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EDUCATION

University of Southern California
Neuroscience Graduate Program
Ph.D. Candidate
Expected May 2020
Richard M. Leahy, PhD & John C. Wood, MD, PhD

University of Southern California
College of Letters, Arts & Sciences
Neuroscience BA, Natural Science Minor
Class of 2010

Los Angeles Center for Enriched Studies
Class of 2006
Valedictorian

Ph.D. Thesis: "Neurological consequences of chronic anemia: insights from Sickle Cell Disease"

AWARDS

American Society of Hematology Abstract Achievement Award (2019)
Neuroscience Graduate Program Annual Symposium Poster Award (2018)
National Institute of Neurological Disorders and Stroke (1F31NS106828-01A1), 2018-2021
National Institutes of Health Predoctoral Training in Interdisciplinary Neurosciences (1 T32 MH 111360-1 A1), 2016

PROFESSIONAL EXPERIENCE 2007 - Present

Clinical Research Assistant **Summer 2014 – Present**
Heart Institute, Children's Hospital Los Angeles

- Studying the effects of Sickle Cell Disease in the brain using multimodal MR imaging, neurocognitive testing, and phlebotomy laboratory factors. Current thesis project.

Research Assistant **Summer 2014 – Present**
Biomedial Imaging Group, SIPI, USC.

- Development of brain image analysis methods in registration, segmentation, diffusion image processing, and post-processing analysis.

Research Assistant **Spring 2010 – Summer 2014**

Dornsife Neuroimaging Center, USC

- Studied the secondary effects of anterior temporal lesions in the frontal lobe using T1 and DWI.
- Studied neurodevelopmental outcomes of premature birth in preadolescents using T1, DWI, and MRS.
- Development and testing of MR image analysis tool, BrainSuite.
- Development of the BCI-DNI brain atlas, a high-resolution anatomical brain atlas with 95 ROI's and 76 sulci, used for registration and segmentation.

Researcher, **Spring 2011 – Summer 2014**
Children's Hospital Los Angeles

- Studied prematurity and traumatic brain injury using MRS. Collaboration with USC Dornsife and Children's Hospital of Pittsburg of UPMC.

Research Volunteer, **Summer 2007 – Fall 2007**
Maxine Dunitz Neurosurgical Institute, Cedars Sinai Medical Center

- Development of nanoparticles and docking abilities of inorganic molecules to neuroreceptors.
- Ran samples through nuclear magnetic resonance (NMR) spectroscopy, scanning electron microscope (SEM) imaging.

PUBLICATIONS

1. **Choi S**, O'Neil SH, Joshi AA, Li J, Bush AM, Coates TD, Leahy RM, Wood JC. Anemia predicts lower white matter volume and cognitive performance in sickle and non-sickle cell anemia syndrome. American journal of hematology. 2019 Oct;94(10):1055-65.
2. Chai Y, Bush AM, Coloigner J, Nederveen AJ, Tamrazi B, Vu C, **Choi S**, Coates TD, Lepore N, Wood JC. White matter has impaired resting oxygen delivery in sickle cell patients. American journal of hematology. 2019 Apr;94(4):467-74.
3. Kim B, Fisher BE, Schweighofer N, Leahy RM, Haldar JP, **Choi S**, Kay DB, Gordon J, Winstein CJ. A comparison of seven different DTI-derived estimates of corticospinal tract structural characteristics in chronic stroke survivors. Journal of neuroscience methods. 2018 Jul 1;304:66-75.
4. Joshi AA, Chong M, Li J, **Choi S**, Leahy RM. Are you thinking what I'm thinking? Synchronization of resting fMRI time-series across subjects. NeuroImage. 2018 May 15;172:740-52.
5. Bush A, Chai Y, **Choi SY**, Vaclavu L, Holland S, Nederveen A, Coates T, Wood J. Pseudo continuous arterial spin labeling quantification in anemic subjects with hyperemic cerebral blood flow. Magnetic resonance imaging. 2018 Apr 1;47:137-46.
6. Miao X, **Choi S**, Tamrazi B, Chai Y, Vu C, Coates TD, Wood JC. Increased brain iron deposition in patients with sickle cell disease: an MRI quantitative susceptibility mapping study. Blood. 2018 Jan 1:blood-2018.

