency: NINDS
Type: NIH R01 NS059736
Project Period: 07/01/07-06/30/13
Total Award: $1,690,000
Goal: Develop techniques to optimize stimulation parameter selection and the design of DBS electrodes.

"Patient-Specific Models of Deep Brain Stimulation"
Principal Investigator: Cameron McIntyre, PhD
Agency: NINDS
Type: NIH R21 NS050449
Project Period: 07/15/05-06/30/07
Total Award: $382,000
Goal: Develop computer models of DBS customized to individual patients.

Other Funding:

“Magnetic Resonance Fingerprinting for Target Identification in Deep Brain Stimulation”
Co-Principal Investigator: Cameron McIntyre, PhD
Co-Principal Investigator: Mark Griswold, PhD
Agency: Case-Coulter Translational Research Partnership
Project Period: 10/01/18-09/31/19
Total Award: $138,000
Goal: Evaluate the potential utility of MRF data in DBS surgical targeting.

"Deep Brain Stimulation Interactive Visualization System"
Principal Investigator: Cameron McIntyre, PhD
Agency: Wallace H. Coulter Foundation
Type: Early Career Research Grant
Project Period: 08/01/05-07/31/09
Total Award: $500,000
Goal: Develop software technology that improves the clinical implementation of DBS.

"Electric Field Generated by Deep Brain Stimulation"
Principal Investigator: Cameron McIntyre, PhD
Agency: American Parkinson Disease Association
Type: Research Grant
Project Period: 09/01/03-08/30/06
Total Award: $85,000
Goal: Create a model of the electric field generated by DBS.

COMPLETED RESEARCH FUNDING (as co-I)

"Brain Circuitry Analysis in Bipolar Disorder"
Principal Investigator: Jennifer Sweet, MD
Co-Investigator: Cameron McIntyre, PhD
Agency: NIMH
Type: NIH R56 MH121598
Project Period: 08/07/20-07/31/21
Goal: Develop a new DBS therapy for bipolar disorder using advanced clinical imaging strategies.

“Circuit-Based Deep Brain Stimulation for Parkinson’s Disease”
Principal Investigator: Jerrold Vitek, MD, PhD
Co-Investigator: Cameron McIntyre, PhD
Agency: NINDS
Type: NIH P50 NS098573
Project Period: 09/25/16-05/31/21
Goal: Udall center grant to study the mechanisms of DBS.

COMPLETED RESEARCH FUNDING (as Mentor)

“Computational Models of Deep Brain Stimulation of Cerebellothalamic and Subthalamopallidal Pathways”
Principal Investigator: Kelsey Bower
Mentor: Cameron McIntyre, PhD
Agency: NINDS
Type: NIH F31 NS098696
Project Period: 09/01/16-05/31/21
Goal: Doctoral training award to evaluate axonal pathways modulated by DBS.

“Effects of Parkinson’s Disease and Deep Brain Stimulation on Heading Perception”
Principal Investigator: Aasef Shaikh, MD, PhD
Mentor: Cameron McIntyre, PhD
Agency: American Academy of Neurology
Type: Career Development Award

Project Period: 01/01/18-12/31/20
Goal: Career development award to evaluate the vestibular system of PD patients.

"Deep Brain Stimulation for the Treatment of Bipolar Disorder"
Principal Investigator: Jennifer Sweet, MD
Mentor: Cameron McIntyre, PhD
Agency: NIH CTSC
Type: NIH KL2 TR000440
Project Period: 10/01/15-05/31/19
Goal: Career development award to evaluate the dorsal cingulum bundle as a DBS surgical target.

"Computational Models of Subcallosal Cingulate Deep Brain Stimulation"
Principal Investigator: Bryan Howell, PhD
Mentor: Cameron McIntyre, PhD
Agency: NINDS
Type: NIH F32 NS096839
Project Period: 04/01/16-03/31/19
Goal: Post-doctoral training award to evaluate DBS model complexity.

"Time Course of Subthalamic Deep Brain Stimulation"
Principal Investigator: Scott Cooper, MD, PhD
Mentor: Cameron McIntyre, PhD
Agency: NINDS
Type: NIH K23 NS052523
Project Period: 09/01/07-08/31/12
Goal: Career development award to examine the role of synaptic plasticity in DBS.

"Mechanisms of Pallidal Deep Brain Stimulation"
Principal Investigator: Matthew Johnson, PhD
Mentor: Cameron McIntyre, PhD
Agency: NINDS
Type: NIH F32 NS061541
Project Period: 04/01/08-12/31/09
Goal: Post-doctoral training award to examine the effects of globus pallidus DBS.

"Realistic Biophysical Models of Deep Brain Stimulation"
Principal Investigator: Christopher Butson, PhD
Mentor: Cameron McIntyre, PhD
Agency: NINDS
Type: NIH F32 NS052042
Project Period: 04/01/05-03/31/08
Goal: Post-doctoral training award to quantify the stimulating influence of DBS.

NATIONAL INSTITUTES OF HEALTH REVIEW PANELS

2006, 07	Fellowship Special Emphasis Panel, ZRG1 F01-N (20) – ad hoc member
2007	Pathway to Independence Panel, ZNS1 SRB-M (44) – ad hoc member
2007	Neurophysiology and Neuroprosthetics, ZRG1 BDCN-E (95) – ad hoc member
2007	Clinical Neuroplasticity and Neurotransmitters [CNNT] – ad hoc member
2009	Challenge Grant Panel, 11 ZRG1 BDCN-T (58) – ad hoc member
2009	Challenge Grant Panel, 12 ZRG1 ETTN-A (58) – ad hoc member
2014	Imaging, Biomarkers and Therapy, 10 ZRG1 BDCN-N (02) – ad hoc member
2015	Neural Basis of Psychopathology [NPAS] – ad hoc member
2016	Fellowship Special Emphasis Panel, ZRG1 F03-B (20) – ad hoc member
2016	Parkinsonism Biomarkers, ZNS1 SRB-T (23) – ad hoc member
2017, 18, 19	BRAIN Initiative Ethical Implications RFA, ZMH1 ERB-L(03) – ad hoc member
2019	BRAIN Initiative Research Opportunities in Humans U01, ZNS1 SRB K16 – ad hoc member
2019	BRAIN Initiative Resource Dissemination U24, ZNS1 SRB-M(11) – ad hoc member
2019	BRAIN Initiative Post-Doctoral Fellowship F32, ZMH1 ERB-Q(02) – ad hoc member

