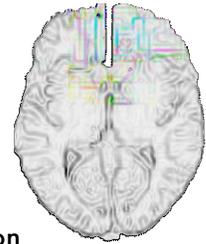


UNIVERSITY OF PENNSYLVANIA  
CENTER FOR COGNITIVE NEUROSCIENCE (CCN)



## DR. INGRID OLSON STUDIES OF MEMORY

Everyone has lapses of memory. It is common to forget people's names, the location of your car keys, or the title of the book you read last week. However some people have more pronounced failures of memory. People with anterograde amnesia have difficulty following the plot of television shows and movies because they cannot remember the storyline. They find newspaper articles confusing because they cannot remember what was written in the previous paragraph. In extreme cases amnesics appear to be mentally "stuck" in a particular point in time, usually shortly before some neurological sickness or brain trauma, unable to acquire any new information. Many cases of amnesia are due to brain damage suffered from head trauma, stroke, or encephalitis in which a part of the brain called the *hippocampus* is damaged.

Dr. Ingrid Olson is studying how the brain forms memories by testing people with anterograde amnesia. She has found that visual information, such as colors or faces, disappears from memory within a few seconds, when the hippocampus is damaged (*Journal of Cognitive Neuroscience, in press*). She has also found that when two things need to be remembered together, like a particular object and the location in which it sits, the hippocampus is especially needed (*Journal of Neuroscience, submitted for publication*).

Current research is examining the contributions of tissue surrounding the hippocampus, in a region called the *temporal pole*, to visual perception and visual memory. New findings by Dr. Olson indicate that the temporal pole may be involved in making fine visual discriminations.

## PERSONAL THANK YOU NOTES TO OUR PATIENTS

### **ELAINE WENCIL:**

*Thanks to all who have participated in the experiment in which you made judgments about the timing and size of circles. Looking at the data that you provided us so far, we are beginning to believe that judgments about different types of magnitudes (e.g., how far away your friend is standing or how long a song lasted) are processed independently in the brain. We presented these results at the Annual Meeting of the Cognitive Neuroscience Society in a poster titled, "Splitting the ATOM (a theory of magnitude): Associations and Dissociations".*

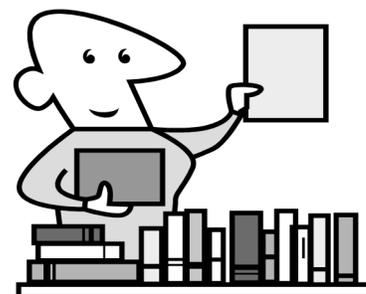
### **DR. CRIS HAMILTON:**

*I would like to thank all of you that have helped with my studies over the past year. Your work has contributed to studies that I will be presenting at conferences in the near future. Over the next few months, I plan to continue my work examining language and the processing of time. I'm sure I will see many of you then. Thanks again for your help!*

## SPOTLIGHT ON GRADUATE STUDENT RESEARCH

### MARINA BEDNY

An important step in understanding language is finding the meanings of the words we hear in our mental dictionary. One of the obstacles to understanding words is that almost all words have multiple meanings. To convince yourself that this is true try looking up a few words in the dictionary, and you will find that most words have many definitions. For example the seemingly simple word "line" has fourteen definitions in the Merriam-Webster dictionary! For example, you can draw a line on a piece of paper, but you can also stand in line to buy some milk. Out of all these meanings we have to pick the one that is appropriate in the current context. In one experiment we were interested in the neural mechanisms that allow us to find the right meaning of a word from all the different meanings stored in memory. We found that the left inferior frontal gyrus is important for understanding words in context.



Bedny, M., Hulbert, N. & Thompson-Schill, S. L. (2005). Contextual meaning selection during comprehension of homonymous and polysemous words. Poster presented at the Cognitive Neuroscience Society Annual Meeting, New York, NY.

Bedny, M., Hulbert, N. & Thompson-Schill, S. L. (in preparation) The role of the left inferior frontal gyrus in context dependent word comprehension.

~Marina is working toward her Ph.D. in Dr. Sharon Thompson-Schill's laboratory.

### PRIN AMORAPANTH

Hi, my name is Prin and I'm an M.D./Ph.D. candidate in Dr. Anjan Chatterjee's lab. The main project I'm working on is looking at which brain areas are necessary for processing spatial concepts, ranging from the type that we use to understand terms like "above" and "below" to those that support our ability to mentally rotate things. So far, we're finding that contrary to existing notions that the right side of the brain is dominant for spatial processing, the left hemisphere is also highly important, especially for processing categorical spatial relations of the type described by prepositions like "above" and "below." We're also finding the ability to access spatial concepts may depend on how they're being accessed (whether by words, sentences, or images).

A side research interest is how various neurological conditions affect artistic efforts; there is a growing body of literature that suggests that art often changes in interesting ways following various types of brain injury. If any of you reading this knows of or is an artist who has had their artistic output changed as a result of a neurological condition, I would be interested in hearing from you. Finally, I greatly appreciate everyone who has volunteered their time and effort for any of my studies! Thanks!



