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Weill Cornell Medicine
Department of Radiology
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Faculty Appointments

- 2013-2015 **Instructor of Mathematics in Radiology and Neuroscience**
Department of Radiology and the Brain and Mind Research Institute
Weill Cornell Medicine, New York, NY
- 2014-2018 **Visiting Researcher**
Non-Invasive Brain Stimulation and Human Motor Control Laboratory
Burke Rehabilitation Center, White Plains, NY
- 2015-2019 **Assistant Professor of Mathematics in Radiology and Neuroscience**
Department of Radiology and the Brain and Mind Research Institute
Weill Cornell Medicine, New York, NY
- 2017-2019 **Adjunct Assistant Professor**
Department of Biostatistics and Computational Biology
Cornell University, Ithaca, NY
- 2019-present **Associate Professor of Mathematics in Radiology and Neuroscience**
Department of Radiology and the Brain and Mind Research Institute
Weill Cornell Medicine, New York, NY
- 2019-present **Adjunct Associate Professor**
Department of Computational Biology
Cornell University, Ithaca, NY
- 2021-present **Adjunct Associate Professor**
Burke Neurological Research Institute, White Plains, NY

Education

Mount Union College

BS, Mathematics, May 2004
Graduated Summa Cum Laude

Case Western Reserve University

PhD, Applied Mathematics, May 2009
Thesis Advisor: Dr. Daniela Calvetti
Thesis Title: Efficient computational and statistical models of hepatic metabolism

Weill Cornell Medicine

Postdoctoral Fellow, 2009-2013
Department of Radiology, Raj Laboratory

Publications

PEER-REVIEWED JOURNAL PUBLICATIONS

1. Calvetti D.*, **Kuceyeski A.***, and Somersalo E. (2008) Sampling-based analysis of spatially distributed model for liver metabolism at steady state, *Multi-Scale Modeling and Simulation* 7(1), p 407-431. ***co-first author**
2. Calvetti D.*, **Kuceyeski A.***, and Somersalo E. (2008) A mathematical model of liver metabolism: from steady state to dynamic, *Journal of Physics: Conference Series* (124). ***co-first author**
3. **Kuceyeski A.**, Maruta, J., Niogi, S., Ghajar, J. and Raj, A. (2011) *The generation and validation of white matter connectivity importance maps*. *NeuroImage* (58), p 109-121.
4. **Kuceyeski A.**, Zhang, Y. and Raj, A. (2012) *Investigating white matter loss and gray matter changes in Alzheimer's disease and Fronto-temporal dementia using structural brain connectivity information*.

