T. Dorina Papageorgiou, Ph.D., M.H.Sc.

- **Instructor of Neurology**

Specialty

Human Brain Neuroimaging
Real-time Functional MRI Neurofeedback
Plasticity and Neuro-rehabilitation of Cortical Blindness
Neuro-rehabilitation of Speech Impairment
Neuro-rehabilitation of Chronic Pain

Graduate School

Ph.D., University of Texas, M.D. Anderson Cancer Center, Houston, Texas
M.H.Sc., Johns Hopkins University, Bloomberg School of Public Health, Baltimore, Md.

Undergraduate School

B.A., University of Georgia , Ga.

Internship

Attention Deficit Hyperactivity Disorder, University of Maryland, Baltimore, Md.
Neuropsychology of Neurodegenerative Diseases, Baylor College of Medicine, Houston, Texas

Post-Doctoral Research Fellowship

Functional Imaging of Pain and Opioid Administration, University of Texas M. D. Anderson Cancer Center, Houston, Texas
Real-time Functional MRI Neurofeedback of Speech, Baylor College of Medicine, Houston, Texas
Real-time Functional MRI Neurofeedback & Rehabilitation of Cortical Blindness, Baylor College of Medicine, Houston, Texas

Research Interests

The areas of focus my laboratory - Investigational Targeted Brain Neuro-therapeutics - funded by the McNair Medical Institute, include the neuro-rehabilitation of:

1. visual cortical blindness;
2. speech/motor impairment; and
3. chronic pain as a result of traumatic brain injury, stroke, brain tumor, neurodegenerative disease, and pain syndromes.

We use a novel intervention to provide cortically targeted neuro-rehabilitation, called real-time functional MRI neurofeedback to induce reorganization in cortical and subcortical pathways. Patients undergo rneurofeedback in real time to upregulate or downregulate the activity of intact cortical and/or subcortical areas in conjunction with the continuous presentation of visual stimuli inside the MRI environment with the goal to restore or reorganize lesioned pathways associated with vision, speech, or pain. The modulation in the Blood-Oxygen-Level-Dependent (BOLD) signal intensity is achieved by feeding" back to the patient the magnitude of mean BOLD signal intensity of his/her intact cortical area during the presentation of a stimulus in real-time. The hypothesis is that such training engages Hebbian mechanisms that modulate the activity of intact cortical areas with the goal to improve performance.

The current research goals of my laboratory are:

1. To examine and understand the neural mechanisms of brain plasticity in the design of treatments that will enhance nervous system recovery after a brain insult;
2. To achieve long-term effects of personalized neurofeedback interventions at targeted cortical and subcortical areas, and;
3. To optimize rt-fMRI neurofeedback as "a next generation" neurotherapeutic approach with the end goal to use this tool in the clinical setting, the effects of which can be translated outside the MRI environment.

The long-term goal is to correlate neuroimaging with genetic biomarkers to better understand the pathways and mechanisms involved in the dynamic variability in disease risk and brain reorganization, which will allow us to induce fast, robust and long-term brain neuro-rehabilitation.

Contact Information

T. Dorina Papageorgiou, Ph.D., M.H.Sc.
Center for Advanced MR Imaging
Baylor College of Medicine
One Baylor Plaza, Suite T115H
Houston, Texas 77030

Tel: 713-798-7450

Email: papageor@bcm.edu

Journal Publications

1. Hotez PJ, Papageorgiou TD. A new European neglected diseases center for Greece? PLoS Negl Trop Dis. 2013;7(2):e1757. [View journal article]
2. Papageorgiou TD, Lisinski JM, McHenry MA, White JP, Laconte SM. Brain-computer interfaces increase whole-brain signal to noise. Proc Natl Acad Sci U S A. 2013;:. [View journal article]
3. Papageorgiou TD, Curtis WA, McHenry M, LaConte SM. Neurofeedback of two motor functions using supervised learning-based real-time functional magnetic resonance imaging. Conf Proc IEEE Eng Med Biol Soc. 2009;2009:5377-80. [View journal article]
4. Papageorgiou TD, McHenry M, Lisinski JM, White JP, LaConte SM. Speech rate control using supervised learning-based real-time fMRI. Neuroimage. 2009;47:97.