2020 Sensorimotor Integration [SMI] – ad hoc member
2020 BRAIN Initiative Secondary Analysis & Archiving R01, ZMH1 ERB-Q (02) – ad hoc member
2021 Clinical Trials in Neurology U01, ZNS1 SRB-G (38) – ad hoc member
2021 National Cooperative Drug/Device Discovery/Development Groups (NCDDG) U19 – ad hoc
2021 Clinical Trials in Neurology U01, ZNS1 SRB-G (46) – ad hoc member
2022, 23 BRAIN Initiative Ethical Implications RFA, ZMH1 ERB-M (05) R – ad hoc member
2023 BRAIN Initiative Translational and Brain Devices RFA, ZNS1 SRB-G (59) M – ad hoc member
2023 BRAIN Initiative Brain Behavior Quantification RFA, ZMH1 ERB-E (01) – ad hoc memeber

NATIONAL SCIENCE FOUNDATION REVIEW PANELS

2011 Collaborative Research in Computational Neuroscience (CRCNS)
2012 Collaborative Research in Computational Neuroscience (CRCNS)
2017 Collaborative Research in Computational Neuroscience (CRCNS)
2018 Collaborative Research in Computational Neuroscience (CRCNS)
2021 Collaborative Research in Computational Neuroscience (CRCNS)

EDITORIAL BOARDS

2007-2013 Deputy Editor, *Brain Stimulation*
2007-present Editorial Board, *Brain Stimulation*
2010-present Editorial Board, *Neuromodulation*
2022-present Editorial Board, *Deep Brain Stimulation*

SCIENTIFIC ADVISORY BOARDS and STEERING COMMITTEES

2007-2011 IntElect Medical – Scientific Advisory Board
2011 Gulf Coast Consortia Center for NeuroEngineeing – Scientific Advisory Board
2011-2020 Cleveland FES Center Executive Committee
2013-present Surgical Information Sciences – Scientific Advisory Board
2014-present Boston Scientific Neuromodulation – Deep Brain Stimulation Advisory Board
2019-present CereGate – Scientific Advisory Board
2021-present McCamish Parkinson's Disease Innovation Program – Scientific Advisory Board

SUPERVISORY EXPERIENCE

1998-2000 Mentor for Undergraduate Research Assistant, Andrew G. Richardson, CWRU
1999-2000 Mentor for Undergraduate Research Assistant, Jennifer A. Kozak, CWRU
2002 Mentor for Undergraduate Research Assistant, Korak Sarkar, JHU
2003-2004 Supervisor for Research Engineer, John Hall, CCF
2003-2004 Supervisor for Research Engineer, Amanda Adams, CCF
2003-2004 Research Advisor for Undergraduate Research Assistant, Matthew Roberston, CWRU
2004 Research Advisor for Undergraduate Research Assistant, Michael Apanius, CWRU
2004-2005 Supervisor for Post-Doctoral Fellow, Michael A. Moffitt, PhD, CCF
2004-2005 Supervisor for Research Engineer, Dongchul C. Lee, PhD, CCF
2004-2007 Research Advisor for MD/PhD Student, Svjetlana Miocinovic, CWRU
2004-2008 Supervisor for Post-Doc. & Research Associate, Christopher R. Butson, PhD, CCF
2004-present Supervisor for Research Engineer, Angela M. Noecker, CCF & CWRU & Duke
2005-2008 Supervisor for Research Engineer, Christopher B. Maks, CCF
2005-2011 Research Advisor for Ph.D. Student, Ashutosh Chaturvedi, CWRU
2005-2010 Research Advisor for Ph.D. Student, Scott F. Lempka, CWRU
2005-2013 Supervisor for Research Associate, Philip J. Hahn, PhD, CCF & CWRU
2006-2011 Research Advisor for MD/PhD Student, Thomas J. Foutz, CWRU
2006-2008 Research Advisor for Undergraduate Research Assistant, Carl Hacker, CWRU
2006-2012 Supervisor for Post-Doc. & Research Associate, J. Luis Lujan, PhD, CCF
2007-2009 Supervisor for Post-Doc. & Research Associate, Matthew D. Johnson, PhD, CCF
2007-2012 Research Mentor for Clinician-Scientist, Scott Cooper, MD, PhD, CCF
2008 Supervisor for Research Engineer, Kevin Wang, CCF