7. Coloigner J, Kim Y, Bush A, **Choi S**, Balderrama MC, Coates TD, O'Neil SH, Lepore N, Wood JC. Contrasting resting-state fMRI abnormalities from sickle and non-sickle anemia. PloS one. 2017 Oct 5;12(10):e0184860.
8. Chong M, Bhushan C, Joshi AA, **Choi S**, Haldar JP, Shattuck DW, Spreng RN, Leahy RM. Individual parcellation of resting fMRI with a group functional connectivity prior. NeuroImage. 2017 Aug 1;156:87-100.
9. Joshi AA, **Choi S**, Sonkar G, Chong M, Gonzalez-Martinez J, Nair D, Shattuck DW, Damasio H, Leahy RM. A whole brain atlas with sub-parcellation of cortical gyri using resting fMRI. InMedical Imaging 2017: Image Processing 2017 Mar 2 (Vol. 10133, p. 101330O). International Society for Optics and Photonics.
10. **Choi S**, Bush AM, Borzage MT, Joshi AA, Mack WJ, Coates TD, Leahy RM, Wood JC. Hemoglobin and mean platelet volume predicts diffuse T1-MRI white matter volume decrease in sickle cell disease patients. NeuroImage: Clinical. 2017 Jan 1;15:239-46.
11. Bush AM, Borzage MT, **Choi S**, Václavů L, Tamrazi B, Nederveen AJ, Coates TD, Wood JC. Determinants of resting cerebral blood flow in sickle cell disease. American journal of hematology. 2016 Sep 1;91(9):912-7.
12. Bhushan C, Chong M, **Choi S**, Joshi AA, Haldar JP, Damasio H, Leahy RM. Temporal non-local means filtering reveals real-time whole-brain cortical interactions in resting fMRI. PloS one. 2016 Jul 8;11(7):e0158504. doi:10.1371/journal.pone.0158504
13. Borzage MT, Bush AM, **Choi S**, Nederveen AJ, Václavů L, Coates TD, Wood JC. Predictors of cerebral blood flow in patients with and without anemia. Journal of Applied Physiology. 2016 Jan 21;120(8):976-81.
14. Bhushan C, Haldar JP, **Choi S,** Joshi AA, Shattuck DW, Leahy RM. Co-registration and distortion correction of diffusion and anatomical images based on inverse contrast normalization. Neuroimage. 2015 Jul 15;115:269-80.
15. Degnan AJ, Wisnowski JL, **Choi S**, Ceschin R, Bhushan C, Leahy RM, Corby P, Schmithorst VJ, Panigrahy A. Altered structural and functional connectivity in late preterm preadolescence: an anatomic seed-based study of resting state networks related to the posteromedial and lateral parietal cortex. PloS one. 2015 Jun 22;10(6):e0130686.
16. Wisnowski JL, Ceschin RC, **Choi SY**, Schmithorst VJ, Painter MJ, Nelson MD, Blüml S, Panigrahy A. Reduced thalamic volume in preterm infants is associated with abnormal white matter metabolism independent of injury. Neuroradiology. 2015 May 1;57(5):515-25.
17. Degnan AJ, Wisnowski JL, **Choi S**, Ceschin R, Bhushan C, Leahy RM, Corby P, Schmithorst VJ, Panigrahy A. Alterations of resting state networks and structural connectivity in relation to the prefrontal and anterior cingulate cortices in late prematurity. Neuroreport. 2015 Jan 7;26(1):22-6.
18. Habibi A, Ilari B, Crimi K, Metke M, Kaplan JT, Joshi AA, Leahy RM, Shattuck DW, **Choi SY**, Haldar JP, Ficek B. An equal start: absence of group differences in cognitive, social, and neural measures prior to music or sports training in children. Frontiers in human neuroscience. 2014 Sep 9;8:690.