- NeuroImage 61(4): p 1311-23.
5. Raj, A., **Kuceyeski, A.** and Weiner, M. (2012) *A diffusion network model of disease progression in dementia*. *Neuron* 73(6): p 1204-15.
 6. Ivkovic, M., **Kuceyeski, A.**, and Raj, A. (2012) *Statistics of Weighted Brain Networks Reveal Hierarchical Organization and Gaussian Degree Distribution*. *PLoS ONE* 7(6): e35029.
 7. LoCastro, E., **Kuceyeski, A.** and Raj, A. (2013) *Brainography: An Atlas-Independent Surface and Network Rendering Tool for Neural Connectivity Visualization*. *Neuroinformatics*, News Item.
 8. **Kuceyeski A.**, Maruta, J., Relkin, N., and Raj, A. (2013) *The Network Modification (NeMo) Tool: elucidating the effect of white matter integrity changes on cortical and subcortical structural connectivity*. *Brain Connectivity*, 3(5).
 9. **Kuceyeski A.**, Meyerhoff, D., Durrazo T., and Raj, A. (2013) *Loss in Connectivity (LoCo) in regions of the brain reward system in alcohol dependence*. *Human Brain Mapping*, 34(12), p 3129-42.
 10. **Kuceyeski, A.**, Kamel, H., Navi, B.B., Raj, A., and Iadecola, C. (2014) *Predicting future brain tissue loss from white matter connectivity disruption in ischemic stroke*. *Stroke*, 45(3), p 717-22.
 11. Goel, P., **Kuceyeski, A.**, LoCastro, E. and Raj, A. (2014) *Spatial patterns of genome-wide expression profiles reflect anatomic and fiber connectivity architecture of healthy human brain*. *Human brain mapping*, 35(8), p 4204-18.
 12. Glodzik, L.*, **Kuceyeski A.***, Rusinek, H., Tsui, W., Mosconi, L., Li, Y., Osorio, R.S., Williams, S., Randall, C., Spector, N., McHugh, P., Murray, J., Pirraglia, E., Vallabhajosula, S., Raj, A., de Leon, M.J. (2014) *Reduced glucose uptake and A β in brain regions with hyperintensities in connected white matter*. *NeuroImage*, 100, p 684-91. ***co-first author**
 13. **Kuceyeski, A.**, Vargas, W., Dayan, M., Monohan, E., Blackwell, C., Raj, A., Fujimoto, K., Gauthier, S.A. (2015) *Modeling the relationship between gray matter atrophy, abnormalities in connecting white matter and cognitive performance in early Multiple Sclerosis*. *American Journal of Neuroradiology*. 36(4), p 702-9. PMID: 25414004.
 14. Raj, A., LoCastro, E., **Kuceyeski, A.**, Tosun, D., Relkin, N. and Weiner, M. (2015) *Network diffusion model of progression predicts longitudinal patterns of atrophy and metabolism in Alzheimer's Disease*. *Cell Reports*, 10 (3), p. 359-369.
 15. **Kuceyeski, A.**, Navi, B.B., Kamel, H., Relkin, N., Villanueva, M., Raj, R., Toglia, T., O'Dell, M. and Iadecola, C. (2015) *Exploring the brain's structural connectome: a quantitative stroke lesion-dysfunction mapping study*. *Human Brain Mapping*, 36(6), p 2147-60. PMC4414746.
 16. Juluru, K., Al Khori, N., He, S., **Kuceyeski, A.**, and Eng, J. (2015) *A Mathematical Simulation to Assess Variability in Lung Nodule Size Measurement Associated With Nodule-Slice Position*. *Journal of Digital Imaging*. 28(3), p 373-9.
 17. Dayan, M., Monohan, E., Pandya, S., **Kuceyeski, A.**, Nguyen, T., Raj, A., Gauthier, S. (2016) *Profilometry: A new statistical framework for the characterization of white matter pathways, with application to multiple sclerosis*. *Human Brain Mapping*, 37(3), p 989-1004.
 18. Otal B., Dutta A., Foerster Á., Ripolles O., **Kuceyeski A.**, Miranda P.C., Edwards D.J., Ilić T.V., Nitsche M.A., Ruffini G. (2016) *Opportunities for Guided Multichannel Non-invasive Transcranial Current Stimulation in Poststroke Rehabilitation*. *Frontiers in Neurology*, p 7-21. PMC4764713.
 19. **Kuceyeski, A.**, Navi, B.B., Kamel, H., Relkin, N., Villanueva, M., Raj, R., Toglia, T., Iadecola, C. and O'Dell, M. (2016). *Structural connectome disruption at baseline predicts 6-months post-stroke outcome*. *Human Brain Mapping*, 37(7), p 2587-2601. PMID: 27016287.
 20. **Kuceyeski, A.***, Sudhin, S.*, Dyke, J.P., Bickel, S., Abdelnour, F., Schiff, N.D., Voss, H.U., Raj, A. (2016) *The application of a mathematical model linking structural and functional connectomes in severe brain injury*. *NeuroImage: Clinical* (11), p 635-647. PMC4864323. ***co-first author**
 21. Pandya, S., **Kuceyeski, A.** and Raj, A. (2017) *The brain's structural connectome mediates the relationship between regional neuroimaging biomarkers in Alzheimer's disease*. *Journal of Alzheimer's Disease*, 55 (4), p 1639-1657.
 22. Chiang G., Chang E., Pandya S., **Kuceyeski A.**, Hu J., Isaacson R., Ganzer C., Schulman A., Sobel V., Vallabhajosula S., Ravdin L. (2017) *Cognitive deficits in non-demented diabetic elderly appear independent of brain amyloidosis*. *J Neurol Sci*, 372, p 85-91. PMID: 28017255.
 23. Kaunzner U.W., Kang Y., Monohan E., Kothari P.J., Nealon N., Perumal J., Vartanian T., **Kuceyeski A.**, Vallabhajosula S., Mozley P.D., Riley C.S., Newman S.M., Gauthier SA. (2017) *Reduction of PK11195 uptake observed in multiple sclerosis lesions after natalizumab initiation*. *Multi Scler Relat*