2010-present Supervisor for Research Engineer, Anneke M. Frankemolle (Gilbert), CCF & CWRU & Duke
2010, 2012 Research Advisor for Visiting Scholar, Christian Hartmann, MD, Univ. of Dusseldorf
2010-2012 Supervisor for Post-Doctoral Fellow, Scott F. Lempka, PhD, CCF
2010-2017 Research Advisor for MD/PhD Student, Kabilar Gunalan, CWRU
2010-2011 Research Advisor for MS Student, Kyle Taljan, CSU
2011-2014 Research Advisor for MD/PhD Student, Richard A. Arlow, CWRU
2011-2015 Research Advisor for PhD Student, Kyle Taljan, CWRU
2011-2013 Supervisor for Post-Doctoral Fellow, Ashutosh Chaturvedi, PhD, CCF & CWRU
2013-2015 Supervisor for Post-Doctoral Fellow, Reuben R. Shamir, PhD, CWRU
2013-2016 Supervisor for Study Coordinator, Theresa Lempka, CWRU
2013-2014 Research Advisor for MD Student, Trygve Dolber, CWRU
2014-2017 Supervisor for Post-Doctoral Fellow, Nicholas Maling, PhD, CWRU
2014-2017 Supervisor for Post-Doctoral Fellow, Ross Anderson, PhD, CWRU
2014 Research Advisor for MD Student, Michael Wassef, CWRU
2014-2015 Supervisor for Post-Doctoral Fellow, Gregory P. Russell, PhD, CWRU
2015-2019 Research Mentor for Clinician-Scientist, Jennifer Sweet, MD, CWRU
2015-present Supervisor for Post-Doctoral Fellow & Research Scientist, Bryan Howell, PhD, CWRU & Duke
2015-2021 Research Advisor for PhD Student, Kelsey Bower, CWRU
2016-2019 Supervisor for Research Associate, Suraj Thyagaraj, PhD, CWRU
2016-2018 Supervisor for Post-Doctoral Fellow, AmirAli Farokhniaee, PhD, CWRU
2016-2020 Supervisor for Post-Doctoral Fellow, Sinem Balta Beylergil, PhD, CWRU
2016-2017 Supervisor for Post-Doctoral Fellow, Sarah Ozinga, PhD, CWRU
2017-2020 Research Mentor for Clinician-Scientist, Aasef Shaikh, MD, PhD, CWRU
2018 Supervisor for Post-Doctoral Fellow, Kabilar Gunalan, PhD, CWRU
2018-2019 Supervisor for Post-Doctoral Fellow, Mikkel Petersen, MD, PhD, CWRU
2018-present Supervisor for Post-Doctoral Fellow, M. Sohail Noor, PhD, CWRU & Duke
2019-2022 Supervisor for Post-Doctoral Fellow, Clayton Bingham, PhD, CWRU & Duke
2021-present Research Advisor for MD/PhD Student, Andreas Seas, Duke
2021-present Research Advisor for PhD Student, Hengji Chen, Duke
2021-present Research Advisor for PhD Student, Anna Gann, Duke
2022 Research Advisor for Visiting Scholar, Alexandra Steina, PhD, Univ. of Dusseldorf
2023-present Supervisor for Research Engineer, Mark Ogren, Duke
2023-present Supervisor for Post-Doctoral Fellow, Ketan Mehta, PhD, Duke

11 total PhD trainees (including 3 current)
22 total Post-Doctoral trainees (including 2 current)

EXAMPLE TRAINEE CURRENT POSITIONS

Academia:
Christopher R. Butson, PhD – Professor, University of Florida
Matthew D. Johnson, PhD – Professor, University of Minnesota
J. Luis Lujan, PhD – Associate Professor, Mayo Clinic
Jennifer A. Sweet, MD – Associate Professor, Case Western Reserve University
Aasef Shaikh, MD, PhD – Associate Professor, Case Western Reserve University
Svjetlana Miocinovic, MD, PhD – Associate Professor, Emory University
Scott F. Lempka, PhD – Associate Professor, University of Michigan
Scott F. Cooper, MD, PhD – Assistant Professor, University of Minnesota
Mikkel Petersen, MD, PhD – Assistant Professor, Aarhus University
Thomas J. Foutz, MD, PhD – Instructor, Washington University
AmirAli Farokhniaee, PhD – Research Scientist, University College Dublin
Bryan Howell, PhD – Research Scientist, Duke University
Clayton Bingham, PhD – Program Officer, National Institute of Neurological Disorders & Stroke

Industry:
Michael A. Moffitt, PhD – Director of Research, Boston Scientific Neuromodulation
Ashutosh Chaturvedi, PhD – Scientist, Kernel

Reuben R. Shamir, PhD – Senior Algorithms Engineer, Novocure
Nicholas Maling, PhD – Medical Education Specialist, Boston Scientific Neuromodulation
Sarah Ozinga, PhD – Field Clinical Engineer, Abbott Neuromodulation
Kabilar Gunalan, MD, PhD – Director of Research, DataJoint
Kelsey Bower, PhD – Field Clinical Engineer, CereGate

COMPLETED Ph.D. DISSERTATION COMMITTEE SERVICE

2007 Svjetlana Miocinovic, MD, PhD - CWRU
2009 D. Michael Ackermann, PhD - CWRU
2010 Scott F. Lempka, PhD - CWRU
2010 Stephen Foldes, PhD - CWRU
2011 Amar R. Marathe, PhD - CWRU
2011 Thomas J. Foutz, MD, PhD - CWRU
2011 Ashutosh Chaturvedi, PhD - CWRU
2013 Marcel Lourens, PhD - University of Twente
2013 James A. Hokanson, PhD - University of Pittsburgh
2014 Michelle L. Kuykendal, PhD - Georgia Institute of Technology
2014 Layla Houshmand, PhD - University of Michigan
2015 Sarah J. Ozinga, PhD - Cleveland State University
2016 JingLe Jiang, PhD - CWRU
2017 Kabilar Gunalan, PhD - CWRU
2021 Kees van Dijk, PhD - University of Twente
2021 Kelsey Bower, PhD - CWRU
2023 Eric Musselman, PhD - Duke

CURRENT THESIS COMMITTEE SERVICE

Andreas Seas – Duke (BME PhD – chair)
Anna Gann – Duke (BME PhD – chair)
Hengji Chen – Duke (BME PhD – chair)
Brandon Thio – Duke (BME PhD)
Jahrane Dale – Duke (BME PhD)
Minhaj Hussain – Duke (BME PhD)
Tianqing Li – Duke (BME PhD)
Nimesha Gerlus – Duke (Psychology & Neuroscience PhD)

CLASSROOM TEACHING EXPERIENCE

1998-1999 Supplemental Instructor, Undergraduate Physiology-Biophysics (EBME 201 - CWRU)
2002 Guest Lecturer & Lab Instructor, Undergrad/Grad Neuroengineering (580.702 - JHU)
2003-2006 Lab Instructor, Undergraduate Biomedical Engineering Lab (EBME 313/314 - CWRU)
2006 Guest Lecturer, Graduate, Physiological Processes (EBME 451 - CWRU)
2007 Guest Lecturer, Graduate, Neuroprostheses (EBME 507 - CWRU)
2008 Guest Lecturer, Graduate, Bioelectric Phenomena (EBME 401 - CWRU)
2004-2021 Guest Lecturer, Graduate, Neural Engineering (EBME 407 - CWRU)
2006-2018 Guest Lecturer, Undergraduate, Neural Engineering (EBME 327 - CWRU)
2008-2015 Guest Lecturer, Undergraduate, Intro to Biomedical Engineering (EBME 105 - CWRU)
2014-2019 Guest Lecturer, Graduate, Translational Physiology (PHOL 483 - CWRU)
2015-2021 Guest Lecturer, Graduate, Neurodegenerative Diseases (PATH 444 - CWRU)
2021-2022 Guest Lecturer, Undergraduate, Scientific Writing (WRITING 101 - Duke)
2022-present Course Director, Graduate, Connectomic Neuromodulation (BME 590 - Duke)

INSTITUTIONAL SERVICE

2004-2010 Cleveland Clinic Biomedical Engineering Department Seminar Coordinator
2005-2009 Cleveland Clinic Lerner College of Medicine Admissions Committee
2009-2012 Cleveland Clinic Lerner College of Medicine Medical Student Promotions and Review Comm.

