

# Stanford Neurology Research Report

**Members of Our Research Community, We at the Stanford Movement Disorders Center & Poston Lab want to take the opportunity to express our sincere gratitude for your participation and interest in our research on Parkinson’s disease and other parkinsonian disorders. The dedicated participation from volunteers like you lies at the heart of our scientific research. As a show of thanks, here’s an update on our progress to date.**



*Special thanks from the Poston Lab Research Team!*

## Hot off the Press

**We have been hard at work compiling and interpreting valuable information given to us by research participants. The fruits of our efforts will soon be available for shared access by the scientific community. Please see Page 3 for more information.**

## Research Recruitment

**With the help of our Research Assistants, Jee Kim & Colin McDaniel, we’ve considered over 375 individual cases for research.**

<u>Diagnosis</u>	<b>#</b>
Parkinson’s disease (PD)	222
Atypical Parkinsonism (MSA, PSP, CBD)	23
Healthy Control	130
<b>Total Enrolled</b>	<b>375</b>

**We are actively recruiting participants with diagnoses of Parkinson’s disease. We are also actively recruiting healthy controls, over the age of 70.**

## Recruitment for New Research Studies!

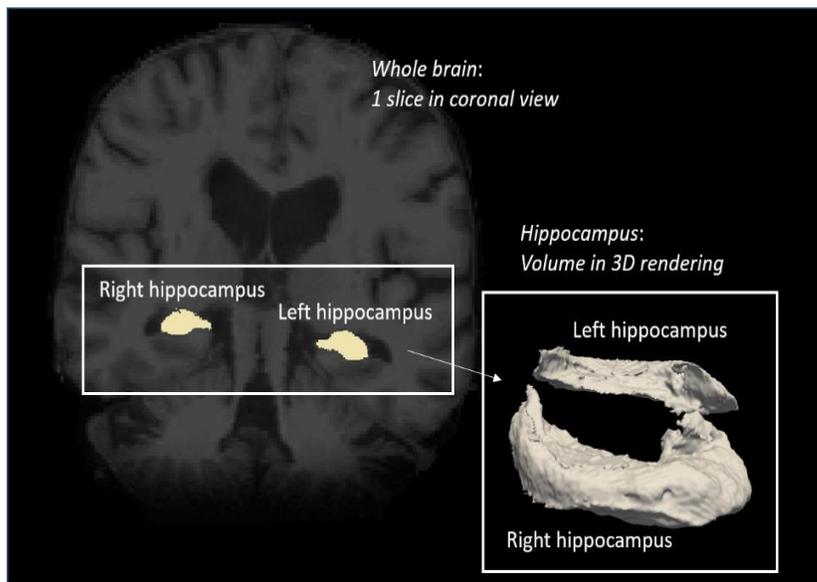
- If you were part of our **Michael J. Fox Foundation** funded research study, you might be contacted to return for another visit! After the overwhelming success of our primary study, the Fox Foundation has asked us to continue to monitor the motor and memory functions of our participants.
- The NIH, with the National Institute for Aging (NIA), approved funding for the new **Stanford Alzheimer's disease Research Center (ADRC)** and we have had a very successful year of recruitment and data collection! Our Center's theme is understanding early memory problems in people with Parkinson's disease and Alzheimer's disease. If you are interested in learning more about participating in this study, please contact Christina Wyss-Coray, RN, BSN, PHN, at (650) 721-2409 or [ADRCstanford@stanford.edu](mailto:ADRCstanford@stanford.edu).
- In a collaborative study with **SRI**, we are recruiting people with Parkinson's disease for an MRI study focused on understanding how dopamine might influence thinking and executive function.
- In July 2016, Stanford became the lead site for the **Pacific Udall Center: A Morris K Udall Center of Excellence in Parkinson's Research**, which is one of eight Centers funded by the NIH and the National Institute for Neurological Disease and Stroke (NINDS). Pathology Chairman Dr. Tom Montine and Dr. Kathleen Poston are leading the Stanford team. Together with University of Washington and Oregon Health Sciences University (OHSU), the Pacific Udall Center's mission is to understand the genetic contributions to Parkinson's disease memory problems and balance problems. If you are interested in learning more about participating in this study, contact Christine Blabe, MS at 650-721-5351 or [udallcenter@stanford.edu](mailto:udallcenter@stanford.edu).

If you would like to participate or want more information about research, contact Marian Shahid at (650) 723-0060 or [mshahid@stanford.edu](mailto:mshahid@stanford.edu).