Books and Volumes

1. Papageorgiou TD, Christopoulos G, Smirnakis SM, editors. Advanced topics in brain neuroimaging: methods and applications. InTech, Open Access Publishing Company; 2013. (in press).

Book Chapters and Other Publications

1. Papageorgiou TD, Smirnakis SM. Real-time fMRI applications in the study of visual processing and rehabilitation. In: Papageorgiou TD, Christopoulos G, Smirnakis SM, editors. Advanced topics in brain neuroimaging: methods and applications. InTech, Open Access Publishing Company; 2013. (in press).
2. Papageorgiou TD, Valenzuela JO, Jackson EF. Functional imaging of symptoms. In: Cleeland CS, Fisch M, Dunn A, editors. Cancer symptom science. Measurement, mechanisms, and management. Cambridge, UK: Cambridge University Press; 2011. p. 206-223.
3. Papageorgiou TD. Blood-oxygen-level-dependent (BOLD) signal changes in total cortex and subcortex, pain, reward, and vigilance regions during mechanical pressure pain after morphine administration. Ph.D. [dissertation]. Houston, Texas: The University of Texas School of Public Health; 2006. Available from: http://digitalcommons.library.tmc.edu/dissertations/AAI3258579. [View thesis]

Poster and Platform Presentations

1. Papanikolaou A, Keliris GA, Papageorgiou DT, Shao Y, Krapp E, Papageorgiou E, et al. Human area V5/MT+ organization changes following lesions of the primary visual cortex. Program No. 602.07. 2013 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2013. Online.
2. Papageorgiou TD. Decoding visual imagery during a motion coherence task via real-time fMRI.

Presented at the VA Research Day, Michael E. DeBakey Veterans Affairs Medical Center in Houston, Texas (August 2010).