2013-2015 CWRU Biomedical Engineering Development Committee
2013-2016 CWRU Health Informatics for Engineering Cluster Strategic Hiring Initiative Search Committee
2013-2018 CWRU Biomedical Engineering Publicity Committee
2014-2018 CWRU Biomedical Engineering Research Committee
2014-2016 CWRU Image Guided Interventions Faculty Search Committee
2015 CWRU Biomedical Engineering PhD Qualifying Exam Committee
2016-2021 CWRU Biomedical Engineering School of Medicine Affairs Committee
2017-2019 CWRU School of Engineering Neural Engineering Faculty Search Committee
2018-2019 CWRU School of Medicine Neural Engineering Faculty Search Committee
2019-2021 CWRU School of Medicine Magnetic Resonance Imaging Faculty Search Committee
2019-2021 CWRU Conflict of Interest Committee
2023 Duke Biomedical Engineering Masters Research Review Committee

INVITED LECTURES - CONFERENCE / WORKSHOP / SYMPOSIA

June, 2003 - MBI Workshop on Sensory-Motor Systems, Ohio State University, Columbus, OH
June, 2006 - Dystonia Medical Research Foundation Workshop, National Institutes of Health, Washington DC
August, 2006 - Neural Interfaces Workshop, National Institutes of Health, Washington DC
November, 2006 - National Academies Keck Futures Initiative Workshop on Smart Prosthetics, Irvine, CA
March, 2007 - Neuroinformatics and Deep Brain Stimulation Symposium, Imperial College, London, England
June, 2007 - Dutch Endo-Neuro-Psycho Meeting, Doorwerth, Netherlands
August, 2007 - Diffusion Weighted Imaging Summer School, Schoenburg, Germany
September, 2007 - Mathematical Neuroscience Workshop, Universite de Montreal, Canada
December, 2007 - International Neuromodulation Society Meeting, Acapulco, Mexico
April, 2008 - MBI Workshop on Peripheral Nervous System Stimulation, Ohio State University
August, 2008 - International Brain Mapping & Intraoperative Surgical Planning Society, Los Angeles, CA
June, 2009 - Lorentz Center Workshop on Brain Waves, Leiden University, Netherlands
July, 2009 - Amsterdam International Medical Summer School, University of Amsterdam, Netherlands
September, 2009 - IEEE Workshop on Deep Brain Stimulation, Minneapolis, MN
September, 2009 - CHDI Workshop on DBS for Huntington's Disease, New York, NY
March, 2010 - Midwest Biomedical Engineering Conference, Cleveland, OH
June, 2010 - Neural Interfaces Conference, Long Beach, CA
June, 2010 - International Basal Ganglia Society Meeting, Long Branch, NJ
September, 2010 - Medical Device - Biological Interactions IMA Workshop, University of Minnesota
October, 2010 - Deep Brain Stimulation: Motor Systems and Beyond, University of Rochester
November, 2011 - Dynamical Neuroscience XIX, Society for Neuroscience, Washington DC
March, 2012 - Rewiring the Brain, Stanford University, Palo Alto, CA
March, 2012 - Constant Current Deep Brain Stimulation, Parkinson Alliance, Princeton, NJ
May, 2012 - Deep Brain Stimulation: A Multidisciplinary Approach, Santa Monica, CA
May, 2012 - Fields Institute Parkinson's Disease Workshop, Toronto, Canada
June, 2012 - Neural Interfaces Conference, Salt Lake City, UT
January, 2013 - CSNE Microelectrode Workshop, University of Washington, Seattle, WA
February, 2013 - MBI Workshop on Disease, Ohio State University, Columbus, OH
February, 2013 - American Society for Experimental NeuroTherapeutics Meeting, Washington, DC
April, 2013 - Shaping the Future of DBS, University of Florida, Gainesville, FL
April, 2013 - International Conference on Schizophrenia Research, Orlando, FL
May, 2013 - International Conference on 25 Years of DBS, University Hospital Dusseldorf, Germany
October, 2013 - From Neurodegeneration to Brain Health, University Hospitals, Cleveland, OH
November, 2013 - Society for Neuroscience, Deep Brain Stimulation Symposium, San Diego, CA
February, 2014 - Center for Neuroscience Annual Symposium, University of Colorado, Aurora, CO
March, 2014 - Boston Scientific Neuromodulation Medical Advisory Board Meeting, Paris, France
March, 2014 - International Conference on Basal Ganglia Speech Disorders and DBS, London, England
March, 2014 - Mechanisms of Action: Electrical Stimulation of the Nervous System, Orlando, FL
September, 2014 - European Society for Stereotactic & Functional Neurosurgery, Maastricht, Netherlands
October, 2014 - Orthopaedic Rehabilitation Association Conference, Cleveland, OH
October, 2014 - Dystonia Medical Research Foundation Workshop, Chicago, IL
November, 2014 - Boston Scientific Neuromodulation DBS Masters Debate, Paris, France