CONFERENCES ABSTRACTS & PUBLICATIONS/POSTER PRESENTATIONS

1. **Choi S**, Joshi AA, O'Neil SH, Miao X, Li J, Haldar J, Coates T, Leahy RM, Wood JC. Exploring Anemia's Impact on Brain Microstructure, Volume, Functional Connectivity,

Iron and Cognitive Performance. 61st American Society of Hematology Annual Meeting and Exposition (ASH), Orlando, 2019, 3553.

2. **Choi S**, Joshi AA, Vu C, Li J, O'Neil SH, Wood JC, Leahy RM. Detecting alterations of brain connectivity in anemic subjects using fMRI under hypoxic and hyperoxic conditions. Organization of Human Brain Mapping Annual Meeting (OHBM), Rome, 2019, T035
3. Joshi AA, McCoy D, Chong M, Li J, **Choi S,** Shattuck DW, Leahy RM. BFP: A BrainSuite fMRI pipeline. Organization of Human Brain Mapping Annual Meeting (OHBM), Singapore, 2018, 2038
4. Vu C, Coloigner J, Choi S, Wood JC. Relative perfusion mapping using BOLD imaging with induced hypoxia. International Society for Magnetic Resonance in Medicine Joint Annual Meeting (ISMRM-ESMRMB), Paris, 2018 2292.
5. Li J, **Choi S**, Joshi AA, Wisnowski JL, Leahy RM. Global pdf-based temporal non-local means filtering reveals individual differences in brain connectivity. 2018 IEEE 15th International Symposium on Biomedical Imaging (ISBI 2018) 2018 Apr 4 (pp. 15-19). IEEE.
6. Vu C, Bush A, **Choi S**, Miao X, Coates TD, Wood JC. Chronic Anemia Is Associated with Lower Cerebral and Peripheral Arterio-Venous Oxygen Gradients. Blood, 2017 130:3542
7. **S Choi**, S O'Neil, AA Joshi, AM Bush, M Borzage, J Coloigner, TD Coates, JC Wood, RM Leahy. The Anemic Brain: Hemoglobin Level Predicts Brain Volume in Watershed Areas and Cognitive Function. Organization of Human Brain Mapping Annual Meeting (OHBM), Vancouver, 2017, 1272
8. AA Joshi, **S Choi**, M Chong, G Sonkar, J Gonzalez-Martinez, D Nair, D Shattuck, H Damasio, RM Leahy. USCBrain Atlas: A Volumetric and Surface Atlas Delineated by Anatomical and Functional MRI. Organization of Human Brain Mapping Annual Meeting (OHBM), Vancouver, 2017, 1650
9. J Li, **S Choi**, RM Leahy. Global PDF-Based Non-Local Means Filtering of Resting fMRI Data. Organization of Human Brain Mapping Annual Meeting (OHBM), Vancouver, 2017, 1868
10. **S Choi**, AM Bush, M Borzage, AA Joshi, TD Coates, RM Leahy, JC Wood. Regional Susceptibility to Chronic Anemia in WM Microstructure Using Diffusion Tensor Imaging. 58th American Society of Hematology Annual Meeting and Exposition (ASH), San Diego, 2016, 3640
11. **S Choi**, AM Bush, M Borzage, AA Joshi, TD Coates, RM Leahy, JC Wood. Hemoglobin Level and Platelet Size Predicts Grey and White Matter Volume Loss Measured by Tensor Based Morphology in Sickle Cell Disease. 58th American Society of Hematology Annual Meeting and Exposition (ASH), San Diego, 2016, 2481
12. **S Choi**, J Coloigner, AM Bush, TD Coates, RI Wood, RM Leahy, JC Wood. Chronic Anemia is Associated with Significant White Matter Atrophy. Society for Neuroscience's 46th Annual Meeting (SFN), San Diego, 2016, 13623
13. Y Chai, J Coloigner, Xiaoping Qu, **S Choi**, AM Bush, M Borzage, C Vu, N Lepore, JC Wood. Tract specific analysis in patients with sickle cell disease. 11th International Symposium on Medical Information Processing and Analysis (SIPAIM), International Society for Optics and Photonics, 2015, 968108, doi:10.1117/12.2213617