- Disord, 15, p 27-33. PMID: 28641769.
24. Yao Y, Nguyen TD, Pandya S, Zhang Y, Hurtado Rúa S, Kovanlikaya I, **Kuceyeski A**, Liu Z, Wang Y, Gauthier SA. (2018) *Combining Quantitative Susceptibility Mapping with Automatic Zero Reference (QSM0) and Myelin Water Fraction Imaging to Quantify Iron-Related Myelin Damage in Chronic Active MS Lesions*. Am J Neuroradiol., 39 (2), p 303-310, PMID: 29242359.
 25. Fuchs TA, Dwyer MG, **Kuceyeski A**, Choudhery S, Carolus K, Li X, Mallory M, Weinstock-Guttman B, Jakimovski D, Ramasamy D, Zivadinov R, Benedict RHB. (2018) *White matter tract network disruption explains reduced conscientiousness in multiple sclerosis*. Hum Brain Mapp. 39(9), p 3682-3690. PMID: 29740964.
 26. Fuchs TA, Carolus K, Benedict RHB, Bergsland N, Ramasamy D, Jakimovski D, Weinstock-Guttman B, **Kuceyeski A**, Zivadinov R, Dwyer MG. (2018) *Impact of Focal White Matter Damage on Localized Subcortical Gray Matter Atrophy in Multiple Sclerosis: A 5-Year Study*. Am J Neuroradiol., 39(8), p 1480-1486. PMID: 29976833
 27. **Kuceyeski A**, Monohan E, Morris E, Fujimoto K, Vargas W, Gauthier SA. (2018) *Baseline biomarkers of connectome disruption and atrophy predict future processing speed in early multiple sclerosis*. NeuroImage: Clinical, 19, p 417-424.
 28. Kang Y, Schlyer D, Kaunzner UW, **Kuceyeski A**, Kothari PJ, Gauthier SA. (2018) *Comparison of two different methods of image analysis for the assessment of microglial activation in patients with multiple sclerosis using (R)-[N-methyl-carbon-11]PK11195*. PLoS One, 13(8):e0201289. PMID: 30091993.
 29. Puig, J., Blasco, G., Alberich-Bayarri, A., Biarnes, C., Navas-Martí, M., Rivero, M., Gich, J., Figueras, J., Torres, C., García, F., Daunis-i-Estadella, P., Oramas-Requejo, C.L., Serena, J., Schlaug, G., Stinear, C.M., **Kuceyeski, A.**, Deco, G., Sorino, C., Thomalla, G., Essig, M., Figley, C., Menon, B., Demchuk, A., Nael, K., Wintermark, M., Liebeskind, D., Pedraza, S. (2018) *Resting State Functional Connectivity MRI and Outcome after Acute Stroke*. Stroke., 49(10), p 2353-2360.
 30. Respino M, Jaywant A, **Kuceyeski A**, Victoria LW, Hoptman MJ, Scult MA, Sankin L, Pimontel M, Liston C, Belvederi Murri M, Alexopoulos GS, Gunning FM. (2019) *The impact of white matter hyperintensities on the structural connectome in late-life depression: Relationship to executive functions*. NeuroImage: Clin., 23:101852. PMID: 31077981.
 31. Gerber MB, McLean AC, Stephen SJ, Chalco AG, Arshad UM, Thickbroom GW, Silverstein J, Tsagaris KZ, **Kuceyeski A**, Friel K, Santos TEG, Edwards DJ. (2019) *NeuroMeasure: A Software Package for Quantification of Cortical Motor Maps Using Frameless Stereotaxic Transcranial Magnetic Stimulation*. Front Neuroinform. 13:23. PMID: 31105546
 32. Khosla M, Jamison K, **Kuceyeski A**, Sabuncu MR. (2019) *Ensemble Learning with 3D convolutional neural networks for functional connectome-based prediction*. NeuroImage. 199, p 651-662. PMID: 31220576.
 33. Khosla M, Jamison K, **Kuceyeski A**, Sabuncu MR. (2019) *Detecting Abnormalities in Resting-State Dynamics: An Unsupervised Learning Approach*. Machine Learning in Medical Imaging, p. 301-309.
 34. **Kuceyeski A**, Jamison KW, Owen JP, Raj A, Mukherjee P. (2019) *Longitudinal increases in structural connectome segregation and functional connectome integration are associated with better recovery after mild TBI*. Hum Brain Mapp., 40(15), p 4441-4456. PMID: 31294921.
 35. Tozlu C, Edwards D, Boes A, Labar, D, Tsagaris, KZ, Silverstein, J, Lane, HP, Sabuncu, MR, Liu, C, **Kuceyeski, A.** (2020) *Predicting response to motor therapy in chronic stroke patients using Machine Learning*. Neurorehabilitation and Neural Repair, 34(5):428-439, PMID: 32193984.
 36. Dhamala E, Jamison K, Sabuncu M, **Kuceyeski A.** (2020) *Sex classification using long-range temporal dependence of resting-state functional MRI time series*. Human Brain Mapping.
 37. Cha J, Speaker S, Hu B, Altinay M, Koirala P, Karne H, Spielberg J, **Kuceyeski A**, Dhamala E, Anand A. *Neuroimaging correlates of emotional response-inhibition discriminate between young depressed adults with and without sub-threshold bipolar symptoms (Emotional Response-inhibition in Young Depressed Adults)*. J Affect Disord. 2021 Feb 15;281:303-311.
 38. Sweeney EM, Nguyen TD, **Kuceyeski A**, Ryan SM, Zhang S, Zexter L, Wang Y, Gauthier SA. *Estimation of Multiple Sclerosis lesion age on magnetic resonance imaging*. Neuroimage. 2021 Jan 15;225:117451.