December, 2014 - New Perspectives and Applications in Functional Neurosurgery, Rome, Italy
March, 2015 - Boston Scientific Neuromodulation DBS Academy, Paris, France
March, 2015 - Deep Brain Stimulation Think Tank, University of Florida, Orlando, FL
April, 2015 - American Society of NeuroRadiology Annual Meeting, Chicago, IL
May, 2015 - OptoDBS, Optogenetics and Deep Brain Stimulation Conference, Geneva, Switzerland
June, 2015 - BRAIN Initiative Workshop on Neuromodulation, National Institutes of Health, Washington DC
September, 2015 - Collaborative Research in Computational Neuroscience, Univ. of Washington, Seattle, WA
October, 2015 - CWRU Innovation Summit, Engineering Better Health, Cleveland, OH
November, 2015 - Boston Scientific Neuromodulation DBS Masters Debate, Paris, France
November, 2015 - Brain States, Deep Brain Stimulation Conference, Cologne, Germany
March, 2016 - Deep Brain Stimulation Think Tank, University of Florida, Gainesville, FL
March, 2016 - International Conference on Deep Brain Stimulation, Dusseldorf, Germany
May, 2016 - Boston Scientific DBS Rock Star Tour: Milan, Italy; Warsaw, Poland; Madrid, Spain
May, 2016 - Neuromodulation: The Science, San Francisco, CA
September, 2016 - Neuroscience School of Advanced Study, Deep Brain Stimulation, Bressanone, Italy
October, 2016 - Persistent Maladaptive Behaviors, University of Rochester, Rochester, NY
November, 2016 - International DBS Symposium, Charité Universitätsmedizin, Berlin, Germany
November, 2016 - Expert Summit on the Future of DBS, Wurzburg, Germany
January, 2017 - North American Neuromodulation Society, Annual Meeting, Las Vegas, NV
Feburary, 2017 - Boston Scientific International DBS Academy, Kleinheubach, Germany
March, 2017 - World Society for Stereotactic & Functional Neurosurgery Panel, Barcelona, Spain
April, 2017 - Boston Scientific DBS Rock Star Tour: Prague, Czech; Porto, Portugal; Paris, France
May, 2017 - Deep Brain Stimulation Think Tank, Atlanta, GA
June, 2017 - Collaborative Research in Computational Neuroscience, Brown University, Providence, RI
June, 2017 - World Society for Stereotactic & Functional Neurosurgery Meeting, Berlin, Germany
September, 2017 - MBI Workshop on Modulation of Motor Systems, Ohio State University, Columbus, OH
September, 2017 - Connectomic DBS, Radcliffe Institute, Harvard University, Boston, MA
November, 2017 - Boston Scientific DBS Masters Debate, Paris, France
November, 2017 - Society for Neuroscience, Deep Brain Stimulation Roundtable, Washington, DC
November, 2017 - National Academy of Engineering, EU-US Frontiers of Engineering, UC Davis, Davis, CA
February, 2018 - BrainLab Functional and Stereotactic Neurosurgery Symposium, Munich, Germany
April, 2018 - NIH BRAIN Initiative Investigators Meeting, Washington, DC
May, 2018 - Deep Brain Stimulation Think Tank, Atlanta, GA
May, 2018 - Boston Scientific DBS Rock Star Tour: Copenhagen, Denmark; Paris, France; Barcelona, Spain
June, 2018 - American Society for Stereotactic & Functional Neurosurgery Meeting, Denver, CO
June, 2018 - Neuroscience, Neuroengineering, and Biomedical Engineering Workshop, Newport, RI
June, 2018 - Collaborative Research in Computational Neuroscience, UC Berkeley, Berkeley, CA
August, 2018 - NYC Neuromodulation Conference, New York, NY
September, 2018 - European Society for Stereotactic & Functional Neurosurgery Meeting, Edinburgh, Scotland
October, 2018 - Neuroscience School of Advanced Study, Deep Brain Stimulation, Venice, Italy
November, 2018 - Boston Scientific DBS Masters Debate, Paris, France
December, 2018 - Digital Neuro Symposium, Mt Sinai Neurosurgery, New York, NY
January, 2019 - North American Neuromodulation Society, Annual Meeting, Las Vegas, NV
April, 2019 - Boston Scientific DBS Rock Star Tour: Lisbon, Portugal; Malaga, Spain; Milan, Italy
May, 2019 - Society of Biological Psychiatry, Annual Meeting, Chicago, IL
May, 2019 - International Neuromodulation Society, Annual Meeting, Sydney, Australia
June, 2019 - World Society for Stereotactic & Functional Neurosurgery Meeting, New York, NY
September, 2019 - Deep Brain Stimulation Think Tank, Orlando, FL
October, 2019 - Boston Scientific DBS Summit, Charlotte, NC
October, 2019 - Boston Scientific International DBS Academy, Porto, Portugal
October, 2019 - Congress of Neurological Surgeons, Annual Meeting, San Francisco, CA
November, 2019 - Boston Scientific DBS Masters Debate, Paris, France
November, 2019 - ASSFN Stereotactic & Functional Neurosurgery Hands-on Workshop, Denver, CO
January, 2020 - North American Neuromodulation Society, Annual Meeting, Las Vegas, NV
February, 2020 - Neurosurgery in the Rockies, Annual Meeting, Beaver Creek, CO
March, 2020 - Milken Institute Neurotechnology Retreat, Washington, DC

June, 2020 - Canadian Computational Neuroscience Spotlight, Virtual Meeting
June, 2020 - American Society for Stereotactic & Functional Neurosurgery, Virtual Meeting
August, 2020 - MSRI Workshop for Clinical Translation of Implantable Devices, Virtual Meeting
December, 2020 - Boston Scientific DBS Masters Debate, Virtual Meeting
January, 2021 - North American Neuromodulation Society, Annual Meeting, Virtual Meeting
April, 2021 - Bioelectronic Medicine Fourm, Neurotech Reports, Virtual Meeting
June, 2021 - Clinical Principles of DBS and SCS, Virtual Meeting
October, 2021 - Congress of Neurological Surgeons, Annual Meeting, Austin, TX
November, 2021 - ASSFN Stereotactic & Functional Neurosurgery Hands-on Workshop, Denver, CO
January, 2022 - North American Neuromodulation Society, Annual Meeting, Orlando, FL
April, 2022 - Society of Biological Psychiatry, Annual Meeting, New Orleans, LA
June, 2022 - American Society for Stereotactic & Functional Neurosurgery Meeting, Atlanta, GA
August, 2022 – Brain & Human Body Modeling Conference, Boston, MA
September, 2022 - World Society for Stereotactic & Functional Neurosurgery Meeting, Incheon, South Korea
October, 2022 - Congress of Neurological Surgeons, Annual Meeting, San Francisco, CA
October, 2022 - Freiburg Center for Deep Brain Stimulation Symposium, Freiburg, Germany
November, 2022 - ASSFN Stereotactic & Functional Neurosurgery Hands-on Workshop, Denver, CO
November, 2022 - Boston Scientific DBS Masters Debate, Paris, France
January, 2023 - North American Neuromodulation Society, Annual Meeting, Las Vegas, NV
March, 2023 - Artificial Intelligence in Epilepsy & Neurological Disorders, Breckenridge, CO
April, 2023 - American Association of Neurological Surgeons, Annual Meeting, Los Angeles, CA
May, 2023 - InterfaceRice, Rice Neuroengineering Initiative, Houston, TX