3. Papageorgiou TD, LaConte SM, Lisinski JM, Peng X, Smirnakis SM. Classification accuracy and spatial networks of motion coherence and direction using real-time fMRI. Presented at the Organization of Human Brain Mapping (OHBM), 16th International Conference in Barcelona, Spain (June 6-10, 2010).
4. Papageorgiou TD, LaConte SM, Lisinski JM, Peng X, Smirnakis SM. Classification accuracy and spatial networks of motion coherence using real-time fMRI. Presented at the Baylor College of Medicine (BCM), 20th Annual Rush and Helen Record Neuroscience Forum in Galveston, Texas (Feb. 19-21, 2010).
5. Papageorgiou TD, Lisinski JM, McHenry M, LaConte SM. Classification accuracy and spatial networks of covert speech rate using real-time fMRI. Presented at the Baylor College of Medicine (BCM), 20th Annual Rush and Helen Record Neuroscience Forum in Galveston, Texas (Feb. 19-21, 2010).
6. Papageorgiou TD, LaConte SM, Lisinski JM, Peng X, Smirnakis SM. Real-time fMRI can decode visual mental imagery during a motion coherence task. Presented at the Rice University and the Texas Medical Center, Bioscience Research Collaborative in Houston, Texas (2010).
7. Papageorgiou TD, Lisinski JM, McHenry M, LaConte SM. Decoding rate of speech in the real-time fMRI environment. Presented at the Rice University and the Texas Medical Center, Bioscience Research Collaborative in Houston, Texas (2010).
8. Papageorgiou TD, McHenry M, Lisinski JM, White JP, LaConte SM. Speech rate control using supervised learning-based real-time fMRI. NeuroImage. 2009;47(Suppl 1):S97.
9. Prasad PG, Papageorgiou TD, LaConte SM. Pattern classification of spatially overlapping bimanual brain networks performing stable and unstable coordinated tapping. NeuroImage. 2009;47(Suppl 1):S58.
10. Papageorgiou D, LaConte SM, Curtis W, McHenry M. Differences in prediction accuracy and distributed patterns of activity for automatic covert speech with and without neurofeedback from real-time functional magnetic resonance imaging. Program No. 712.8. 2008 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2008. Online. [Platform Presentation]
11. Papageorgiou TD. Functional imaging of pain. Presented at the Baylor College of Medicine (BCM), Dept. of Neuroscience in Houston, Texas (August 2007). [Invited Talk]
12. Papageorgiou TD. Functional imaging of cancer-treatment related neuropathy. Presented at the Astra Zeneca, Houston, Texas (June 2007). [Invited Talk]
13. Papageorgiou TD, Jackson EF, Cleeland CS. A potential mechanism of the effects of morphine during pain on CNS circuitry using pharmacological fMRI. Presented at the University of Texas M.D. Anderson Cancer Center, 3rd Annual Division of Medicine Retreat in Houston, Texas (May 2007).
14. Papageorgiou TD, Jackson EF, Cleeland CS. A potential mechanism of the effects of morphine during pain on CNS circuitry using pharmacological fMRI. Presented at the University of Texas M.D. Anderson Cancer Center, Trainee Recognition Day in Houston, Texas (May 2007). [Previously Presented]
15. Papageorgiou TD. Functional imaging of disease-related and treatment-related symptoms. Presented at the Astra Zeneca, Houston, Texas (March 2007). [Invited Talk]
16. Papageorgiou TD. BOLD Signal changes during pain following morphine administration. Presented at the University of Texas M.D. Anderson Cancer Center, Division of Internal Medicine, Grand Rounds in Houston, Texas (December 2006). [Oral Presentation]
17. Papageorgiou TD. fMRI signal changes during pain after morphine administration. Presented at the Hawn Foundation, Houston, Texas (November 2006). [Invited Talk]
18. Papageorgiou TD, Jackson EF, Cleeland CS. fMRI BOLD Signal changes in the pain and reward cortical circuits during mechanical pressure pain with and without morphine in healthy volunteers. Presented at the University of Texas M.D. Anderson Cancer Center, Trainee Recognition Day in Houston, Texas (May 2006).
19. Papageorgiou TD, Jackson EF, Cleeland CS. fMRI BOLD signal changes on the effects of morphine and pain on cortical and subcortical circuitry. Presented at the University of Texas M.D. Anderson Cancer Center, 2nd Annual Division of Medicine Retreat in Houston, Texas (May 2006).
20. Papageorgiou TD, Jackson EF, Cleeland CS. Regional functional MRI signal changes during mechanical pressure pain with and without morphine administration. Presented at the University of Texas M.D. Anderson Cancer Center, 2nd Annual Division of Medicine Retreat in Houston, Texas (May 2006).
21. Papageorgiou TD, Jackson EF, Anderson KO, Shrikanth M, Cleeland CS. Ascending and descending BOLD signal changes in response to selective attention during pain stimulation. Presented at the University of Texas M.D. Anderson Cancer Center, Continuing Medical Education Program, Dept. of

Symptom Research, Division of Medicine in Houston, Texas (May 2005).

22. Papageorgiou TD, Jackson EF, Anderson KO, Shrikanth M, Cleeland CS. BOLD functional MRI signal changes in response to mechanical pressure pain stimulation. Presented at the University of Texas M.D. Anderson Cancer Center, Trainee Recognition Day in Houston, Texas (May 2005).
23. Papageorgiou T, Jackson E, Anderson K, Mahankali S, Cleeland C. Top-down and bottom-up fMRI BOLD signal changes in response to selective attention during mechanical pressure pain. J Pain. 2005;6(3 Suppl):S6.
24. Papageorgiou TD, Jackson EF, Anderson KO, Shrikanth M, Cleeland CS. Ascending and descending BOLD signal changes during mechanical pressure pain. Presented at the University of Texas Health Science Center, Houston Neuroscience Research Center, 11th Annual Poster Session in Houston, Texas (December 2004).
25. Papageorgiou TD, Jackson EF, Anderson KO, Shrikanth M, Cleeland CS. Functional magnetic resonance imaging (fMRI) blood-oxygen-level-dependent (BOLD) signal response in selective and sustained attention during mechanical pressure pain. Presented at the Houston Neuropsychological Society/VAMC, 2004 Annual Symposium in Houston, Texas (October 2004).