39. Kang Y, Rúa SMH, Kaunzner UW, Perumal J, Nealon N, Qu W, Kothari PJ, Vartanian T, **Kuceyeski A**, Gauthier SA. *A Multi-Ligand Imaging Study Exploring GABAergic Receptor Expression and Inflammation in Multiple Sclerosis*. *Mol Imaging Biol*. 2020 Dec;22(6):1600-1608.
40. Fuchs TA, Ziccardi S, Benedict RHB, Bartnik A, **Kuceyeski A**, Charvet LE, Oship D, Weinstock-Guttman B, Wojcik C, Hojnacki D, Kolb C, Escobar J, Campbell R, Tran HD, Bergsland N, Jakimovski D, Zivadinov R, Dwyer MG. *Functional Connectivity and Structural Disruption in the Default-Mode Network Predicts Cognitive Rehabilitation Outcomes in Multiple Sclerosis*. *J Neuroimaging*. 2020 Jul;30(4):523-530.
41. Liew SL, Zavaliangos-Petropulu A, Jahanshad N, Lang CE, Hayward KS, Lohse KR, Juliano JM, Assogna F, Baugh LA, Bhattacharya AK, Bigjahan B, Borich MR, Boyd LA, Brodtmann A, Buetefisch CM, Byblow WD, Cassidy JM, Conforto AB, Craddock RC, Dimyan MA, Dula AN, Ermer E, Etherton MR, Fercho KA, Gregory CM, Hadidchi S, Holguin JA, Hwang DH, Jung S, Kautz SA, Khlif MS, Khoshab N, Kim B, Kim H, **Kuceyeski A**, Lotze M, MacIntosh BJ, Margetis JL, Mohamed FB, Piras F, Ramos-Murguialday A, Richard G, Roberts P, Robertson AD, Rondina JM, Rost NS, Sanossian N, Schweighofer N, Seo NJ, Shiroishi MS, Soekadar SR, Spalletta G, Stinear CM, Suri A, Tang WKW, Thielman GT, Vecchio D, Villringer A, Ward NS, Werden E, Westlye LT, Winstein C, Wittenberg GF, Wong KA, Yu C, Cramer SC, Thompson PM. *The ENIGMA Stroke Recovery Working Group: Big data neuroimaging to study brain-behavior relationships after stroke*. *Hum Brain Mapp*. 2020.
42. Dhamala E, Jamison K, Jaywant, A, Dennis, S, **Kuceyeski A**. *Distinct functional and structural connections predict crystallised and fluid cognition in healthy adults*. *Human Brain Mapping*. 2021. Vol 42: p 3102– 3118.
43. Khosla M, Ngo GH, Jamison K, **Kuceyeski A**, Sabuncu MR. *Cortical response to naturalistic stimuli is largely predictable with deep neural networks*. *Sci Adv*. 2021;7(22):eabe7547. doi:10.1126/sciadv.abe7547.
44. Gu, Z, Jamison, K, Sabuncu, M, **Kuceyeski A**. *Heritability and interindividual variability of regional structure-function coupling*. *Nat Communications*. 2021. Vol 12, p 4894.
45. Jaywant, A, Dunlop, K, Victoria, L, Oberlin, L, Lynch, C, Respino, M, **Kuceyeski, A**, Scult, M, Hoptman, M, Liston, C, O'Dell, M, Alexopoulos, G, Perlis, R, Gunning, F. *Estimated Regional White Matter Hyperintensity Burden, Resting State Functional Connectivity, and Cognitive Functions in Older Adults*. *Am J Geriatr Psychiatry*. (in press)
46. Hurtado-Rua, S, Kaunzner, U, Pandya, S, Sweeney, E, Tozlu, C, **Kuceyeski, A**, Nguyen, T, and Gauthier, S. *Lesion features discriminate multiple sclerosis patients*. *European Journal of Neurology*. (in press)
47. Tozlu C, Jamison K, Nguyen T, Zinger N, Kaunzner U, Pandya S, Wang Y, Gauthier S, **Kuceyeski A**. *Structural disconnectivity from paramagnetic rim lesions is related to disability in multiple sclerosis*. *Brain Connectivity and Behavior*. (in press)
48. Tozlu C, Jamison K, Gauthier S and **Kuceyeski A**. *Estimated connectivity networks outperform observed connectivity networks when classifying people with multiple sclerosis into high and low disability groups*. *NeuroImage: Clinical*. (in press)
49. Liew SL, Zavaliangos-Petropulu A, Jahanshad N, Lang CE, Hayward KS, Lohse KR, Juliano JM, Assogna F, Baugh LA, Bhattacharya AK, Bigjahan B, Borich MR, Boyd LA, Brodtmann A, Buetefisch CM, Byblow WD, Cassidy JM, Conforto AB, Craddock RC, Dimyan MA, Dula AN, Ermer E, Etherton MR, Fercho KA, Gregory CM, Hadidchi S, Holguin JA, Hwang DH, Jung S, Kautz SA, Khlif MS, Khoshab N, Kim B, Kim H, **Kuceyeski A**, Lotze M, MacIntosh BJ, Margetis JL, Mohamed FB, Piras F, Ramos-Murguialday A, Richard G, Roberts P, Robertson AD, Rondina JM, Rost NS, Sanossian N, Schweighofer N, Seo NJ, Shiroishi MS, Soekadar SR, Spalletta G, Stinear CM, Suri A, Tang WKW, Thielman GT, Vecchio D, Villringer A, Ward NS, Werden E, Westlye LT, Winstein C, Wittenberg GF, Wong KA, Yu C, Cramer SC, Thompson PM. *Smaller spared subcortical nuclei are associated with worse post-stroke sensorimotor outcomes in 28 cohorts worldwide*. *Brain Communications*. (in press)
50. Dhamala, E., Jamison, K, Jaywant A., and **Kuceyeski A**. *Shared functional connections within and between cortical networks predict individual cognitive abilities in adult males and females*. *Human Brain Mapping* (in press).

51. Olafson E, Jamison K, Sweeny E, Liu H, Wang D, Bruss J, Boes A, **Kuceyeski A.** *Functional connectome reorganization after pontine stroke is associated with structural disconnection and motor recovery.* *NeuroImage.* Vol 245; 118642.
52. Tozlu C, Jamison K, Gauthier S and **Kuceyeski A.** Dynamic functional connectivity better predicts disability than structural and static functional connectivity in people with multiple sclerosis. *Frontiers in Neuroscience: Brain Imaging Methods.* (in press)

BOOK CHAPTERS

1. **Kuceyeski A.** (2017) "Brain Lesion Studies." *Encyclopedia of Evolutionary Psychological Science*, Editors: Todd K. Shackelford and Viviana A. Weekes-Shackelford, Springer.
2. **Kuceyeski A and Boes A.** (in press) "Lesion network mapping: from a topologic to a hodologic approach", *Lesion-to-Symptom Mapping: Principals and Tools.* Editors: Daniel Mirman and Dorian Pustina.

REVIEWS

1. Khosla M, Jamison K, Ngo GH, **Kuceyeski A**, Sabuncu MR. (2019) *Machine learning in resting-state fMRI analysis.* *Magn Reson Imaging.* 64:101-121. PMID: 31173849; PMCID: PMC6875692.
2. Shah, S, Lowder, R and **Kuceyeski A.** (2020) *Quantitative multimodal imaging in traumatic brain injuries producing impaired cognition.* *Current Opinions Neurology,* 33(6): p. 691-698.