CONFERENCE / WORKSHOP LEADERSHIP

2011 - Dynamical Neuroscience XIX, Society for Neuroscience - Meeting Co-Organizer
2012 - Neural Interfaces Conference - Chair / Co-Chair of 3 Platform Sessions
2018 - Neural Interfaces Conference - Steering Committee & Session Chair
2018 - Deep Brain Stimulation Think Tank - Steering Committee & Session Chair
2018 - Cleveland Course for Advanced Neuromodulation - Course Organizer
2018 - Society for Neuroscience - Symposium Chair & Organizer - LFPs and DBS
2019 - World Society for Stereotactic & Functional Neurosurgery Meeting - Workshop Chair & Organizer
2019 - Cleveland Course for Advanced Neuromodulation - Course Organizer
2019 - Deep Brain Stimulation Think Tank - Steering Committee & Session Chair
2019 - Congress of Neurological Surgeons Annual Meeting - Symposium Chair & Organizer
2019 - ASSFN Stereotactic and Functional Neurosurgery Hands-on Workshop - Session Organizer
2020 - North American Neuromodulation Society Meeting - Engineering Track Co-Organizer
2020 - American Society for Stereotactic & Functional Neurosurgery Meeting - Workshop Chair & Organizer
2021 - Neural Interfaces Conference - Steering Committee
2021 - North American Neuromodulation Society Meeting - Engineering Track Co-Organizer
2021 - Congress of Neurological Surgeons Annual Meeting - Symposium Chair & Organizer
2021 - ASSFN Stereotactic and Functional Neurosurgery Hands-on Workshop - Session Organizer
2022 - North American Neuromodulation Society Meeting - Engineering Track Co-Organizer
2022 - ASSFN Stereotactic and Functional Neurosurgery Hands-on Workshop - Session Organizer
2023 - North American Neuromodulation Society Meeting - Engineering Track Co-Organizer
2024 - North American Neuromodulation Society Meeting - Engineering Track Co-Organizer
2024 - American Society for Stereotactic & Functional Neurosurgery Meeting - Scientific Steering Committee
2024 - International Neuromodulation Society Meeting - Scientific Steering Committee

INVITED LECTURES - NON-CONFERENCE or DEPARTMENT SEMINARS

January, 2001 - Advanced Bionics Corporation, Research and Development Seminar
February, 2001 - Case Western Reserve University, Biomedical Engineering Department Seminar
March, 2001 - Johns Hopkins University, Biomedical Engineering Department Seminar
April, 2002 - Medtronic Neurological, Research and Development Seminar
May, 2002 - Emory University School of Medicine, Neurology Department Seminar
July, 2002 - Vanderbilt University Medical Center, Neurological Surgery Department Seminar

September, 2002 - Cleveland Clinic Foundation, Neurology Department Seminar
September, 2002 - Medical University of South Carolina, Neurosurgery/Neurology Grand Rounds
December, 2002 - Cleveland Clinic Foundation, Biomedical Engineering Department Seminar
February, 2003 - Ohio State University, Mathematical Biosciences Institute Seminar
May, 2003 - University of Utah, Scientific Computing and Imaging Institute Seminar
September, 2003 - Case Western Reserve University, Biomedical Engineering Department Seminar
February, 2004 - Cleveland Clinic Foundation, Epilepsy and Sleep Disorders Grand Rounds
June, 2004 - Cleveland Clinic Foundation, Neurosurgery Grand Rounds
October, 2004 - NDI Medical, Research and Development Seminar
December, 2004 - Washington University School of Medicine, Radiology Department Seminar
December, 2004 - Northwestern University School of Medicine, Physiology Department Seminar
February, 2005 - Kansas University Medical Center, Physiology Department Seminar
April, 2005 - University of Pennsylvania School of Engineering, Bioengineering Department Seminar
May, 2005 - Dartmouth University School of Medicine, Physiology Department Seminar
September, 2005 - CWRU/CCF, Musculoskeletal Biomechanics Seminar Series
October, 2005 - University of Florida, Movement Disorders Center Seminar
October, 2005 - George Mason University, Center for Neural Dynamics Seminar
February, 2006 - Advanced Bionics Corp., Research and Development Seminar
October, 2006 - Penn State University, Neural Engineering Seminar
November, 2006 - Cleveland Clinic Foundation, Center for Neurological Restoration Grand Rounds
December, 2006 - City College of New York, Biomedical Engineering Department Seminar
March, 2007 - Hôpital de la Salpêtrière (Paris), Neuroscience Seminar
January, 2008 - Cleveland Clinic Foundation, Lerner Research Institute Showcase Seminar
July, 2008 - Vanderbilt University, Electrical Engineering and Computer Science Department Seminar
September, 2008 - Cleveland Clinic Foundation, Neurosurgery Grand Rounds
December, 2008 - Cleveland Functional Electrical Stimulation Center, Neural Prosthesis Seminar
January, 2009 - University of Wisconsin School of Medicine, Neurology Grand Rounds
March, 2009 - University of Florida, Movement Disorders Center Seminar
May, 2009 - Active Diagnostics Inc., Research and Development Seminar
November, 2011 - Rice University, Center for NeuroEngineeing Seminar
December, 2011 - Cedar Sinai Medical Center, Neurology Grand Rounds
March, 2012 - Johns Hopkins University, Biomedical Engineering Department Seminar
April, 2012 - University of Pennsylvania, Bioengineering Department Seminar
July, 2012 - Case Western Reserve University, Center for Translational Neuroscience Seminar
September, 2012 - NeuroPace Inc., Research and Development Seminar
November, 2012 - Yale University, John B. Pierce Laboratory Seminar
April, 2013 - Sapiens Brain Stimulation GmbH, Research and Development Seminar
April, 2013 - University of Twente, Department of Mathematics Seminar
April, 2013 - University of Texas Southwestern Medical Center, Neurology Grand Rounds
May, 2013 - University of Michigan School of Medicine, Neurology Grand Rounds
June, 2013 - University Hospitals, Case Medical Center, Epilepsy Grand Rounds
September, 2013 - University of Texas San Antonio, Neurobiology Seminar
November, 2013 - University Hospitals, Case Medical Center, Neurology Grand Rounds
November, 2013 - University of Pittsburgh, Bioengineering Department Seminar
March, 2014 - Thiel College, Haer Family Symposium
July, 2014 - University Hospitals, Case Medical Center, Epilepsy Grand Rounds
July, 2014 - Cleveland Clinic Foundation, Epilepsy Grand Rounds
August, 2014 - Beth Israel Deaconess Medical Center, Harvard Medical School, ARC Seminar
April, 2015 - Wright State University, Neuroscience Engineering Collaboration Seminar
August, 2015 - Emory University, Neuromodulation and Technology Innovation Seminar
October, 2015 - University of Freiburg, Bernstein Center Seminar
November, 2016 - University of Pennsylvania, Department of Neurosurgery, Jaggi Lecture
January, 2017 - University Hospitals, Cleveland Medical Center, Neurology & Psychiatry Grand Rounds
March, 2017 - University of Kentucky, Institute for Biomedical Informatics Seminar
May, 2017 - Harvard Medical School, Martinos Center for Biomedical Imaging Seminar
October, 2017 - Israel Brain Technologies, Deep Brain Stimulation Lecture