14. **S Choi**, AM Bush, M Borzage, A Joshi, J Coloigner, V Rajagopalan, N Lepore, T Coates, JC Wood. Diffuse T1-MRI White Matter Volume Decrease in Patients with Sickle Cell Disease. 21th Annual Meeting of the Organization for Human Brain Mapping (OHBM), Honolulu, 2015, 3364
15. AM Bush, M Borzage, **S Choi**, T Coates, JC Wood. Elevated Cerebral Blood Oxygen Extraction in Non-Transfused Sickle Cell Disease Patients. 56th American Society of Hematology Annual Meeting and Exposition (ASH), San Francisco, 2014, 1387
16. AM Bush, M Borzage, **S Choi**, T Coates, JC Wood. Elevated Cerebral Metabolic Oxygen Consumption in Sickle Cell Disease. 56th American Society of Hematology Annual Meeting and Exposition (ASH), San Francisco, 2014, 2706
17. M Borzage, AM Bush, **S Choi**, T Coates, JC Wood. Cerebral Blood Flow and Metabolic Correlates of Near Infrared Spectroscopy in Patients with Sickle Cell Disease. 56th American Society of Hematology Annual Meeting and Exposition (ASH), San Francisco, 2014, 1386
18. A Panigrahy, JL Wisnowski, **S Choi**, R Ceschin, N Dosenbach, S Bluml, VJ Schmithorst. Altered Glutamatergic Fronto-Limbic Network Connectivity in Late Preterm Preadolescents. Pediatric Academic Societies and Asian Society for Pediatric Research Joint Meeting (PAS/ASPR), Vancouver, 2014, 2185.7
19. Gingival Inflammation Is Associated With Altered Tissue Microstructure in Frontolimbic Regions and Memory Performance in Otherwise Healthy Preadolescents
JL Wisnowski, VJ Schmithorst, **S Choi**, RC Ceschin, S Bluml, P Corby, A Panigrahy
Pediatric Academic Societies and Asian Society for Pediatric Research Joint Meeting (PAS/ASPR), Vancouver, 2014, 3814.262
20. **S Choi,** AA Joshi, C Bhushan, DW Shattuck, RM Leahy, H Damasio, A Panigrahy and JL Wisnowski. A Multimodal Investigation of Neuronal/Axonal Integrity Using Structural T1-weighted Imaging, Diffusion Tensor Imaging, and H1 MR Spectroscopy. 21st Scientific Meeting of International Society for Magnetic Resonance in Medicine (ISMRM), Salt Lake City, 2013, p. 1951
21. DW Shattuck, AA Joshi, JP Haldar, C Bhushan, **S Choi**, AC Krause, JL Wisnowski, AW Toga and RM Leahy. Tools for Brain Image Segmentation, Registration, and Connectivity Analysis. 21st Scientific Meeting of International Society for Magnetic Resonance in Medicine (ISMRM), Salt Lake City, 2013, p. 2691
22. **S Choi**, C Bhushan, AA Joshi, K Raphel, D Tranel, DW Shattuck, JP Haldar, RM Leahy, H Damasio, JL Wisnowski. Altered orbitofrontal tissue microstructure in patients with chronic anterior temporal lobe lesions. 19th Annual Meeting of the Organization for Human Brain Mapping (OHBM), Seattle, 2013, p. 3781
23. DW Shattuck, AA Joshi, JP Haldar, C Bhushan, **S Choi,** AC Krause, JL Wisnowski, H Damasio, AW Toga, RM Leahy. New BrainSuite13 Tools for Image Segmentation, Registration, Connectivity Analysis and Visualization. 19th Annual Meeting of the Organization for Human Brain Mapping (OHBM), Seattle, 2013, p. 1688

PROFESSIONAL AFFILIATIONS

Organization of Human Brain Mapping (2013-Present)
International Society for Magnetic Resonance in Medicine (2013, 2019-Present)
American Society for Hematology (2015, 2019-Present)

Society for Neuroscience (2015)

REFERENCES

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