



THIRTY-SIX ANNUAL
WINTER CONFERENCE
ON
THE NEUROBIOLOGY
OF LEARNING & MEMORY
AT PARK CITY



January 4-7, 2012
Park City Marriott Hotel
Park City, Utah

REGISTRATION FEE: \$200.00 for regular participants - Payable at registration on Wednesday, January 4th, from 3:00-4:00 pm in the hall outside of Ballroom 1 at the Park City Marriott Hotel. There is a reduced fee of \$100.00 for graduate students and postdoctoral fellows. Banquet on Saturday, January 7th. The banquet will cost \$40.00 per person. The Pizza Party will be free for participants and guests. Rooms for the Marriott hotel are based on a single rate for \$199 or double rate for \$199. **If you plan to stay at the Marriott Hotel, they can be contacted directly at (800) 234-9003 if you have any problems making the reservation. Please make your reservation by Nov 15 and request a room booked by the neurobiology of learning and memory conference for the rate of \$199.00 per night. In order to avoid paying higher prices for the hotel room, please make the reservation before November 15. Furthermore, we have booked a certain set of rooms and if they are not reserved by November 15, the conference will have to pay for the rooms, resulting in higher conference registration costs in the future.**

BACKGROUND INFORMATION: The Thirty-Sixth Annual Neurobiology of Learning and Memory Conference is organized by Robert Berman and Michael Ragozzino in conjunction with Paul Gold, Raymond Kesner, Sheri Mizumori, Aryeh Routtenberg, Os Steward, and Wendy Suzuki, and is supported in part by the Department of Psychology, University of Utah. The sessions are organized so that one-half of the time will be available for discussion. There will be time-keepers who will make certain that the formal presentations do not extend beyond the allotted time. Furthermore, we will strongly encourage a limit of 5-7 slides and suggest that the first slide summarizes the "take home message".

Material presented at this meeting should not be cited in bibliographies. It should be treated as personal communication and should be cited as such only with consent of the author. For Data Blitz session (only), please give the title, presenter, and ppt slide (no more than one slide) to Donna Korol and Rebecca Burwell. If you would like to present at this session please send an email to either Donna(dkorol@illinois.edu) or Rebecca (Rebecca.burwell@brown.edu) with the title of your presentation by December 1, 2011. A projector for power point slides presentations will be available.

TRANSPORTATION:

Transportation from Salt Lake City International Airport to Park City (approximately 40 miles) is available in all forms: bus, limousine, cab, rental car, etc. Park City Marriott Hotel provides a courtesy shuttle bus during peak periods to the ski area and downtown Park City. The fare is free and times vary with demand. Inquire at the hotel desk for further information. Park City offers a ski shuttle service from the ski area to area hotels. The fare is free and the shuttle departs the ski area on the hour and every 20 minutes with the exception of no run at 2:00 pm. Park City Marriott Hotel also provides for discount tickets for the three ski resorts in Park City.

If desired, ski rental and ski repair (e.g. waxing, tuning, and sharpening) are available at the hotel.

WEDNESDAY, JANUARY 4

Session 1: Dave Olton Data Blitz

Registration: 3:00 – 4:00 pm
Time: 4:00 - 6:30 pm
Location: TBA

Moderators: The session will be co-organized by Donna Korol and Rebecca Burwell. If you would like to present at this session please send an email to either Donna (dkorol@illinois.edu) or Rebecca (Rebecca.burwell@brown.edu) with the title of your presentation.

Overview: Presentation limited to 5 minutes, including any discussion. Limit of one slide.

PIZZA PARTY: 6:30-8:00 pm

Location: Atrium

Session 2: Autobiographical memory: What's it like with, without, and with a lot of it?

Time: 8:00-10:00 pm
Location: TBA

Organizer: James L. McGaugh

Abstract:

This session will discuss autobiographical memory assessed in normal adults, subjects who do not have autobiographical memory and subjects who have highly superior autobiographical memory. Recent fMRI findings indicate that different brain regions, including the lateral and medial pre-frontal cortex, hippocampus, and amygdala are involved in different aspects of retrieving and recollecting autobiographical memories. Subjects who lack autobiographical memory fail to activate the brain regions typically activated during autobiographical memory. Findings of investigation of subjects who have highly superior autobiographical memory will be discussed in the context of the MRI findings.