February, 2018 - University of Florida, Department of Biomedical Engineering Seminar
March, 2018 - University of Louisville, Department of Neurosurgery, Neuroscience Grand Rounds
April, 2018 - University of California Los Angeles, Brain Mapping Center Seminar
June, 2018 - MetroHealth System, Neurosurgery Grand Rounds
April, 2019 - SUNY Upstate Medical University, Department of Neurosurgery, Jacobsen Lecture
May, 2019 - University of Pittsburgh, Department of Neurobiology Seminar
August, 2019 - Duke University, Department of Biomedical Engineering Seminar
September, 2019 - University of Texas Health Science Center, Department of Neurosurgery Seminar
December, 2019 - University of Chicago, Department of Neurosurgery Grand Rounds
September, 2020 - Mount Sinai, Center for Advanced Circuit Therapeutics Seminar
October, 2020 - University of California Los Angeles, Training in Neurotechnology Translation Seminar
January, 2021 - University Hospitals, Cleveland Medical Center, Neurology Grand Rounds
August, 2021 - Duke University, Department of Neurosurgery Grand Rounds
January, 2022 - Charite/Wurzburg ReTune Neuroscience Colloquium
January, 2022 - Duke University, Duke Research Week, Advancing Neuroscience Panel
April, 2023 - Georgia Tech, Department of Biomedical Engineering, Neuro Seminar Series

INTELLECTUAL PROPERTY

Issued United States Patents

1. **McIntyre CC**, Grill WM. Waveforms for selective stimulation of central nervous system neurons. US Patent #6,560,490.
2. **McIntyre CC**, Butson CR, Hall JD, Henderson JM. Brain stimulation models, systems, devices, and methods. US Patent #7,346,382.
3. Kilgore KL, Grill WM, **McIntyre CC**, Mortimer JT. Systems and methods for reversibly blocking nerve activity. US Patent #7,389,145.
4. **McIntyre CC**, Butson CR, Hall JD, Henderson JM. System and method for obtaining a volume of influence based on non-uniform tissue conductivity data. US Patent #7,680,526.
5. **McIntyre CC**, Butson CR, Hall JD, Henderson JM. Tissue stimulation models, systems, devices, and methods. US Patent #7,860,548.
6. **McIntyre CC**, Butson CR, Hall JD, Henderson JM. Brain stimulation models, systems, devices, and methods. US Patent #7,904,134.
7. Butson CR, Maks CB, **McIntyre CC**. System and methods for determining volume of activation for deep brain stimulation. US Patent #8,180,601.
8. Butson CR, **McIntyre CC**. System and method to design structure for delivering electrical energy to tissue. US Patent #8,209,027.
9. **McIntyre CC**, Butson CR, Hall JD, Henderson JM. Method and device for displaying predicted volume of influence with patient-specific atlas of neural tissue. US Patent #8,379,952.
10. **McIntyre CC**, Butson CR. System and method to design structure for delivering electrical energy to tissue. US Patent #8,538,543.
11. Lujan JL, Chaturvedi A, **McIntyre CC**. System and method to estimate region of tissue activation. US Patent #8,589,316.
12. Butson CR, **McIntyre CC**. System and method to define target volume for stimulation of the spinal cord and peripheral nerves. US Patent #8,594,800.
13. Butson CR, Maks CB, **McIntyre CC**. Systems and methods for determining volume of activation for spinal cord and peripheral nerve stimulation. US Patent #8,606,360.
14. Butson CR, **McIntyre CC**. System and method to define target volume for stimulation in brain. US Patent #8,644,946.
15. **McIntyre CC**, Lujan JL, Chaturvedi A. Methods for identifying target stimulation regions associated with therapeutic and non-therapeutic clinical outcomes for neural stimulation. US Patent #8,649,845.
16. Butson CR, **McIntyre CC**. System and method to define target volume for stimulation of the spinal cord and peripheral nerves. US Patent #8,812,126.
17. **McIntyre CC**, Foutz TJ. Estimation of neural response for optical stimulation. US Patent #8,868,351.
18. **McIntyre CC**, Butson CR, Hall JD, Henderson JM. Method and device for displaying predicted volume of influence with patient-specific atlas of neural tissue. US Patent #8,983,155.
19. Foutz TJ, Ackermann DM, **McIntyre CC**. Apparatus for energy efficient stimulation. US Patent #9,014,813.