Presentations

INVITED TALKS

- 12/06 *A spatially distributed metabolic model of the liver in fasted, resting state*
Finnish Inverse Problems Society Conference, Tampere, Finland
- 09/07 *Mathematical modeling and its application to liver metabolism*
Mount Union College, Alliance, OH
- 06/07 *The liver: spatial distribution at steady state*
Applied Inverse Problems Conference, Vancouver, Canada, June 2007
- 05/07 *Adaptive sampling techniques: application to a large-dimensional liver metabolism model*
Lappeenranta University of Technology, Lappeenranta, Finland
- 09/11 *Quantifying Disruptions in the Structural Brain Network*
McGill University, Montreal, Quebec, Canada
- 03/12 *Linking Structural Brain Network Disruption to Dysfunction*
Brain Trauma Foundation, New York, NY
- 04/12 *Quantifying loss in brain connection in Neurodegeneration*
Columbia University, New York, NY
- 06/13 Works in Progress Seminar: *Exploring the brain's connectome: linking patient dysfunction to network disruption*
The Brain and Mind Research Institute, WCM, New York, NY
- 10/13 *Structural disconnection in early multiple sclerosis patients is related to atrophy in subcortical areas and a measure of cognition*
European Committee for Treatment and Research in Multiple Sclerosis Conference, Copenhagen, Denmark
- 03/13 *Changes to the Structural Connectivity Network in MS Subjects Is Correlated with Cortical Thickness and a Measure of Disability*
American Academy of Neurology Conference, San Diego, CA
- 10/14 *Modeling the Link Between Structural Connectivity Network Disruption and Performance and Activity Limitation in Stroke*
American Congress for Rehabilitation Medicine, Toronto, Canada
- 11/15 *The (dys)-connectome: quantifying brain network influences in disease and recovery*
The City College of New York, New York NY
- 10/15 *The (dys)-connectome: quantifying brain network influences in disease and recovery*
Mount Sinai Hospital, New York NY

- 04/16 *Exploring the connectome without diffusion tensor imaging: from research to clinical application in stroke*
European Stroke Conference, Venice Italy
- 10/16 *The (dys)-connectome: quantifying brain network influences in disease and recovery*
Biomedical Imaging Center 3rd Annual Symposium, Mount Sinai, NY
- 11/16 *The role of the brain's connectome in health and disease*
Buffalo NeuroImaging Analysis Center, Buffalo, NY
- 04/18 *The role of the connectome in health, disease and recovery*
Progress in Neuroscience Seminar
The Brain and Mind Research Institute, WCM, New York, NY
- 09/18 *Machine Learning and the Brain's Connectome*
Bridging the Gap: Machine Learning in Medicine Symposium, Ithaca, NY
- 09/18 *Quantifying and manipulating the connectome*
Cross-campus NeuroImaging Symposium, WCM, New York, NY
- 09/19 *Connectomics in injury and recovery*
Brain Injury Research Seminar Series, WCM, New York, NY
- 10/19 *NeuroImaging in the Cloud*
Cloud Computing Symposium, WCM, New York, NY
- 11/19 *The role of the connectome in post-stroke impairment and recovery*
Cleveland Clinic, Cleveland, OH
- 7/20 *Connectivity Networks in the Human Brain*
Online Academic Conference of College of Biological Sciences, China Agricultural University
- 7/20 *Work-life balance: finding your fulcrum*
Conference for the Organization for Human Brain Mapping, Student Interest Group Seminar
- 2/21 *Increased Range of Dynamic Functional Connectome Trajectories Predict Better Attention in Individuals with Traumatic Brain Injury*
International Neuropsychological Society (virtual conference)
- 5/21 *Psychedelics flatten the brain's energy landscape*
Canadian Computational Neuroscience Spotlight, Montreal, Canada (virtual conference)
- 6/21 *Structure-function (dis)connectome coupling: brain network modeling in disease*
Symposium talk, **Organization for Human Brain Mapping** (virtual)
- 6/21 *Structure-function (dis)connectome coupling: brain network modeling in disease*
Burke Neurological Institute, White Plains, NY (virtual)
- 6/21 *Artificial and biological neural networks*
Pattern Recognition Lab, Friedrich-Alexander University, Erlangen-Nurnberg, Germany (virtual)
- 7/21 *Connectomics in neurological impairment and recovery*
Clinical Neuroanatomy Seminars, France/Germany (virtual)
- 7/21 *Artificial and biological neural networks*
Korean Brain Seminar, Ewha Women's University, Seoul, South Korea (virtual)
- 2/22 *TBD*
Brain Space Initiative, Georgia State University/Georgia Tech and Emory University for a worldwide audience (virtual)

Support and Awards

CURRENT RESEARCH GRANTS

NIH/NINDS R01NS102646

Kuceyeski and Shah (co-PIs)

12/01/17-11/31/22

Multi-modal imaging of the mechanisms underlying impaired executive attention after traumatic brain injury

To elucidate mechanisms of attention impairment in TBI using EEG/MRI and machine learning.

