



Sleep for Science

Brown University

Bradley Hospital

William C. Dement
Sleep and Chronobiology Behavioral
Science Research Apprenticeship

Retreat Colloquium

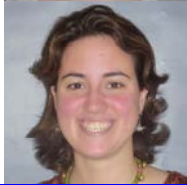
20-22 August 2003

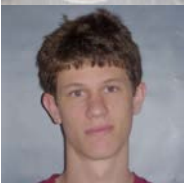
Whispering Pines Conference Center
URI Alton-Jones Campus
West Greenwich, RI

Wednesday	Event	Speaker	Topic
1200	Lunch		
1315		Kenneth P. Wright, Ph.D., Young Investigator	Sleep loss, Circadian Misalignment, and Human Performance
1430	Break		
1500		Danielle Delosh	Autism and Sleep Neurobiological Connections
1515		Daniel Reiness	The Effects of Cocaine and Nicotine on Sleep During Use and Abstinence
1530		Angela Scott	REM Sleep in Alzheimer's and Parkinson's Patients
1545		Arlene Chung	Sleep and Insulin Resistance
1600	Break		
1615		Jennifer Choi	The Use of ERPs in Sleep Research
1630		Adrijana Koscec	Circadian Rhythms, Sleep, and Accidents

Wednesday	Event	Speaker	Topic
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1645		Libby Vo	Characteristics of REM Behavior Disorder in Post Traumatic Stress Disorder and EMDR As A Proposed Alternative Treatment
1700		Stephanie Crowley	Changes in Circadian Rhythms Across Tanner Stages
1715	Hors d'oeuvres		
1800	Dinner		
1930	Special "Guest"		

Thursday	Event	Speaker	Topic
0800	Breakfast		
0915		Elizabeth Klerman, M.D., Ph.D., Young Investigator	Impact of Sleep Deprivation on Menstrual Cycle Dynamics
1030	Break		
1045		Laura Wagner	Circadian Rhythms and Sleep In Migratory Birds
1100		Lalin Anik	Sleep, Cortisol Levels and Weight Gain
Thursday	Event	Speaker	Topic

1115		Pamela Dubyak	Cognitive Behavioral Therapy (CBT) and Insomnia
1130		Nick Cardé	Sleep Disturbances as a Biological Marker for Depression
1145		Dane Holderman	The Controversy over Co-Sleeping and Sudden Infant Death Syndrome
1200	Lunch		
1330		Jeff Noble	The Slippery Path from Insomnia to Depression
1345		Alan Gordon	REM Dreams and Procedural Memory
1400		David Rector, Ph.D., Young Investigator	Scattered Light, Sherrington, and Sleep
1530		All	“Walk in the Woods”
1630	Fun & Games	All	Team tasks!
1800	Dinner		
1930	FUN NIGHT		

Friday	Event	Speaker	Topic
0800	Breakfast		
0915		Pamela V. Thacher, Ph.D., Young Investigator	Ganging up on the Frontal Lobes: Learning Under Conditions of Sleep Deprivation during the Subjective Night
1030	Break		
1045		Monique K. LeBourgeois, Ph.D., Postdoctoral Fellow	Racial Differences in the Distribution of Sleep in Children
1100		Tracy L. Rupp, Brown Graduate Student	An Evolutionary Perspective on Sleep in Birds
1115		Eliza Van Reen	Cardiovascular Function and the Brain in the Sudden Infant Death Syndrome
1130		Mary A. Carskadon	Farewell
1200	Lunch		

Young Investigator Presentations

Kenneth P. Wright, Ph.D., Assistant Professor, Integrative Physiology Department, University of Colorado, Boulder, Colorado

Sleep loss, Circadian Misalignment, and Human Performance

In today's 24-hour society, sleepiness and fatigue impair human performance regardless people's level of motivation, intelligence, education, aptitude or occupation. The topic for this discussion will focus on sleep homeostasis and internal circadian time as biological determinants of human performance. Integrative research studies that examined the physiology of sleepiness and its effects on human performance will be presented. Implications of sleepiness for job productivity, public health and safety will be discussed.

Elizabeth Klerman, M.D., Ph.D., Assistant Professor of Medicine, Harvard Medical School, Boston, Massachusetts

Impact of Sleep Deprivation on Menstrual Cycle Dynamics

Millions of adults work a variable schedule that includes both day and night shifts. Shift-work and night-work schedules are associated with irregular menses, increased early miscarriage, and decreased fertility. It has been assumed that the stress associated with these work schedules is responsible for these reproductive abnormalities. However, it is known that the frequency of GnRH secretion is dynamically modulated across the menstrual cycle in normal women, that this modulation is critical for normal reproductive cycles, and that at specific times in the menstrual cycle sleep is a profound regulator of the frequency of GnRH secretion. We hypothesize that the disruptions in sleep that accompany rotating shift- and night-work schedules contribute to the associated reproductive abnormalities, and that there are specific times in the menstrual cycle at which hormonal regulation is particularly susceptible to this sleep disruption. The protocol and preliminary results from studies testing these hypotheses will be presented.

