Postdoctoral Researcher sought for neuroethics project on Agency and Neurointerventions

Applications are invited for the position of Postdoctoral Research Associate at Dartmouth College, to take the lead on a project funded by the BRAIN Initiative entitled "Assessing the Effects of Deep Brain Stimulation on Agency." The position is associated with the programs in Cognitive Science and Philosophy at Dartmouth College, and the Dartmouth Geisel School of Medicine.

The aim of this project is to use insights from clinical medicine, philosophy, psychology and neuroscience to develop a computerized assay of agency that can be used to track changes in agency due to neurodegenerative and neuropsychiatric diseases and therapies aimed at combatting these changes. In particular, we are interested in being able to describe both desired and unforeseen changes due to deep brain stimulation (DBS) in Parkinson's Disease, OCD, and treatment-resistant depression. Machine learning techniques will be employed to assess and improve the predictive power of the assay, and the assay will be piloted on normal and clinical populations. Work with DBS patients will be undertaken in collaboration with several clinical centers. A more detailed description of the project is below.

The competitive candidate will have interdisciplinary interests and a strong track record of work in data science, with experience in statistical analysis and programming. Experience in machine learning is a plus, but the position will provide opportunities to develop expertise in machine learning. This position is renewable for a period of 3 years from January 2019 (start date flexible).

Applicants should submit cover letter, curriculum vitae, one piece of written work, and a statement of research interests, as well as three letters of reference. Applications will be reviewed beginning November 7, 2018, and will continue to be accepted until the position is filled. International applicants are encouraged, as are applications from women and minorities.

Dartmouth College is an equal opportunity/affirmative action employer with a strong commitment to diversity and inclusion. We prohibit discrimination on the basis of race, color, religion, sex, age, national origin, sexual orientation, gender identity or expression, disability, veteran status, marital status, or any other legally protected status. Applications by members of all underrepresented groups are encouraged.

Further details and a link to the online application portal are available at https://apply.interfolio.com/56650.

Project Description
Recent advances in neurotechnologies have provided us with the ability to modulate brain function by direct and indirect interventions. Deep Brain Stimulation (DBS) is one such intervention that has already been FDA-approved for certain disorders, and its use has already raised ethical questions about ways in which direct brain stimulation may affect personal identity, autonomy, authenticity and, more generally, agency. Thus far the neuroethical worries have been largely based on anecdotal clinical reports. Further neurotechnological interventions developed as part of the BRAIN initiative are bound to raise similar questions, but we lack a clear framework in which to think of the ethical consequences of these interventions. The overall goal of this project is to articulate such a framework, to enable us to better evaluate and respond to the neuroethical challenges raised by our abilities to alter brain function. The more concrete objectives of our proposal are to 1) develop comprehensive assessment tools to measure changes in agency due to direct brain interventions, 2) to use this tool to assess changes in agency due to brain interventions using DBS patient populations as a test case; and 3) to develop a database to house the data we acquire with these tools to allow us to catalogue the effects and side effects of DBS. This will also make it possible to correlate the effects of DBS with electrode placement and white matter tractography, enabling better prediction of outcomes and aid in understanding of the mechanisms by which DBS works. We will analyze this data machine with machine learning methods to inform a more comprehensive neuroethical analysis of how brain interventions affect agency. Our approach is innovative in that it applies neurophilosophical insights about agency and employs deep learning algorithms in constructing and evaluating these assessment instruments. This contribution is significant in that it will provide a broad-based assessment tool and database that will be a resource for researchers and clinicians using DBS, which could be used to improve therapeutic approaches and informed consent. The data will also inform a framework for further neuroethical thought about brain interventions, allowing us to better identify, articulate and measure changes on "dimensions of agency." Finally, the approach is generalizable, and thus could be adapted for use with other brain intervention techniques, such as brain-computer interfaces (BCIs) or pharmacological treatments.

Informal enquiries may be directed to Dr. Adina Roskies at adina.roskies@dartmouth.edu.