Role: co-PI

NIH/NINDS R01NS104283 Gauthier (PI) 7/1/2018-6/30/2023
Identifying mechanisms of tissue injury in MS lesions: a multi-modality imaging approach
 To test the hypotheses that m/M activity and iron increases in acute MS lesions results in more myelin destruction and that low myelin and persistent iron predicts neurodegeneration and disability.
Role: Co-I

NIH/NINDS 1R56NS111052 Butler (PI) 8/15/2019-7/31/2024
CSF Clearance and Brain Amyloid Dynamics after Traumatic Brain Injury
 This project applies PET to measure clearance of amyloid in TBI to examine if it's recovery-related.
Role: co-I

NIH/NINDS 1R01NS114405 Boes (PI) 1/01/2020-12/31/2025
Predicting Cognitive Outcomes from Stroke Based on Lesion Location
 The goals of this project are to use advanced statistical techniques applied to lesion characteristics to obtain more accurate prediction of cognitive outcomes in post-stroke populations.
Role: co-I

Cornell Intercampus Pilot Grant Kuceyeski (co-PI) 10/9/2020-12/31/2021
Creating and Validating a Novel, Non-Invasive Method for Targeted Brain Activation
 To use ML to create synthetic images targeted to achieve a certain pattern of brain activity.
Role: co-PI

NIH/NIMH 1RF1MH123232 Kuceyeski (PI) 5/01/2021-4/31/2024
Heritability and cognitive implications of structural-functional connectome coupling
 To investigate how structural-functional connectome relationships vary with genetics and cognition.
Role: PI

Cornell University MRI Facility Pilot Grant Kuceyeski (PI) 5/01/2021-4/31/2022
Understanding the relationship between the brain's connectivity networks and cognition in pre- and post-menopausal MS patients
 To quantify differences in brain connectomes between multiple sclerosis patients before and after menopause.
Role: PI

NIH/NINDS R21NS120227 Basu (PI) 5/01/2021-4/30/2024
Learning high-dimensional functional connectomes of heterogeneous populations
 To create statistical tools to more accurately estimate functional connectomes using functional MRI.
Role: co-I

PAST RESEARCH GRANTS AND STIPENDS

NIH/NIBIB NRSA F32 Post-doc Fellowship Kuceyeski (PI) 8/2010-8/2012
Construction of a connectivity importance map of white and gray matter in the human brain
 Awarded this prestigious two-year postdoctoral fellowship research training grant to study structural connectivity in the human brain
Role: Co-I

Leon Levy Research Fellowship Kuceyeski (PI) 2/1/13-06/31/14
Quantifying the link between connectivity disruption and patient dysfunction and disability in stroke
 This project focused on creating biomarkers that quantified the impact of stroke infarct location and size on the structural connectivity network in the brain and built models to predict patient disability based on these biomarkers.
Role: PI

NIH/NCI: 1R01CA181566-01A1 Spincemaille (PI) 5/19/2015-4/30/2020
Compact Representations of Dynamic Liver MRI

To develop and test an MR-based imaging method for more accurate characterization of liver tumors during initial detection and follow-up.

Role: Co-I

NIH/NINDS R01NS092802 Raj (PI) 7/15/16-12/01/17

Predictive model of spread of Parkinson's pathology using network diffusion

The major goals of this project are to use mathematical models to predict the spread of pathology in Parkinson's disease.

Role: Co-I

NIH/NHLBI R21HL132277 Kuceyeski and Min (co-PIs) 9/1/16-8/31/18

An integrated computing platform for prediction and visualization of coronary ischemia

To improve visualization and prediction of coronary ischemia from CT imaging and computational fluid dynamics.

Role: Co-PI

NIH/NIBIB R01EB022717 Raj (PI) 9/30/16-6/30/19

Multimodal modeling framework for fusing structural and functional connectome data

This project will develop graph theoretic models of brain activity.

Role: Co-I

NIH/ NINDS R01NS092802 Raj (PI) 7/15/16-12/01/17

Predictive model of spread of Parkinson's pathology using network diffusion

The major goals of this project are to use mathematical models to predict the spread of pathology in Parkinson's disease.

Role: Co-I

National Multiple Sclerosis Society: RG-1602-07671 Nguyen (PI) 10/01/16-9/30/20

Quantitative MRI of lesion iron and myelin repair

To develop MRI methods for quantifying iron and myelin in MS lesions and correlate with recovery.

Role: Co-I

Kellen Junior Faculty Fellowship Kuceyeski (PI) 4/1/17-7/31/18

Multiple Sclerosis and Connectomes

To use quantitative methods, including mathematical modeling and machine learning, to uncover connectome-based mechanisms of resiliency to multiple sclerosis-related damage.

Role: PI

NIH/NINDS R21NS104634 Kuceyeski (PI) 9/27/17-9/26/21

Quantifying the role of the connectome in resiliency to multiple sclerosis

To identify differences between high and low adapting patients with MS using machine learning.

Role: PI

CBIC Imaging Pilot Award Kuceyeski (PI) 8/1/18-7/31/21

Quantifying the evolving post-stroke connectome

This aims to capture recovery-relevant changes in post-stroke structural and functional connectomes.

Role: PI

CBIC Imaging Pilot Award Kuceyeski and Shah (co-PIs) 2/01/19-6/30/20

Neuronal loss underlying impaired executive attention after traumatic brain injury (TBI)

To relate PET-based biomarkers of neuronal loss to attention deficits in traumatic brain injury.

Role: co-PI

CBIC Imaging Pilot Award Butler (PI) 7/01/2019-6/30/2021

Biomarkers of neurodegeneration in women with repetitive traumatic brain injury due to intimate partner violence

The major goals of this project are to identify neuroimaging based biomarkers of neurodegeneration in victims of domestic violence.