**David M. Rector, Ph.D., Assistant Professor, Department of
Veterinary Comparative Anatomy, Physiology, and Pharmacology,
College of Veterinary Medicine, Washington State University,
Pullman, Washington**

Scattered Light, Sherrington, and Sleep

The study of complex oscillatory patterns within intact neural tissue defies most existing techniques in neurobiology. Thus, one of the major challenges in neuroscience is to develop new neurophysiological procedures for imaging the electrical and chemical correlates of activity from large numbers of individual cells in the brain simultaneously. Since nerve cells swell during activation, and change their light scattering properties very quickly, we have developed novel high-speed electronic systems to make movies of neural activity non-invasively using light and detecting changes in the back-scattered light from neural tissue. Sherrington was the first to describe the brain as a constellation of lights, we may be able to use this idea to image brain activity in three dimensions. We are also developing high-density electrode arrays to record the electrical potentials generated by the brain from 256 or more locations simultaneously. Initially, we are using this technology to study the plasticity of local neural groups within the brain and their oscillatory activity during different behavioral states such as sensory processing and sleep. Over the past year, we have developed a rat animal model for sleep during different types of sensory stimulation including whisker somatosensory and auditory tones and clicks. Unfortunately, precise whisker stimulation requires that rats be restrained for long time periods. Thus, we have been exploring different training procedures that will allow long term (up to 2 hours) sleep recordings while animals are restrained. We have established a set of observable parameters that allows us to assess sleep state based on the characteristics of the evoked responses to whisker and auditory stimulation. Periodic fluctuations in the evoked response amplitude, which is different across different neural groups, support the hypothesis that neural groups can fluctuate in and out of sleep-like states independently of organism sleep state.

**Pamela V. Thacher, Ph.D., Assistant Professor, Department of
Psychology, St. Lawrence University**

Ganging up on the Frontal Lobes: Learning Under Conditions of Sleep Deprivation during the Subjective Night

The frontal lobes of the brain are most active during tasks of sustained attention and strategic planning, referred to as “executive function.” These tasks feel more difficult when we are sleep-deprived, and yet the effects of sleep deprivation on executive functions can be difficult to detect. By asking subjects to perform both during the subjective night and under conditions of sleep deprivation, we hoped to uncover reliable signs of frontal lobe deficits. Our data showed that these conditions do lead to problems with executive functions and with learning. Many people commonly use sleep restriction in order to use the night time hours to study for or learn specific tasks; our findings may have implications for the limitations of such a strategy.

2003 William C. Dement Fellows

Lalin Anik

Rising sophomore, Brandeis University

Nick Cardé

2003 graduate, University of Arizona

Jennifer Choi

Rising senior, SUNY Stony Brook

Arlene Chung

Rising sophomore, Brown University

Stephanie Crowley

Entering graduate student, Department
of Psychology, Brown University

Danielle Delosh

Rising senior, SUNY Stony Brook

Pamela Dubyak

Rising senior, Brown University

Alan Gordon

Rising sophomore, Brown University

Dane Holderman

Rising senior, University of Arizona

Adrijana Koscec

Psychology graduate student, Institute
for Medical Research and
Occupational Health, Zagreb, Croatia

Jeff Noble

Rising junior, Brown University

Daniel Reiness

Rising senior, Connecticut College

Angela Scott

Rising senior, Tougaloo College

Libby Vo

Rising senior, College of the Holy Cross

Laura Wagner

Rising junior, Brown University

2003 William C. Dement Fellows

APPRENTICESHIP FACULTY

Brown Medical School, Department of Psychiatry and Human Behavior

Christine Acebo, Ph.D.
J. Todd Arnedt, Ph.D.
Mary A. Carskadon, Ph.D., Apprenticeship
Director
Gahan Fallone, Ph.D., Associate
Apprenticeship Director
Ron Seifer, Ph.D.

University of Washington, School of Nursing

Susan E. Labyak, R.N., Ph.D.

Valencia College, Department of Speech and Communication

Kathleen Perri

TEACHING ASSISTANT

Brown University, Department of Psychology

Tracy Rupp

CONSULTING PHYSICIANS

Brown Medical School, Department of Pediatrics

Elizabeth Forbes, M.D.
Judith Owens, M.D.

Other

Oskar Jenni, M.D.
Sonia Jenni, M.D.

E.P. BRADLEY HOSPITAL SLEEP LABORATORY, RESEARCH FELLOWS AND STAFF

Noah Andrews, Research Technologist
Kevin Beach, Research Assistant
David Bushnell, Research Assistant
Marcy D'Uva, Research Technologist
Patrick Dwyer, Research Assistant
Max Elliott, Administrative Secretary
Kristen Fortin, Research Technologist
Janet Foster, Research & Data Assistant
Oskar Jenni, M.D., Postdoctoral Research
Fellow
Erin Kelleher, Research Assistant
Thierry Lagman, Research Technologist
Monique LeBourgeois, Ph.D., Postdoctoral
Research Fellow
Jennifer Maxwell, Data Coordinator
Dawn Roux, Research Assistant
Leah Schweid, Student Data Assistant
Eli Sørensen, M.D., Ph.D., Postdoctoral
Research Fellow
Nicole Spanakis, Research Technologist
Suni Sun, Laboratory Coordinator
Lori Swanton, Office Assistant
Daniel Taylor, Ph.D., Psychology Intern
Amy R. Wolfson, Ph.D., Research
Collaborator
Eliza Van Reen, Research Technologist

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