## High Resolution Imaging Scans

A major focus for the Poston Lab is studying why some people with Parkinson's disease experience more memory problems than other people with Parkinson's disease. Over this past year, Dr. Poston, Dr. La, and Dr. Linortner have been using data from a specialized 7 Tesla MRI scanner to analyze detailed ultra-high resolution images of the hippocampus, a primary brain region responsible for the formation of memory. Specifically, the hippocampus is necessary to encode and recall the memory of life episodes, which is referred to as episodic memory. We have found that episodic memory difficulties are common in many people with Parkinson's disease. Our preliminary results suggest that thinning of a certain hippocampal sub-region (called CA1) where Parkinson's disease pathology can form, might be responsible for these difficulties with episodic memories.



If you would like to participate in this effort or want more information regarding this research, contact Marian Shahid at (650) 723-0060 or [mshahid@stanford.edu](mailto:mshahid@stanford.edu).

**Figure 1:** High Resolution Image of the Hippocampus from the 7-Tesla MRI scanner

## Stanford Brain Donation Program

Science has taught us that aging, dementia, and neurodegenerative disorders happen at the cellular level. While our research in diagnosing living participants is becoming more promising every day, Stanford investigators aim to use microscopic brain tissue analysis to learn more about brain disorders and improve our diagnostic ability. Autopsy and brain donation will help doctors move from a “best-guess” approach to that of concrete evidence-based diagnosis. Using this valuable information, we will be able to refine our approach to clinical diagnoses for future patients and families.

If you or a family member is interested in brain donation, please contact Christina Wyss-Coray at (650) 721-2409 or [ADRCstanford@stanford.edu](mailto:ADRCstanford@stanford.edu).

## Memory: Do I know what I know?

Memory problems sometime occur in people with Parkinson's disease, but they are often unrecognized until the problems become conspicuous. Episodic memory is the type of memory that pertains to recalling daily life events and experiences. This is an extremely critical aspect of our personality, since it records our daily experiences and defines our perspectives. For these reasons, episodic memory has become a major focus of our studies in people with Parkinson's disease.

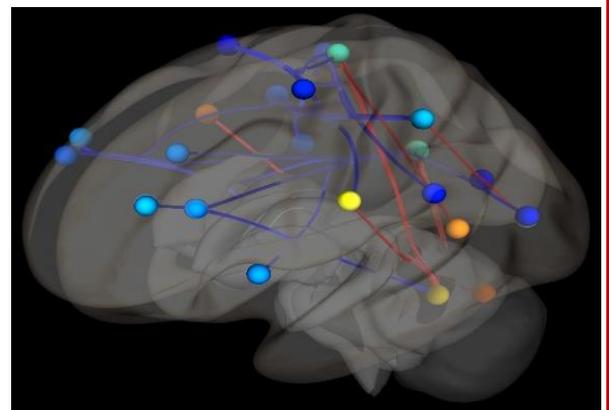
Poston Lab researchers Dr. Tanusree Das and Ms. Nessa Kim are investigating how episodic memory is affected in people with Parkinson's disease. Episodic memories are initially formed and stored in a region of our brain called the hippocampus. The hippocampus is very efficient in recognizing similarities between overlapping events, as well as detecting subtle differences between them. This function of the hippocampus helps us distinguish between similar or overlapping events and store them as distinctive memories. Thus, we can retrieve and remember the many unique experiences that have occurred over our lives.

We are using a specific kind of memory task on the computer that taps onto the memory system of brain that helps us distinguish between similar events as unique. Dr. Das and Ms. Kim are currently recruiting people with Parkinson's disease and people without Parkinson's disease for the study. We hope to benefit the entire Parkinson's community by understanding the exact nature of episodic memory in Parkinson's disease, and then to guide research towards the next step: finding ways to treat or prevent these memory changes.

## What can 10 minutes at rest tell us about brain networks?

Some of our research participants may be curious about the 10-minute MRI "Resting-State" scans (i.e. close your eyes and let your mind wander...). How restful can a brain be? Not for a single second. Even at rest various brain regions work together and are associated with different brain functions; we call these brain "networks". We can detect these brain networks using the MRI signal fluctuations during the 10-minute rest. We use this technique to understand different types of mind and memory changes that can be associated with Parkinson's disease. Recently, the Poston lab investigated the connection strengths among key brain regions from eight major brain networks. We found that the connections related to attention network were disrupted in people with Parkinson's disease. This finding is illustrated in the figure below (blue lines). On the contrary, red lines indicates enhanced connectivity between sensory and motor network and cerebellum. These findings can help us better understand the mind/memory and movement changes that can occur in people with Parkinson's disease.

**Figure 2:** Brain network connections in people with Parkinson's disease. Blue lines indicate weaker connectivity, and red lines mean stronger connectivity.



## Scientific Papers

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