Role: co-I

CBIC Imaging Pilot Award Kuceyeski and Calderon (co-PIs) 10/01/2019-9/30/2020

Brain structural connectivity changes in mouse models of post-traumatic brain injury recovery

The major goals of this project are to relate diffusion MRI based biomarkers of injury and measures of motor recovery after traumatic brain injury in mice

Role: co-PI

AWARDS

04/07 First Prize

Research Showcase, Case Western Reserve University, Cleveland, OH

Approximately 5% of the participants were awarded this prize for outstanding research and communication of their work

04/08 Honorable Mention

Research Showcase, Case Western Reserve University, Cleveland, OH

Awarded to approximately 10% of the participants for excellence in research and poster presentation

05/12 Magna Cum Laude Award

International Society of Magnetic Resonance in Medicine, Melbourne, Australia

Awarded to the top 15% of all abstracts within the same category

07/20 Editor's Choice Collection, Human Brain Mapping 2020

Awarded to: Kuceyeski A, Jamison KW, Owen JP, Raj A, Mukherjee P. (2019) *Longitudinal increases in structural connectome segregation and functional connectome integration are associated with better recovery after mild TBI*. Hum Brain Mapp., 40(15), p 4441-4456. PMID: 31294921.

07/21 Organization for Human Brain Mapping Merit Awards (top 1% of abstracts)

Functional Connectome Reorganization after Pontine Stroke is Associated with Better Motor Outcomes and Identification

Synthesis of Preferred Images for Individual Regions in the Human Visual Cortex

TEACHING AND MENTORING

Formal Teaching

2005 Calculus I for Science and Engineering, Case Western Reserve University, Cleveland, OH

2005 Calculus I for Life and Social Sciences, Case Western Reserve University, Cleveland, OH

2006 Calculus II for Life and Social Sciences, Case Western Reserve University, Cleveland, OH

2008 Integrated Calculus, Summer Medical and Dental Education Program, Case Western Reserve University, Cleveland, OH

2009 Calculus III for Science and Engineering, Case Western Reserve University, Cleveland, OH

2021 Faculty advisor, Data Science Basics Course, Neuroscience, WCM, NY NY

Invited Educational Lectures

11/11 & 3/14 Lecture for CS7594: Seminar on Computational Issues in Health and Medicine, Cornell-Ithaca and Cornell NYC-Technion, Cornell University, Ithaca, NY

12/13 Lecture for CS5660: Signal and Image Processing at Cornell NYC-Technion, Cornell University, Ithaca, NY

7/14 Rehabilitation Medicine Grand Rounds, WCM, New York, NY

12/15 Neurology Grand Rounds, WCM, New York, NY

6/16 Neurological Surgery Grand Rounds, WCM, New York, NY

11/17 Lecture for ECE 5970: Machine Learning with Biomedical Data, Cornell-Ithaca
 2017-2021 Lecture for Radiology Resident Education Seminar, WCM, New York, NY
 03/19 Lecture for Cornell Bioinformatics Club, Cornell University, Ithaca NY
 02/20 Lecture for Electrical Engineering Department, Cornell University, Ithaca, NY
 08/20 Lecture for Computational Biology Department, Cornell University, Ithaca, NY
 09/21 Lecture for Applied Quantitative Techniques for the Biological Sciences, Neuroscience, WCM, NY NY

Mentoring

Fall 2011 STEM after-school program mentor, New York Academy of Sciences, New York NY
 2015-2016 Neurosciences graduate program rotation mentor: Naomi Xia, Hillary Raab, Hasan Mohammad and Xhie Xie, WCM, New York, NY
 2015-2018 PhD thesis committee member, Christopher Mezas, Department of Neuroscience, WCM, New York, NY
 Summer 2016 Summer internship mentor:
 Evan Yu, Biomedical Engineering graduate student, Cornell University, Ithaca, NY
 Quintin Rizek, neuroscience graduate student, Brown University, Providence, RI
 Kimberly Ho, high school student, Stuyvesant High School, New York, NY
 2016-2021 PhD thesis committee member, Xhie Xie, Department of Neuroscience, WCM, New York, NY
 2017-present PhD thesis committee member for Evan Yu, Department of Electrical and Computer Engineering, Cornell University, Ithaca NY
 2017-2021 PhD thesis co-mentor for Meenakshi Kholsa, Department of Electrical and Computer Engineering, Cornell University, Ithaca NY
 2018-2021 PhD thesis committee member for Hassan Mohammad, Department of Physiology, Biophysics and Systems Biology, WCM, New York NY
 2018-2021 PhD thesis committee member for Gabriele Campanella, Department of Physiology, Biophysics and Systems Biology, WCM, New York NY
 2018-2021 PhD thesis advisor for Elvisha Dhamala, Department of Neuroscience, WCM, New York, NY
 2018-present Postdoctoral Fellow advisor for Ceren Tozlu, Department of Radiology, WCM, New York NY
 09/18-05/19 Mentor for Master's in Engineering project for students Hanyang Zhang, Shashank Pathak, Siwen Chen, Cornell University, Ithaca NY
 12/18-present PhD Committee Member for Biomedical Engineering PhD student Qihao Zhang, Cornell University, Ithaca, NY
 12/18-present Minor PhD mentor for Biomedical Engineering PhD student Jinwei Zhang, Cornell University, Ithaca, NY
 05/19-9/19 Undergraduate research project mentor, Sharon Dang, Cornell University, Ithaca NY
 05/19-05/20 Undergraduate research project mentor for Alex Lin, Cornell University, Ithaca NY
 06/19 PhD Thesis Committee Member for PhD student Sarah Eskreis-Winkler
 07/19-9/19 Undergraduate Summer Research Experience mentor, Sarah Dennis (Sarah Lawrence)
 10/19-present PhD thesis committee member for Amanda Simon, Department of Neuroscience, WCM, NY, NY
 05/19-2021 Undergraduate research project mentor for Jason Chen, Cornell University, Ithaca NY
 2019-present PhD thesis co-mentor, Suniyya Waraich, Department of Neuroscience, WCM, New York, NY
 2019-present PhD thesis committee member, Gia Ngo, Department of Electrical and Computer Engineering, Cornell University, Ithaca NY
 2020-present PhD thesis advisor for Emily Olafson, Department of Neuroscience, WCM, NY, NY
 9/19-present PhD thesis advisor for Electrical and Computer Engineering PhD student Zijin Gu, Cornell University, Ithaca, NY
 12/19-present PhD thesis committee member, Josue Barnes, Physiology, Biophysics, Systems Biology WCM, NY, NY

