

PROMOTION RECOMMENDATION  
THE UNIVERSITY OF MICHIGAN  
MEDICAL SCHOOL  
DEPARTMENT OF RADIOLOGY

Bradley R. Foerster, M.D., Ph.D., assistant professor of radiology, Department of Radiology, Medical School, is recommended for promotion to associate professor of radiology, with tenure, Department of Radiology, Medical School.

Academic Degrees:

Ph.D.	2013	Johns Hopkins Bloomberg School of Public Health
M.D.	1999	University of Michigan

Professional Record:

2009-present	Assistant Professor of Radiology, University of Michigan
2009-2009	Assistant Professor of Radiology, Johns Hopkins University

Summary of Evaluation:

Teaching: Dr. Foerster teaches medical students and radiology residents rotating on the clinical service, as well as fellows in neuroradiology. He is assigned formal teaching conferences to radiology residents in rotation with other faculty. He also gives conferences to a variety of health care professionals through interdisciplinary conferences. The quality of Dr. Foerster's teaching is excellent. He ranks in the top quartile of radiology faculty for the quality of his noon conferences, and at the median of radiology faculty for the quality of his teaching on the clinical service.

Research: Medical imaging has reached practical limits for depicting gross anatomy. However, powerful imaging modalities, especially magnetic resonance and nuclear medicine, are capable of interrogating at the cellular level. Dr. Foerster is using sophisticated MR imaging techniques to elucidate the mechanisms of action of neurologic diseases in anticipation of developing improved therapies. His work includes chronic pain studies in patients with fibromyalgia and is supported by a VA Merit Award. Using MR spectroscopy (MRS), he and colleagues were able to demonstrate a reduction of GABA in the anterior insula that is involved in the emotional and effective aspects of pain processing. Decreased GABA in the anterior insula suggests that a lack of inhibitory tone may lead to an increased pain response. In evaluating the response of transcranial direct current stimulation therapy on different pain centers in the brain, he has demonstrated significant decreases in Glx, the imaging biomarker, in the anterior cingulate, a pain modulation region in the brain. (Since glutamate cannot be distinguished from glutamine on three tesla MR studies, "Glx" is used to represent both glutamate and glutamine.) Dr. Foerster and colleagues have shown that among patients with amyotrophic lateral sclerosis (ALS), MR diffusion tensor imaging alone lacks sufficient diagnostic accuracy to be used as a single test for the presence of the disease. Glutamate toxicity has been described as an important contributor to the pathogenesis of ALS and Dr. Foerster and colleagues have been able to use MR spectroscopy to show a reduction in GABA in the motor cortex of ALS patients as well as alterations in Glx. ALS patients treated with Riluzole, a Glutamate antagonist, had significantly lower levels of Glx as compared to ALS patients who were treatment naïve, as well as untreated ALS patients. He has demonstrated that combining MR spectroscopy

with diffusion tensor imaging is an early phase diagnostic test for the presence of ALS. This preliminary work forms the basis of his NIH R01 grant which will assess the capability of multimodal MRI as a diagnostic test for patients with uncertain ALS as defined by clinical criteria.

#### Recent and Significant Publications:

Foerster BR, Petrou M, Edden RA, et al: Reduced insular gamma-aminobutyric acid in fibromyalgia. *Arthritis Rheum* 64:579-583, 2012.

Foerster BR, Dwamena BA, Petrou M, Carlos RC, Callaghan BC, Pomper MG: Diagnostic accuracy using diffusion tensor imaging in the diagnosis of ALS: A Meta-analysis. *Acad Radiol* 19:1075-1086, 2012.

Foerster BR, Pomper MG, Callaghan BC, et al: An imbalance between excitatory and inhibitory neurotransmitters in amyotrophic lateral sclerosis revealed by use of 3-T proton magnetic resonance spectroscopy. *JAMA Neurol* 70:1990-1916, 2013.

Foerster BR, Carlos RC, Dwamena BA, et al: Multimodal MRI as a diagnostic biomarker for amyotrophic lateral sclerosis. *Ann Clin Transl Neurol* 1:107-114, 2014.

Foerster BR, Nascimento T, Deboer M, et al: Excitatory and inhibitory brain metabolites as targets of motor cortex transcranial direct current stimulation therapy and predictors of its efficacy in fibromyalgia. *Arthritis Rheumatol* 67:576-581, 2015.

Service: Dr. Foerster provides service at both local and national levels. In the Department of Radiology, Dr. Foerster serves on the Medical Student Career Advisory Committee and the Neuroradiology Fellowship Clinical Competency Committee. He is also a member of the re-energized quality committee, the Michigan Radiology Quality Collaborative. Each member of this committee is expected to conduct a quality initiative with meaningful results, suitable for publication in the peer-reviewed literature. On a national level, Dr. Foerster serves his subspecialty society, the American Society of Neuroradiology, as a member of the Young Professionals Membership Committee and the Research Committee. Dr. Foerster is assigned to the Division of Neuroradiology where all of his clinical, teaching and research activities reside. He is very active in clinical service. Dr. Foerster has an appointment at the Ann Arbor Veteran's Administration Hospital. Dr. Foerster is also an appointee at the University Hospital where he participates in the neuroradiology service. He contributes to the clinical service interpreting neuroradiological CT and MR examinations.

#### External Reviewers:

Reviewer A: "Dr. Foerster is an outstanding neuroradiology clinical investigator who has made significant research contributions to the development, implementation and validation of advanced neuroimaging methods to study neurodegenerative diseases, particularly amyotrophic lateral sclerosis (ALS). His work has been innovative and on the cutting edge of this field, using a multi-modality approach for the development of a set of diagnostic biomarkers to better diagnose and follow the treatment of this devastating disease....He not only understands how research is done, but how to teach others to do it."

Reviewer B: “Dr. Foerster has demonstrated independent scholarship with multiple original publications in leading specialty journals. He is an expert in neuroimaging of neurodegenerative conditions, particularly ALS.”

Reviewer C: “Overall, Dr. Foerster has a superb record of scholarship, which ranks very highly when compared with peers nationally at a similar career stage. Recognition for Dr. Foerster’s research accomplishments is further evidenced by five national and international visiting professorships, including at Queen’s Square Hospital in London (which is world renowned for neuroscience).”

Reviewer D: “...Dr. Foerster is an academician, an individual with a clear passion for his field, and a dedication to education and research that is increasingly recognized by his peers. His focus has led to his success in securing funding for his work, and he is likely to continue to be successful in this regard, given the depth of his expertise and institutional collaborations.”

Reviewer E: “His current ROI as PI in the investigation of the Development of a Multi-Modal Neuroimaging Biomarker for ALS deserves particular mention since ALS can present difficulties in clinical diagnosis and the need for an imaging evaluation is highly needed; yet, Brad is one of the comparatively few researchers in this field.”

Summary of Recommendation:

Professor Foerster is a well-trained diagnostic neuroradiologist who is a fine clinical radiologist and an excellent teacher. The focus of his academic career is research, where he is working on the development, implementation and validation of advanced neuro-imaging methods to study degenerative diseases, particularly amyotrophic lateral sclerosis (ALS). I am pleased to recommend Bradley R. Foerster, M.D., Ph.D. for promotion to associate professor of radiology, with tenure, Department of Radiology, Medical School.



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Marschall S. Runge, M.D., Ph.D.  
Executive Vice President for Medical Affairs  
Dean, Medical School

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