



Richard Ryan Darby, M.D.
Assistant Professor

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Faculty Appointments

Assistant Professor of Neurology

Education

Certificate, Applied Biostatistics, Harvard University, Cambridge, Massachusetts

M.D., Vanderbilt University, Nashville, Tennessee

A.B., Psychology, Neuroscience, Princeton University, Princeton, New Jersey

Research Description

Ryan Darby is an assistant professor of neurology at Vanderbilt University. He received his undergraduate degree from Princeton University in psychology and neuroscience, and his medical degree from Vanderbilt University. He trained in neurology at Massachusetts General Hospital and Brigham and Women's Hospital as part of the Partners Neurology/Harvard Medical School program. He then received the Sidney R. Baer, Jr. Research Fellowship in Clinical Neurosciences at the Beth Israel Deaconess Medical Center. He simultaneously completed a clinical fellowship in behavioral neurology and neuropsychiatry at Beth Israel Deaconess Medical Center, Massachusetts General Hospital, and McLean Psychiatric Hospital in Boston. He currently sees patients in the Frontotemporal Dementia Clinic and Dementia-related Psychosis Clinic in the Department of Neurology at Vanderbilt University Medical Center.

Dr. Darby is interested in patients with symptoms at the border zone between neurology, psychiatry, and philosophy. Both neurological and psychiatric patients can share similar symptoms, including delusions, hallucinations, criminal behavior, and disordered free will perception. This suggests that these symptoms may share a common pathway across different diseases. He uses a combination of advanced neuroimaging techniques and behavioral testing to understand the underlying neurobiology of these symptoms at the network level. His work has lent insight into how brain dysfunction can lead to delusions, hallucinations, and criminal behavior in patients with focal brain lesions and dementia. His ultimate hope is that this research will translate into new treatment targets for patients with very few therapeutic options. This includes new types of drugs, as well as the possibility of using noninvasive brain stimulation to alter specific networks in the brain.

Dr. Darby has received numerous awards for his research, including the Stanley Cobb Award from the Boston Society for Neurology and Psychiatry, the Young Investigator Award from the American Neuropsychiatric Association, the New Investigator Award in Neuropsychiatry from the Alzheimer's Association, and the S. Weir Mitchell Award for Outstanding Early Career Investigator from the American Academy of Neurology. His work has also attracted significant media attention, including coverage in Newsweek, Scientific American, US News & World Report, Slate, Discovery Magazine, Telegraph, CBS News, and NBC News. His research is generously funded by the Sidney R. Baer, Jr Foundation, the Alzheimer's Association, the BrightFocus Foundation, and the Vanderbilt Faculty Research Scholars Award.

Clinical Description

Dr. Darby currently sees patients in the Frontotemporal Dementia Clinic and Dementia-related Psychosis Clinic in the Department of Neurology at Vanderbilt University Medical Center.

Research Keywords

frontotemporal dementia, psychosis, morality, neuroimaging, functional connectivity

Publications

Darby RR. Neuroimaging Abnormalities in Neurological Patients with Criminal Behavior. *Curr Neurol Neurosci Rep.* 2018 Jun 6/14/2018; 18(8): 47. PMID: 29904892, PII: 10.1007/s11910-018-0853-3, DOI: 10.1007/s11910-018-0853-3, ISSN: 1534-6293.

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Darby RR, Fox MD. Reply: Capgras syndrome: neuroanatomical assessment of brain MRI findings in an adolescent patient. *Brain.* 2017 Jul 7/1/2017; 140(7): e44. PMID: 28582487, PII: 3861135, DOI: 10.1093/brain/awx125, ISSN: 1460-2156.

Darby RR, Laganieri S, Pascual-Leone A, Prasad S, Fox MD. Finding the imposter: brain connectivity of lesions causing delusional misidentifications. *Brain [print-electronic].* 2017 Feb; 140(2): 497-507. PMID: 28082298, PMCID: PMC5278302, PII: aww288, DOI: 10.1093/brain/aww288, ISSN: 1460-2156.

Darby RR, Dickerson BC. Dementia, Decision Making, and Capacity. *Harv Rev Psychiatry.* 2016 Dec; 25(6): 270-8. PMID: 29117022, PMCID: PMC5711478, PII: 00023727-201711000-00005, DOI: 10.1097/HRP.000000000000163, ISSN: 1465-7309.

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Darby R, Prasad S. Lesion-Related Delusional Misidentification Syndromes: A Comprehensive Review of Reported Cases. *J Neuropsychiatry Clin Neurosci [print-electronic].* 2016; 28(3): 217-22. PMID: 26900740, DOI: 10.1176/appi.neuropsych.15100376, ISSN: 1545-7222.

Darby RR, Caplan D. "Cat-gras" delusion: a unique misidentification syndrome and a novel explanation. *Neurocase [print-electronic].* 2016; 22(2): 251-6. PMID: 26765326, DOI: 10.1080/13554794.2015.1136335, ISSN: 1465-3656.

Bhattacharyya S, Darby R, Berkowitz AL. Antibiotic-induced neurotoxicity. *Curr Infect Dis Rep.* 2014 Dec; 16(12): 448. PMID: 25348743, DOI: 10.1007/s11908-014-0448-3, ISSN: 1523-3847.

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Schneider ER, Rada P, Darby RD, Leibowitz SF, Hoebel BG. Orexigenic peptides and alcohol intake: differential effects of orexin, galanin, and ghrelin. *Alcohol. Clin. Exp. Res [print-electronic].* 2007 Nov; 31(11): 1858-65. PMID: 17850217, PII: ACER510, DOI: 10.1111/j.1530-0277.2007.00510.x, ISSN: 0145-6008.

Available Postdoctoral Position Details

Posted: 8/20/2018

Post-Doctoral Fellowship in cognitive neuroscience of criminal behavior in frontotemporal dementia

The Darby Lab is excited to announce a new position for a post-doctoral fellow. The fellow will participate in two funded research projects investigating: 1.) Moral decision-making and neuroimaging in patients with frontotemporal dementia who commit crimes, and 2.) Belief monitoring and neuroimaging in patients with Lewy body dementia and Alzheimer's disease with delusions. Our lab helped to develop a pioneering new neuroimaging technique called lesion network mapping to show that focal brain lesions in different locations causing the same symptom localize to different parts of the same functionally connected brain network. This work provided insight into complex but poorly understood symptoms including lesion-induced delusions (Darby et al, *Brain*, 2016), criminal behavior (Darby et al, *PNAS*, 2018), and disordered free will perception (Darby et al, in revision). Our lab is now developing new neuroimaging techniques to apply this same approach to the study of patients with dementia. The fellow would have the opportunity to work on the development of these neuroimaging methods, and to apply these neuroimaging methods to localize the neural correlates of criminal behavior and psychosis in dementia patients. There would also be opportunity to work on refining cognitive tasks to evaluate moral decision-making and belief monitoring.

We are seeking a highly motivated and enthusiastic post-doctoral fellow with experience in cognitive neuroscience, neuroimaging, or psychology. The ideal candidate would have a strong background in neuroimaging, including familiarity with common neuroimaging analysis software packages (FSL, SPM, Freesurfer), programming (Matlab, UNIX, Python), and most importantly, a passion for understanding brain-behavior relationships for complex neuropsychiatric symptoms. Fellows will be expected to transition towards working independently, with a focus on producing first-authored publications.

Interested candidates should send a brief cover letter describing their research interests (1 page max), CV, and 3 references to Ryan Darby at richard.r.darby@vumc.org.

DEFENDANT'S
EXHIBIT

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