- 12/19-5/20 Project Advisor, Department of Statistics and Data Science master's students, Cornell University, Ithaca, NY
- 1/20-present PhD thesis co-mentor for Physiology, Biophysics, Systems Biology PhD student Lisa Iatckova, WCM, NY, NY
- 1/20-2021 Undergraduate research project mentor, Elaine Wu, Cornell University, Ithaca NY
- 1/20-9/21 Undergraduate research project mentor, Yiran Li, Cornell University, Ithaca NY
- 5/20-4/21 Undergraduate research project mentor, Nicholas Vartanian, University of Vermont, VT
- 6/20-present PhD thesis advisor for Computational Biology PhD student Parker Singleton, Cornell University, Ithaca, NY
- 6/20-present Undergraduate research project mentor, Catherine Cai, Cornell University, Ithaca NY
- 6/20-present High school summer research project mentor, Georgia Russello, White Plains NY
- 9/20-12/20 Graduate rotation mentor Ann Baako, Weill Cornell Medicine, NY NY
- 2020-2021 OHBM Mentor Program
- 2020-2021 Skype a Scientist
- 1/21-present Undergraduate research project mentor, Bella Nevarez, Cornell University, Ithaca NY
- 2/21-present Undergraduate research project mentor, Nate Roy, Cornell University, Ithaca NY
- 6/21-present High school summer research project mentor, Sophie Card
- 8/21-present Undergraduate research project mentor, James Campbell, Cornell University, Ithaca NY
- 08/21-11/21 Graduate rotation mentor, Syed Hussain Ul-Bukhari, Weill Cornell Medicine, NY NY
- 09/21-10/21 Graduate rotation mentor, Hao Xue, Cornell University, Ithaca NY
- 11/21-12/21 Graduate rotation mentor, Yilin Liu, Cornell University, Ithaca NY

ADMINISTRATIVE AND PROFESSIONAL ACTIVITIES

- 2010-2016 Director, Biomedical Imaging Research Seminar Series, WCM, New York, NY
- 2015-2016 Faculty Board, Women in Science, WCM, New York NY
- 9/18, 2/21, 4/22 Symposium Organizer, *Bridging the Gap: Machine Learning in Medicine*, Cornell University, Ithaca NY and Weill Cornell Medicine, NY NY
- 2016-present Founder and Director, Machine Learning in Medicine, Weill Cornell Medicine and Cornell University, www.mlim-cornell.club
- 2019-present Faculty Advisor, Cornell Bioinformatics Club, Cornell University, Ithaca, NY
- 2020-present Review Editor, *Frontiers in Neuroscience: Brain Imaging Methods*
- 2020-present Associate Editor, *Machine Learning in Biomedical Imaging*
- 2020-present Topic Editor, *Advances in Brain Functional and Structural Networks Modeling via Graph Theory*, *Frontiers in Neuroscience*
- 2021-present Associate Editor, *Data Science in Science*

Ad-hoc Reviewer

Nature Neuroscience, Nature Reviews Neuroscience, Nature Communications, Scientific Reports, Brain, Brain Communications, PNAS, Cerebral Cortex, Journal of Neuroscience, Neurology, Cell, Biological Psychiatry, Translational Psychiatry, NeuroImage, NeuroImage: Clinical, Human Brain Mapping, Radiology, Stroke, Neuroradiology, Journal of Cerebral Blood Flow and Metabolism, JAMA Neurology, eNeuro, Cell Reports, Annals of Neurology, Cognitive Neuroscience, PLoS One, Journal of Neurotrauma, Alzheimer's Research and Therapy, Frontiers in Neurology, Frontiers in Neuroscience, American Journal of Neuroradiology, Frontiers in Human Neuroscience, Journal of Alzheimer's Disease, European Journal of Neurology, Transactions on Biomedical Engineering

Grant Review Panels

National Institutes of Health (NST, EITN and SBIB/SBIR study sections, 2021), Congressionally Directed Medical Research Programs (CDMRP) (United States: 2019, 2020), French Stroke Research Foundation (France), Healthy Brains for Healthy Lives Research (Canada), Biotechnology and Biological Sciences Research Council (United Kingdom, 2019), Dutch Research Council NWO (Netherlands, 2019)

Memberships

Pi Mu Epsilon (mathematics honor society), Vice President
Psi Kappa Omega (academic honor society)

Alpha Lambda Delta (academic honor society)
American Mathematical Society
Society for Industrial and Applied Mathematics
Association for Women in Mathematics
Mathematical Association of America
International Society to Advance Alzheimer's Research and Treatment
American Heart Association
American Academy of Neurology
New York Academy of Sciences
International Society for Magnetic Resonance in Medicine
Organization for Human Brain Mapping
American Congress of Rehabilitation Medicine