## WELCOME TO VISITING SCHOLAR, ALESSIA FOLEGATTI

My name is Alessia Folegatti, and I come from Italy, specifically from Turin, in the Northwest of Italy. I have a psychology degree and I am now a Ph.D. student in Neuroscience. I spent one year in a Rehabilitation Clinic in Italy, where my work consisted of evaluating cognitive impairment and rehabilitation in patients with strokes or other neurological damage. After that I conducted studies in collaboration with a research group at the University of Turin.

My research deals with the cognitive outcomes of cerebral lesions, in particular right brain damage, which often leads to problems in directing attention toward the side that is contralateral to the lesion, that is to the left side of space. This problem is technically called "neglect", because patients neglect, or do not pay attention, to the contralateral field .

Now I am in Philadelphia as a visiting scholar for several months to work in Dr. Anjan Chatterjee's lab. I am presently working on an experiment which tests the hypothesis that space and time are in some way related and coded in the same brain areas. For this purpose I am studying the performance of neglect patients in tasks that involve the processing of time and size. This makes it possible to reveal if time and size are processed in the same way in the spared visual field and in the affected field.

## DR. LESLEY FELLOWS

On-going research has been examining the functions of the frontal lobes in decision-making, and (separately) in emotional experience and control of emotional reactions. One paper has recently been published:

Fellows LK (2006) Deciding how to decide: Ventromedial frontal lobe damage affects information acquisition in multi-attribute decision making. *Brain*, epub Feb 2  
<http://brain.oxfordjournals.org/cgi/reprint/awl017?ijkey=M0lio5pGpmBTjcx&keytype=ref>.

Gillihan, SJ, AS Heberlein, AA Padon, MJ Farah, LK Fellows. Emotion and PFC: I. Neural substrates of emotional reactivity and regulation. Submitted for publication.

Heberlein, AS, SJ Gillihan, AA Padon, MJ Farah, LK Fellows. Emotion and PFC: II. Prefrontal contributions to facial emotion recognition. Submitted for publication.

Three abstracts/posters were presented at the 2006 Cognitive Neuroscience Society meeting:

Xia, C, AA Padon, SJ Gillihan, AS Heberlein, MJ Farah, LK Fellows. Damage to ventromedial frontal lobe alters affective experience in everyday life. Cognitive Neuroscience Society meeting, April 2006, San Francisco.

Simioni, A, LK Fellows. Ventromedial frontal lobe damage leads to impaired decision making under certainty. Cognitive Neuroscience Society meeting, April 2006, San Francisco.

Wheeler EZ, W Schneider, MJ Farah, LK Fellows. Ventromedial prefrontal damage impairs learning from punishment but not reward. Cognitive Neuroscience Society meeting, April 2006, San Francisco.

As well, we have on-going studies looking at how frontal lobe injury might have different effects on flexible learning, responding, and short-term memory, depending on the exact site of damage, and an up-coming study of whether certain kinds of brain injury might affect the ability to detect and react to mistakes.

Thanks again to all participants, and their families, for their past, present and future contributions to these research projects!

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#### FACULTY DIRECTORS

Anjan Chatterjee, M.D.

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Martha Farah, Ph.D.

Sharon L. Thompson-Schill, Ph.D.

## DATABASE SYSTEM FOR PATIENT-BASED NEUROSCIENCE RESEARCH

### DR. DANIEL KIMBERG

This year, we began a new project to develop improved analysis techniques for studies of patients with brain injuries. We expect these new methods to improve our ability to pinpoint the critical brain regions for different cognitive functions, and to maximize the scientific benefit we get from patient data. This project also supports the database program directly, and will eventually improve our ability to match researchers and interested participants.

~Dr. Kimberg is affiliated with the University of Pennsylvania Center for Functional Neuroimaging, and he was awarded an NIH grant which will help support the continued development of our patient database.

## ARTISTIC EXPRESSION AND BRAIN INJURY

### DR. ANJAN CHATTERJEE

Dr. Chatterjee was an invited speaker at a presentation entitled "Alzheimer's Disease: Neurology and the Visual Artist." The lecture was part of an exhibit, "The Later Works of William Utermohlen," presented at the College of Physicians of Philadelphia (the exhibit is on from February 22-April 30, 2006). Dr. Chatterjee's research interests include changes in visual representation that can occur as a result of brain injury or disease.



## WE NEED VOLUNTEERS

Non brain-injured subjects are needed for our research studies. These individuals are often the spouses and caregivers of our patients. Subjects receive the same tests as our patients, and they help to establish a baseline for how non brain-injured individuals perform on the same tasks. Payment for participation is \$15 per hour plus mileage and parking.

Contact us at [215-615-3649](tel:215-615-3649) for more information.

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For More Information:  
Marianna Stark, Ph.D.,  
Patient Coordinator

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