Speakers:

Roberto Cabeza
Duke University
Dissecting autobiographical memory using fMRI

Brian Levine
University of Toronto
Individual differences in autobiographical memory

James L. McGaugh
University of California-Irvine
Highly superior autobiographical memory

THURSDAY, JANUARY 5

Session 3: Computational and behavioral perspectives on pattern separation in the dentate gyrus

Time: 4:00-6:00 pm
Location: TBA

Organizer: Andrea Chiba (University of California-San Diego)

Abstract:

Pattern separation refers to a process by which overlapping inputs become

segregated outputs. Historically, pattern separation was proposed as a way of increasing the storage capacity of a memory system, indicating that storage and retrieval were made more effective if the stored patterns contained minimal overlap. The neural architecture of the dentate gyrus and its projections to CA3 serve as the bases for numerous computational models crediting the dentate gyrus of the hippocampus with the function of pattern separation. Subsequently, behavioral and neural studies, in both rats and humans, demonstrated a role for the dentate gyrus in resolving subtle differences in visual and spatial patterns. There has been a recent upsurge in the number of papers written about pattern separation, indicating a growing interest in the way the brain might achieve this process towards the service of more efficient memory.

Speakers:

Brad Aimone

The Salk Institute

Pattern separation or pattern resolution? Computational and behavioral approaches to addressing the functional role of the dentate gyrus

Janet Wiles

University of Queensland, Australia

A computational model indicating a role for newborn in pattern separation at longer timescales

Ray Kesner

University of Utah

Spatial pattern separation and the dentate gyrus

Scott Small

Columbia University

The role of the human dentate gyrus in visual pattern separation

Dinner: Check out the new eateries in town.
6:00-8:00 pm

Session 4: **The diversity of “epigenetic” mechanisms in learning and memory processes**

Time: 8:00-10:00 pm

Location: TBA

Organizer: Marcelo Wood

Abstract:

The term epigenetic is currently defined, in its most encompassing form, as changes in gene expression that are not brought about by changes in DNA sequence. This is a broad definition and one that represents numerous molecular mechanisms including DNA methylation, histone modification, nucleosome remodeling, and even miRNAs. These mechanisms are exciting to study because they provide transient and potentially stable marks in the service of activating and/or maintaining transcriptional processes, which in turn may underlie long-lasting and persistent changes in behavior. In the past 5 years, there has been a dramatic increase in our understanding of some of these mechanisms, like DNA methylation and histone modification, and how they relate to the regulation of gene expression required for memory processes. Two speakers, Dr. Courtney Miller and Dr. Andre Fischer, will present new findings from their studies aimed at understanding the roles of DNA methylation and histone modification in systems consolidation and long-term memory in the aging brain. Currently, there is no study examining the role of nucleosome remodeling (which works hand in hand with histone modification) in learning and memory, and very little known about the function of miRNAs in memory processes. The other two speakers in this session, Dr. Marcelo Wood and Dr. Tim Bredy, will present new findings from their studies demonstrating a critical role for the nucleosome remodeling BAF complex and miRNA function in long-term memory, respectively. Together, these new findings will reveal the diversity of epigenetic mechanisms involved in memory and begin to demonstrate how they may be working in a concerted effort to help us form long-term memories.

Speakers:

Marcelo Wood

University of California-Irvine

Nucleosome remodeling: A missing link in our understanding of epigenetic mechanisms involved in long-term memory

Tim Bredy

University of Queensland, Australia

MicroRNA regulation of neuronal plasticity and memory

Andre Fischer

European Neuroscience Institute, Goettingen, Germany
Epigenetic signatures of neuropsychiatric diseases

Courtney Miller
Scripps Research Institute, Florida
Targeting epigenetic mechanism to prevent memory-induced relapse to methamphetamine seeking

FRIDAY, JANUARY 6

Session 5: Hippocampal theta and memory from rodent eye blink to human cognition

Time: 4:00-6:00 pm

Location: TBA

Organizer: Neil McNaughton

Abstract:

There is ever increasing evidence that hippocampal “theta” (i.e. neural rhythmicity in the 4-14Hz range, potentially including the official alpha band in humans) is not an epiphenomenon but, instead, is important for the execution of functions mediated by the hippocampus. This symposium will explore the function of theta and its relation to memory processing. “Memory processing”, here, reflects the uncertainties that still exist as to the core functions of the hippocampus itself. We will look at evidence that spans animal work on simple eye-blink conditioning, the effects of manipulating local field potentials on spatial learning, and the activity of grid cells in the entorhinal cortex, and extends to depth recording from the human hippocampus. A fundamental question that we hope our audience will help us answer is: across this spread of species and paradigms, can we discern a common computational or psychological function for theta?