20. Butson CR, Maks CB, **McIntyre CC**. Systems and methods for determining volume of activation for deep brain stimulation. US Patent #9,020,789.
21. **McIntyre CC**, Butson CR, Hall JD, Henderson JM. Method and system for displaying a volume of influence by an electrode inserted in neural tissue. US Patent #9,135,400.
22. Machado A, Alberts JL, **McIntyre CC**, Schindler D. Evaluation of movement disorders. US Patent #9,186,095.
23. **McIntyre CC**, Butson CR, Hall JD, Henderson JM. Brain stimulation models, systems, devices, and methods. US Patent #9,235,685.
24. Lujan JL, **McIntyre CC**. Automated 3D brain atlas fitting using intra-operative neurophysiological data. US Patent #9,289,144.
25. Alberts JL, **McIntyre CC**. System and method for motor and cognitive analysis. US Patent #9,653,002.
26. **McIntyre CC**, Butson CR, Hall JD, Henderson JM. Method and device for displaying predicted volume of influence. US Patent #9,760,688.
27. **McIntyre CC**, Shamir RR, Walter BL. Clinical decision support system. US Patent #9,764,136.
28. Alberts JL, **McIntyre CC**. Reversing cognitive-motor impairments in patients having a neuro-degenerative disease using a computational modeling approach to deep brain stimulation programming. US Patent #9,776,003.
29. **McIntyre CC**, Riva-Posse P, Choi KS, Chaturvedi A, Mayberg H, Tagliati M, Cheung T. Activation map based individualized planning for deep brain stimulation. US Patent #9,937,347.
30. Machado AG, Alberts JL, **McIntyre CC**, Schindler DD. Evaluation of movement disorders. US Patent #10,028,695.
31. **McIntyre CC**, Howell B. Load-preserving method for defining anisotropy in volume-conductor models. US Patent #10,112,049
32. **McIntyre CC**, Riva-Posse P, Choi KS, Chaturvedi A, Mayberg H, Tagliati M, Cheung T. Activation map based individualized planning for deep brain stimulation. US Patent #10,159,836.
33. **McIntyre CC**, Butson CR, Hall JD, Henderson JM. Method and device for displaying predicted volume of influence. US Patent #10,322,285.
34. Lujan JL, Chaturvedi A, **McIntyre CC**. System and method to estimate region of tissue activation. US Patent #10,360,511.
35. Alberts JL, **McIntyre CC**. System and method for motor and cognitive analysis. US Patent #10,741,287.
36. Lujan JL, Chaturvedi A, **McIntyre CC**. System and method to estimate region of tissue activation. US Patent #10,981,013.
37. **McIntyre CC**, Maling N, Lempka SF. Patient-specific local field potential model. US Patent #11,291,832.
38. Griswold MA, **McIntyre CC**. System and method for deploying interventional medical devices using magnetic resonance fingerprinting. US Patent #11,372,069.
39. **McIntyre CC**, Butson CR, Hall JD, Henderson JM. Method and device for displaying predicted volume of influence. US Patent #11,452,871.
40. **McIntyre CC**, Farokhniaee AA. Optimizing deep brain stimulation pulsing based on synaptic suppression. US Patent #11,654,286.

+Numerous Additional International Patents and Pending Patent Applications

<u>Intellectual Property Licensed to the Following Companies:</u>
Boston Scientific Neuromodulation, Corp.
IntElect Medical, Inc. (now owned by BSN)
Neuros Medical, Inc.
Qr8 Health, Inc.
Hologram Consultants, Inc.
BrainDynamics, Inc.
Ceraxis Health, Inc.

CWRU DONOR DEVELOPMENT (featured speaker)

October, 2013 - Dialogue on Discovery, Cleveland, OH
February, 2014 - On the Horizon: A Vision for Cleveland's Future, Naples, FL
September, 2015 - Dialogue on Discovery, Cleveland, OH
September, 2015 - Iris Wolstein Luncheon, Cleveland, OH

August, 2016 - Brain Health Council, Cleveland, OH
January, 2018 - Today's Virtual Imaging, Tomorrow's Cures, Naples, FL
May, 2018 - Dean's Visiting Committee, Cleveland, OH
October, 2019 - President's Faculty Spotlight Series, Cleveland, OH

DUKE DONOR DEVELOPMENT (featured speaker)

October, 2022 - Thinking about Brains: Masterminding Prevention and Repair, Online

PHILANTHROPY

Founded Accelerating Neuromodulation (www.accneuro.org) in 2011. Accelerating Neuromodulation is a 501(c)(3) non-profit organization dedicated to improving access to DBS therapies for patients in need.

HOBBIES

Sports Car Racing – Extensive experience racing KTM GT4 cars, Ligier LMP3 cars, Volkswagen TCR cars, Porsche Cayman Interseries cars, Porsche 944spec cars, and Mazda MX-5 Cup cars. Current focus is on racing a VW TCR car in the National Auto Sport Association (NASA) German Touring Series (GTS), as well as a KTM GT4 car in the International GT (IGT) Stuttgart Cup Series. Racing career highlights: 2016 & 2017 NASA Great Lakes Region GTS3 Season Champion. 2018 & 2019 IGT Stuttgart Cup Season Runner-Up. 2020 NASA Great Lakes Region GTS4 Season Champion.

Bicycling – Active in both mountain biking and road biking. Completed the Regents Annual Great Bicycle Ride Across Iowa (RAGBRI) in 2011 and 2012. Completed the Denver Post Ride the Rockies in 2013, 14, 15, 16, and 2019.

Mountaineering – Spent much of my time away from work during 2003 to 2012 doing mixed rock and ice climbing on glaciated mountains. Most trips were focused on the South American Andes, but also made trips to East Africa and New Zealand. Hung up my ice axes and crampons in 2012 to focus on car racing.