Speakers:

Arne Ekstrom
University of California-Davis
Overview of theta oscillations and memory

Stephen Berry
Miami University

Hippocampal theta-based coordination of a distributed network for trace eyeblink conditioning

Neil McNaughton
University of Otago, New Zealand
Does theta function require fine tuning?

Mark Brandon
Boston University
Theta oscillations and grid cells

Andrew Watrous
University of California-Davis
Behavioral correlates of human hippocampal theta as revealed by intracranial recordings

Dinner: Check out the new eateries in town!
6:00-8:00 pm

Session 6: The role of frontal-striatal systems in uncertainty and decision-making

Time: 8:00-10:00 pm

Location: TBA

Organizer: Mike Ragozzino, University of Illinois

Abstract:

We are continuously confronted with choices associated with risk where uncertain outcomes can yield gains or losses relative to options without risk. Rather than choose according to purely rational expectations, humans and animals often display biases in judgment – either preferring or avoiding risky outcomes. In either case, these biases can lead to suboptimal choices in which assuming excess risk – or not enough- leads to loss. The circuitry of the prefrontal cortex and striatum are widely implicated as critical for the evaluation of stimuli that predict reward, directing behavior to obtain reward, and processing rewards and losses. This session will focus on the neural basis for evaluating risky outcomes and guiding choice behavior. Jamie Roitman (University of Illinois at Chicago) will present neurophysiological studies in behaving rats to test value coding in prefrontal neurons for probabilistic rewards in individuals with different risk-preference. Next, Jon Wallis (University of California, Berkeley) will discuss how uncertain payoffs and costs are represented in non-human primate prefrontal cortex. Finally, Steve

Stanton (Duke University) will discuss the effect of steroid hormones on the evaluation of risk in decisions in humans.

Speakers:

Jamie Roitman
University of Illinois at Chicago
Encoding of risk-preference in cortico-striatal circuitry

Jon Wallis
University of California-Berkeley
Multiple reward signals in prefrontal cortex

Steve Stanton
Duke University
Influence of steroid hormones on evaluation of risk in decisions

SATURDAY, JANUARY 7

Session 7: Exploring interregional dynamics of memory systems across species and levels

Time: 4:00-6:30 pm
Location: TBA

Organizers: Michael Yassa

Abstract:

Over the last several decades it has become clear that learning and memory represents a categorically diverse set of processes, such as emotional learning and declarative memory. Great strides have been made localizing these different types of learning and memory processes to specific regions of the brain, such as the amygdala and the hippocampus, and in identifying behavioral tasks particularly dependent upon these brain regions, such as fear conditioning and the Morris water maze. Current approaches to broadening our understanding of these learning and memory processes have recognized that individual brain regions do not act in isolation, rather networks of regions act together to form memory systems. More recently, technological approaches and analytical tools have been developed in order to study the

functional interactions of multiple brain regions using a variety of measures of correlated activity, sometimes referred to as "functional connectivity". In this session the speakers will (1) discuss a theoretical framework motivating studies of interregional dynamics in rats and humans highlighting the complementary advantages, (2) briefly cover the methodological and analytic techniques used to explore interregional dynamics and, (3) present empirical evidence in support of interregional dynamics as a fundamental neurobiological substrate of learning and memory.

Primary Objectives: (1) To explore the use of *interregional coupling* in human and non-human animal models as a fundamental neurobiological substrate for learning and memory. (2) To emphasize and encourage communication between the disciplines and set the stage for *future integrative studies* towards a more complete understanding of learning and memory.

Speakers:

Michael Yassa
Johns Hopkins University
Understanding functional correlations across species and approaches

Aaron Mattfeld
University of California-Irvine
Assessing functional interactions with the Medial Temporal Lobe during learning and memory

Arne Ekstrom,
University of California-Davis
Representations of spatio-temporal context in human memory: Inspiration and divergence from rodent models

Michael Yassa
Johns Hopkins University
Understanding functional correlations across species and approaches

Timothy A. Allen
University of California-Irvine
A hippocampal-prefrontal cortical system underlies non-spatial sequence memory

Business Meeting:

Time: 7:00-7:15 pm
Location: Silver Mine A & B

Banquet

Time: 7:30-11:00 pm
Location: Grand Ballroom 1-2

SOCIAL ACTIVITIES:

DINNER

January 7th - *Pizza Party - For registrants or guests,
no extra cost.*

January 8th - *Dinner (on your own)*

January 9th - *Dinner (on your own)*

January 10th - *Banquet – \$40.00 for registrants and guests*

Cash Bar: *Saturday, Sunday & Monday Evening*

Time: *10:00 pm-12:00 am*

Location: *Timbers*

